

Curriculum Vitae

Name: Seungyon Cho

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Education

- **(January 2023 - Present) Ph.D. course, School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore**
Academic advisor: Associate Prof. Seung Ki Moon, Ph.D. Expected graduation date: August 2027
- **M.S., Department of Mechanical Engineering, Chung-Ang University, Republic of Korea, February 2022**
Thesis: Selected Frequency Range Critical Information Map: A Data-Driven Mechanical System Fault Diagnosis Model using Spectral Subtraction Academic advisor: Prof. Hae-Jin Choi, Ph.D.
- **B.S., Department of Mechanical Engineering, Chung-Ang University, Republic of Korea, February 2020**

Research interests and experiences

- Real-time monitoring and quality assessment of additive manufacturing processes
 - PBF, DED, and WAAM
 - Multimodal sensing using vision, thermal, acoustic, and process signals
- Data-driven defect detection and performance prediction for manufacturing systems
- Design-parameter-based system performance prediction and design guidance
- Prior research experience in process monitoring and fault diagnosis for robotic manufacturing systems

Research projects

- **Ongoing project**
Researcher, “Development of Wire-Arc Additive Manufacturing and AI-based Quality Enhancement Control Technology for Innovation in Medium-to-Large Shipbuilding Component Manufacturing”, Ministry of Trade, Industry & Energy of the Republic of Korea (2026-present)
 - Collect and analyze monitoring data from WAAM processes
 - Extract correlations between process parameters and quality outcomes
 - Generate processed datasets for certification and feedback

Researcher, “Industry Collaboration Projects (IAF-ICP), CL6 - 3D Printing Simulator”, Hyundai Motor Group Innovation Center Singapore, NTU Singapore, and the Agency for Science, Technology and Research (A*STAR), Singapore (2025-present)

- Multimodal monitoring system development and deployment for WAAM and PBF processes
- Normal-data-based quality anomaly monitoring and anomaly classification for PBF
- Quantitative melt-pool characterization and quality anomaly monitoring for WAAM

Researcher, “Development of AI-based high carbon steel alloy design and sintering-based additive manufacturing technology for 7.0 L/Hr-level high-speed production of powertrain components with tensile strength over 1.0 GPa in the next-generation mobility”, Ministry of Trade, Industry & Energy of the Republic of Korea (2023-present)

- FEM simulation for sintering deformation prediction of binder jet printing
- Development of a design-parameter-based surrogate model for sintering deformation prediction
- Development of a compensation model for sintering-distortion-aware geometry design

- **Completed project**

Researcher, “Demonstration of a intelligent DED system for reducing process time”, Korea Institute of Machinery & Materials (2023-2024)

- Algorithm to actual manufacturing scenario
 - Automating signal processing and analysis processes
 - Feature extraction & selection for additive manufacturing quality monitoring

Researcher, “A Study on the Application of Fault Diagnosis and Prediction Algorithm for Robot Driving System using Vibration Signal”, Hyundai Motor Group (2021-2023)

- Applying laboratory-scale algorithm to actual manufacturing line
 - Automating signal processing and analysis processes
 - Feature extraction and selection process for degradation trend analysis
 - Application of vibration and current signals for analysis

Researcher, Development of Prognostics and Quality Improvement Technologies for Enhancing Productivity and Yield Rate of Automobile Components by Minimizing Downtime of Manufacturing Robots/Process Equipment, Ministry of Trade, Industry, and Energy (2017-2021, joined 2019)

- Spot welding quality monitoring and anomaly detection
 - Feature extraction and selection process design using multi-modal signal
 - Application of transfer learning for limited amount of training data situations
- Developing fault detection model for industrial 6-axis robot driving system
 - Data-driven approach with limited amount of training data situations

Technical skills

- Signal and image processing, optimization, and machine learning
- Python and MATLAB programming
- Machine learning frameworks: PyTorch, TensorFlow
- NI DAQ-based data acquisition and experimental instrumentation
- Finite element simulation: Abaqus, ANSYS
- CAD/CAE tools: SolidWorks, Pro/ENGINEER, CATIA
- Additive manufacturing equipment experience in PBF, DED, and WAAM
- Robotics: Yaskawa Motoman (MotoPlus), Hyundai Robotics (HRR)

Conference Proceedings

- **Seungyon Cho**, Seung Ki Moon, “Simulation-based Data-driven Surrogate Modeling to Predict System Performance”, *IEEE International Conference on Industrial Engineering and Engineering Management 2025 (IEEM 2025)*, 2025
- **Seungyon Cho**, Jungyeon Kim, Seong Je Park, Seung Ki Moon, “A Data-driven Geometrical Shape Prediction Model of Sintering Deformation in Metal Binder Jetting Process”, *International Conference on Precision Engineering and Sustainable Manufacturing 2025 (PRESM2025)*, 2025
- **Seungyon Cho**, Seong Je Park, Seung Ki Moon, “A Data-driven Surrogate Model of Sintering Deformation Prediction in Binder Jetting Process”, *IEEE International Conference on Industrial Engineering and Engineering Management 2024 (IEEM 2024)*, 2024
- **Seungyon Cho**, Lequn Chen, Seung Ki Moon, “Acoustic Signal processing for Direct Energy Deposition In-situ Monitoring”, *The 2nd International Conference on Design for 3D Printing 2023 (ICD3DP 2023)*, 2023

Journal Articles

- Park, S. J., **Cho, S.**, Jeon, S., & Moon, S. K. (2026). A Representative Volume Element-Based Approach for Predicting Sintering Shrinkage in Metal Binder Jetting. *International Journal of Precision Engineering and Manufacturing-Green Technology*, 1-8.
- Park, S. J., **Cho, S.**, Ng, P. H. N., Lee, J., Kim, J., Jeon, S., ... & Moon, S. K. (2026). Insights Into the Industrial Applications and Future Directions of Bulk Metallic Glasses Via Additive Manufacturing. *International Journal of Precision Engineering and Manufacturing*, 1-16.
- **Cho, S.**, Seo, H. R., Lee, G., Choi, S. K., & Choi, H. J. (2023). A rapid learning model based on selected frequency range spectral subtraction for the data-driven fault diagnosis of manufacturing systems. *International Journal of Precision Engineering and Manufacturing-Smart Technology*, 1(1), 49-62.

- Han, S., Do, M. D., Kim, M., **Cho, S.**, Choi, S. K., & Choi, H. J. (2022). A precise 3D scanning method using stereo vision with multipoint markers for rapid workpiece localization. *Journal of Mechanical Science and Technology*, 36(12), 6307-6318.
- Lee, K., Han, S., Pham, V. H., **Cho, S.**, Choi, H. J., Lee, J., ... & Lee, S. W. (2021). Multi-objective instance weighting-based deep transfer learning network for intelligent fault diagnosis. *Applied Sciences*, 11(5), 2370.