Curriculum Vitae

Hogeon Seo

Senior Researcher :: Applied AI Section :: Korea Atomic Energy Research Institute (KAERI)
Associate Professor :: Artificial Intelligence :: University of Science and Technology (UST)
Director of International Affairs :: The Korean Society of Nondestructive Testing (KSNT)
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1) Research Interests

AI Multi-Agent System	AI Multi-agent System for Engineering Problem Solving (Design, Simulation, Optimization), Meta-Learning for Physics-informed Machine Learning, Sim-to-Real Transfer Learning
Autonomous NDT & PHM	Agentic AI for Nondestructive Testing & Evaluation / Prognostics & Health Management, Anomaly Detection of Multi-modal Data, Data Restoration of Multi-channel Signals
Multi-modal Sensor Fusion AI	Multi-modal Sensor Fusion (Ultrasound, UWB, LiDAR, Camera), Data Augmentation, 3D Point Cloud Classification & Segmentation & Pose Estimation
Nonlinear Ultrasonic Imaging	Synthetic Aperture Imaging of Acoustic Nonlinearity (SAIAN) for Damage Visualization, Laser-generated Surface Acoustic Waves (LSAW), Ultrasonic Propagation Imaging (UPI)

2) Education

2013.03 - 2018.02 **Ph.D. in Mechanical Convergence Engineering** *Hanyang University (HYU), Republic of Korea*
Advisor: *Prof. Kyung-Young Jhang*
Thesis Title: Synthetic Aperture Imaging of Acoustic Linearity and Nonlinearity

2006.03 - 2013.02 **B.E. in Mechanical Engineering** *Hanyang University (HYU), Republic of Korea*

3) Positions

2023.03 - Present **Associate Professor** *Artificial Intelligence, University of Science and Technology (UST)*

2020.02 - Present **Director of International Affairs** *The Korean Society of Nondestructive Testing (KSNT)*

2019.12 - Present **Senior Researcher** *Applied Artificial Intelligence Section, Korea Atomic Energy Research Institute (KAERI)*

2018.02 - 2019.11 **Postdoc Researcher** *Artificial Intelligence Laboratory, Gwangju Institute of Science and Technology (GIST)*

2012.04 - 2018.02 **Research Assistant** *Intelligent Sensing & Non-Destructive Evaluation (ISNDE)*

2007.07 - 2009.06 **Military Service :: Discharged as Sergeant** *Republic of Korea Army (ROK Army)*

4) Awards

2024.12	**President's Commendation, 2024 UST Excellent Lecture Award**	*UST*
2024.10	**Best Paper Award, 2023 Journal of the Korean Society for Nondestructive Testing**	*KSNT*
2024.10	**Outstanding Reviewer Award, 2023 Journal of the Korean Society for Nondestructive Testing**	*KSNT*
2024.06	**Best Presentation Award, Prognostics & Health Management Korea 2024**	*KSNT*
2024.05	**The Young Achiever Award, 20th World Conference on Non-Destructive Testing**	*KSNT*
2023.12	**Best Poster Award, Korean Society of Nondestructive Testing 2023 Fall Conference**	*KSNT*
2023.05	**Best Paper Award, Journal of the Korean Society for Nondestructive Testing 2022**	*KSNT*
2023.04	**2023 Best Teaching Award**	*Korea Institute of Human Resources Development in Science and Technology*
2022.07	**Best Paper Award, Applied Artificial Intelligence Conference 2022**	*AIFrenz*
2022.05	**2021 Best Teaching Award**	*Korea Institute of Human Resources Development in Science and Technology*
2022.05	**Best Paper Award, Journal of the Korean Society for Nondestructive Testing** 2021	*KSNT*
2021.07	**Best Paper Presentation Award, Korean Society of Nondestructive Testing** 2021 Spring Conference	*KSNT*
2021.06	**Outstanding Young Researcher Award, 36th International Conference on Control**, Robotics and Systems	*Institute of Control, Robotics and Systems*
2020.11	**Honorable Mention Award, 5th KSME-SEMES Open Innovation Challenge**	*Korean Society of Mechanical Engineers*
2019.11	**Best Paper Award**	*Korean Institute of Smart Media*
2019.01	**Significant New Researcher Award of KRoC 2019**	*Korea Robotics Society*
2012.05	**Capstone Design in Department of Mechanical Engineering Department - 1st Prize**	*Hanyang University*

5) International Journal Papers

Restoration of Multi-Channel Signal Loss Using Autoencoder with Recursive Input Strategy, Scientific Reports (2025), IF: 3.8 (Q1) https://www.nature.com/articles/s41598-025-98374-5

