

Jun Hyuk Lee | Curriculum Vitae

Master's Student, Seoul National University – Seoul, Republic of Korea

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Research Summary

My research goal is to build a **digital clone of the human motor controller**. Realizing this would let us understand the principles of human motor control on a scientific level, and apply that understanding to surgical support, rehabilitation, performance augmentation, and controller design for exoskeletons and any other systems that physically interact with the human body. My work spans classical mathematical modeling, reinforcement-learning-based musculoskeletal simulation, and hands-on biomechanics experiments, grounded in neuroscience and physiology.

Research Interests

Neuromuscular Control, Musculoskeletal Simulation, Biomechanics, Artificial Intelligence, Reinforcement Learning, Nonlinear Dynamics, Human Pose Estimation.

Education

Seoul National University (Graduated Cum Laude)

Bachelor of Sports Science

Bachelor of Science in Artificial Intelligence

Seoul, Republic of Korea

Mar 2018 – Aug 2023

Academic Experience

Sports Engineering Lab, Seoul National University

Master's Student

Advisor: Prof. Jooeun Ahn, [[Homepage](#)]

Seoul, Republic of Korea

Sep 2025 – Present

NeuMove Lab, Northeastern University

Visiting Master's Student

Advisor: Prof. Seungmoon Song, [[Homepage](#)]

Boston, USA

Jul 2025 – Aug 2025

Sports Engineering Lab, Seoul National University

Undergraduate Researcher

Advisor: Prof. Jooeun Ahn

Seoul, Republic of Korea

Jul 2020 – Aug 2023

Publications

Peer-reviewed Journal Articles

- **Lee JH**, Park I, Ahn J. "Noise-robust estimation of the maximal Lyapunov exponent based on state space reconstruction with principal components." *Chaos, Solitons & Fractals*. 2023 Sep 1;174:113916. [[Read Full Paper](#)]
- Park I, **Lee JH**, Ahn J. "Effects of the kinematic variable, time delay and data length on test-retest reliability of the maximal Lyapunov exponent of human walking." *Royal Society Open Science*. 2024 Oct 9;11(10):240333. [[Read Full Paper](#)]
- Joung HJ, Panday SB, **Lee JH**, Ahn J, Park MS. "Sex-Specific Variance in Gait Biomechanics: Machine Learning-Based Feature Prioritization for Personalized Assessment." *Sex- and Gender-Specific Biomedicine*. 2026;1(1):64–73. [[Read Full Paper](#)]

Conference Presentations

- **Lee JH**, Ahn J. "Promoting Efficient Exploration in Predictive Musculoskeletal Simulation by Adopting a Stretch Reflex System." *10th World Congress of Biomechanics (WCB 2026)*, Vancouver, Canada, Jul 2026. (Poster Presentation)

Work Experience

Republic of Korea Navy

AI Development Specialist

As the Republic of Korea's first AI Development Specialist, applied large language model fine-tuning, video object detection, speech recognition (ASR), and text-to-speech (TTS) to national defense.

NCSOFT (Korea's top 3 gaming company)

Intern, Recognition team, Vision AI Lab

Developed a tool that generates realistic human face images with controllable expressions to address the data imbalance in facial-expression recognition training.

Quve Seventeen

AI Engineer, AI team

Developed an algorithm to reconstruct a patient's 3D oral structure from CT scans alone, compressing the traditional month-long dental workflow into a single day.

Gyeryong, Republic of Korea

Sep 2023 – May 2025

Seongnam, Republic of Korea

Jan 2023 – Feb 2023

Seoul, Republic of Korea

Oct 2021 – Feb 2022

Skills

Experimental Skills:

- Motion Capture System: Qualisys, Optitrack, Xsens
- Force Plate & Instrumented Treadmill: Bertec, AMTI
- Electromyography: Delsys
- Wearable Metabolic System: COSMED

Numerical Analysis Skills:

- Programming: Python, MATLAB
- Musculoskeletal Simulation Software: SCONE (HyFyDy), OpenSim, OpenSim Moco, Visual3D
- Document Formatting: LaTeX

Programming & Development Skills:

- Language: Python, C++, C, Java, JavaScript, HTML, CSS
- Environment: Linux CLI, Git, Docker, SSH, Neovim

Media Coverage

My undergraduate research publication in *Chaos, Solitons & Fractals* was featured by several Korean news outlets:

- *The Chosun Ilbo*, "Physics and Mathematics Research by Seoul National University Students Published in the World's Top Journal." Aug 2023. [\[Link\]](#)
- *Sonyeon Chosun Ilbo*. Sep 2023. [\[Link\]](#)
- *Kyunghyang Shinmun*. Aug 2023. [\[Link\]](#)
- *Sports Khan*. Aug 2023. [\[Link\]](#)
- *Segye Ilbo*. Sep 2023. [\[Link\]](#)

Extracurricular Activities

Seoul National University Ice Hockey Team Capitals

Founder & Inaugural Captain

Sep 2018 – Aug 2023

On The Sports (Korea's only professional ice hockey broadcasting team)

Broadcasting team member

Aug 2018 – Aug 2023

Seoul National University Middle School

Student Teacher

May 2023 – Jun 2023

Daemyung Killer Whales (Professional ice hockey team in Korea)

Marketer

Jul 2018 – Mar 2019

English Proficiency

TOEFL (iBT): MyBest Score: **100** (As of Sep 18, 2024)

Reading: 28 Listening: 25 Speaking: 23 Writing: 24

References

Prof. Jooeun Ahn

Professor, Department of Kinesiology, Seoul National University

Seoul, Republic of Korea

Email: ahnjooeun@snu.ac.kr

Profiles: [SNU Personal Page](#) | [Lab Homepage](#) | [Google Scholar](#)

Prof. Seungmoon Song

Assistant Professor, Department of Mechanical and Industrial Engineering, Northeastern University

Boston, USA

Email: s.song@northeastern.edu

Profiles: [Personal Homepage](#) | [NeuMove Lab](#) | [Google Scholar](#)

Prof. Prabhat Pathak

Assistant Professor, Department of Sports Sciences, SeoulTech

Seoul, Republic of Korea

Email: prabhat@seoultech.ac.kr

Profiles: [Google Scholar](#)

Prof. Beom Chan Lee

Associate Professor, Department of Health and Human Performance, University of Houston

Houston, USA

Email: blee24@central.uh.edu

Profiles: [UH Personal Page](#) | [Google Scholar](#)

Prof. Siddhartha Bikram Panday

Associate Professor, Department of Sports Industry and Science, Hanyang University

Seoul, Republic of Korea

Email: siddhartha@hanyang.ac.kr

Profiles: [Lab Homepage](#) | [Google Scholar](#)