Hyeong Jun Lee

School of Mechanical Engineering
Yonsei University
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PERSONAL DATA

- Birth: 4th Dec, 1996, in Republic of Korea
- Nationality: Korean
- Family Status: Single
- Language: First language Korean, Good in English

EDUCATION

Mar. 2020 ~ Present	**Yonsei University** College of Mechanical Engineering *Ph.D. Student* *Advisor: Prof. Joon Sang Lee*	Seoul, Korea
Mar. 2016 ~ Feb. 2020	**Pusan National University** Department of Mechanical Engineering *Bachelor of Engineering*	Seoul, Korea

RESEARCH INTEREST

- **Computational Fluid Dynamics in Cardiovascular Domain**
  - ✓ Lattice Boltzmann method
  - ✓ Coronary Artery Disease
  - ✓ Tricuspid Valve Regurgitation

- **Machine Learning for Cardiovascular Risk Prediction**
  - ✓ Fractional Flow Reserve (FFR) Prediction
  - ✓ Flow Field Prediction of Coronary Artery

- **Photoplethysmography(PPG)-based Hemodynamic Diagnostics**
  - ✓ Real-time Blood Pressure and Blood Viscosity Predictions

PUBLICATIONS (SCI ONLY)

1. **H.J. Lee**†, Y.W. Kim, S.Y. Shin, S.L. Lee, C.H. Kim, K.S. Chung*, J.S. Lee*, " A Physics-Integrated Deep Learning Approach for Patient-Specific Non-Newtonian Blood Viscosity Assessment using PPG" *Computer Methods and Programs in Biomedicine*, Volume 265, June 2025, 108740
2. **H.J. Lee**†, Y.W. Kim†, J.H. Kim, Y.J. Lee, J.S. Moon, Peter Jeong, J.H. Jeong, J.S. Kim*, J.S. Lee*, "Optimization of FFR prediction algorithm for gray zone by hemodynamic features with synthetic model and

biometric data" *Computer Methods and Programs in Biomedicine*, Volume 220, June 2022, 106827

3. Y.W. Kim†, **H.J. Lee**, S.J. Jung, J.H. Kim*, J.S. Lee*, "Optimization of tricuspid membrane mechanism for effectiveness and leaflet longevity through hemodynamic analysis" *Engineering Applications of Computational Fluid Mechanics*, Volume 16(1), July 2022, 1587-1600

PATENTS

1. J. S. Lee, **H. J. Lee**, "Non-Newtonian fluid viscosity modeling of patient blood using wearable device-based PPG and biometric information"

   Korea - Application No. 10-2024-0026709

2. J. S. Lee, **H. J. Lee**, "An algorithm that collects PPG and biometric information from wearable devices and analyzes it to predict systolic and diastolic viscosity"

   Korea - Application No. 10-2024-0028201

3. J. S. Lee, **H. J. Lee**, "Glucose and diabetes prediction algorithm using wearable device-based PPG and biometric information"

   Korea - Application No. 10-2023-0144347

4. J. S. Lee, W. R. Choi, **H. J. Lee**, "A wearable device for monitoring glaucoma suspect and a method for monitoring glaucoma suspect"

   Korea - Application No. 10-2023-0144347

5. J. S. Lee, **H. J. Lee**, "Glaucoma Diagnosis Method and System Based on Contactless Biosignals"

   Korea - Application No. 10-2023-0078883

6. J. S. Lee, **H. J. Lee**, S. C. Ko, "Noninvasive Urodynamics Test Method and Apparatus Based on Artificial Intelligence"

   Korea - Application No. 10-2022-0085583

7. J. S. Lee, Y. W. Kim, **H. J. Lee**, "Optimization system and method of AI algorithm for prediction coronary artery lesions based on FFR"

   Korea - Application No. 10-2022-0030019

   US – Application No. 17/820,819

INTERNATIONAL CONFERENCES

1. **H. J. Lee**, J. H. Kim, Y. W. Kim, D. S. Kim, S. Y. Shin, J. H. Hong, J. S. Lee, "Patient-Specific Coronary Flow Field Prediction Using Physics-Informed Neural Operators", The 18th Asian Congress of Fluid Mechanics (ACFM), Seoul, Korea (2025) – oral (not finalized)
2. **H. J. Lee**, Y. W. Kim, J. H. Kim, S. Y. Shin, S. L. Lee, C. H. Kim, J. S. Kim, K. S. Chung, J. S. Lee, "AI-based Hemorheology Prediction with Patient-Specific Biometric Boundary Conditions", 2024 ICTAM, Daegu, Korea (2024) – short oral & poster
3. **H. J. Lee**, J. S. Lee, "Optimization of Artificial Intelligence Algorithms for FFR Prediction in Gray Zone", 2022 ICTME, Gyeonggi-do, Korea (2022) – oral.
4. **H. J. Lee**, Y. W. Kim, J. H. Kim, J. S. Lee, "Estimating CFD–based CT FFR using lattice Boltzmann method – 3D geometry auto segmentation and novel patient specific computation", ESCHM-ISCH-ISB 2021 FUKUOKA, FUKUOKA, Japan (2021) – oral.

DOMESTIC CONFERENCES

1. **H. J. Lee**, J. S. Lee, "Unlocking Predictive Health Outcomes with Biometric Data", KSME Conference 2023, Song-do, Korea (2023) – oral.

2. **H. J. Lee**, J. S. Lee, "Modeling Coronary Artery Hemodynamics: Exploring DCNN Surrogate Models in Preliminary Research", Biomedical Engineering Society for Circulation (2023 BESCO summer meeting), Daegu, Korea (2023) – oral.
3. **H. J. Lee**, J. S. Lee, "Artificial Intelligence Algorithms for FFR Prediction in Gray Zone by Single-view Angiography", Biomedical Engineering Society for Circulation (2022 BESCO winter meeting), Seoul, Korea (2022) – short oral & poster presentation, *Nominee for Best Paper Award.*
4. **H. J. Lee**, J. H. Kim, J. S. Lee, "Artificial intelligence-based automatic cardiovascular lesion prediction diagnostic device", Biomedical Engineering Society for Circulation (2022 BESCO summer meeting), Jeju, Korea (2022) – poster.
5. **H. J. Lee**, Y. W. Kim, J. S. Lee, "Optimization of Artificial Intelligence Algorithms for FFR Prediction in Gray Zone", Biomedical Engineering Society for Circulation (2021 BESCO winter meeting), Gangwon, Korea (2021) – oral.

CLINICAL TRIALS

- **Research Intern** at E8ight Jan. 2021 ~ Jun. 2021
  - ✓ Computational Fluid Dynamics Simulations via Lattice Boltzmann Method

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RESEARCH EXPERIENCES

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AWARDS AND HONORS

2022	Best Paper Award, BESCO, Korea
2022	Merit Academic Paper Award, Yonsei University, Korea
2022	2022 Best Paper Award, School of Mechanical Engineering, Yonsei University, Korea