Artificial Intelligence Orchestration for Text-based Ultrasonic Simulation via Self-review by Multi-Large Language Model Agents, IEEE Transactions on Industrial Informatics (2024), Scientific Reports (2025), IF: 3.8 (Q1) https://www.nature.com/articles/s41598-025-97498-y

Defect Estimation using Surrogate-based Monte Carlo Bayesian Optimization, Measurement (2025), IF: 5.2 (Q1) https://doi.org/10.1016/j.measurement.2025.117449

Can Untrained Neural Networks Detect Anomalies?, IEEE Transactions on Industrial Informatics (2024), IF: 12.3 (Q1) https://doi.org/10.1109/TII.2023.3345461

SleePyCo: Automatic Sleep Scoring with Feature Pyramid and Contrastive Learning, Expert Systems with Applications (2023), IF: 8.5 (Q1) https://doi.org/10.1016/j.eswa.2023.122551

Symmetry-Informed Surrogates with Data-Free Constraint for Real-Time Acoustic Wave Propagation, Applied Acoustics (2023), IF: 3.4 (Q1) https://doi.org/10.1016/j.apacoust.2023.109686

Probability Propagation for Faster and Efficient Point Cloud Segmentation Using a Neural Network, Pattern Recognition Letters (2023), IF: 5.1 (Q2) https://doi.org/10.1016/j.patrec.2023.04.010

Development of Deep Autoencoder-Based Anomaly Detection System for Hanaro, Nuclear Engineering and Technology (2022), IF: 2.7 (Q1) https://doi.org/10.1016/J.NET.2022.10.009

Deep Reinforcement Learning for 3D Localization from Multi-channel Time-series Signals, Journal of Institute of Control, Robotics and Systems (2022) https://dx.doi.org/10.5302/J.ICROS.2022.22.0146

Quantile Autoencoder with Abnormality Accumulation for Anomaly Detection of Multi-variate Sensor Data, IEEE Access (2022), IF: 3.9 (Q1) https://doi.org/10.1109/ACCESS.2022.3187426

Quantile Autoencoder for Anomaly Detection, AAAI 2022 Workshop on AI for Design and Manufacturing (ADAM) (2021) https://openreview.net/forum?id=yG0EWFkvyjB

Influence of Preprocessing and Augmentation on 3D Point Cloud Classification Based on a Deep Neural Network: PointNet, 2020 20th International Conference on Control, Automation and Systems (ICCAS), 895-899 (2020) https://doi.org/10.23919/ICCAS50221.2020.9268197

Intra-and inter-epoch temporal context network (IITNet) using sub-epoch features for automatic sleep scoring on raw single-channel EEG, Biomedical Signal Processing and Control, 61 (2020), IF:5.1 (Q2) https://doi.org/10.1016/J.BSPC.2020.102037

Nondestructive Evaluation of Thermal Aging in Al6061 Alloy by Measuring Acoustic Nonlinearity of Laser-Generated Surface Acoustic Waves, Metals, 10.1 (2019), IF; 2.117 (Q1) https://doi.org/10.3390/MET10010038

Monitoring of thermal aging of aluminum alloy via nonlinear propagation of acoustic pulses generated and detected by lasers, Applied Sciences, 9.6, 1191 (2019), IF: 2.7 (Q2) https://doi.org/10.3390/APP9061191

Synthetic aperture imaging of contact acoustic nonlinearity to visualize the closing interfaces using tone-burst ultrasonic waves, Mechanical Systems and Signal Processing (2018), IF: 8.4 (Q1) https://doi.org/10.1016/J.YMSSP.2018.08.025

Assessment of Thermal Aging of Aluminum Alloy by Acoustic Nonlinearity Measurement of Surface Acoustic Waves, Research in Nondestructive Evaluation, 28.1, 3-17 (2017), IF: 1.4 (Q3) https://dx.doi.org/10.1080/09349847.2016.1261213

Determination of Laser Beam Intensity to maximize Amplitude of Ultrasound generated in Ablation Regime via monitoring Plasma-induced Air-borne Sound, International Journal of Precision Engineering and Manufacturing, 16.13, 2641-2645 (2015), IF: 1.9 (Q3) https://dx.doi.org/10.1007/S12541-015-0338-0

Noncontact Evaluation of Acoustic Nonlinearity of a Laser-generated Surface Wave in a Plastically Deformed Aluminum Alloy, Research in Nondestructive Evaluation, 26.1, 13-22 (2015), IF: 1.4 (Q3) https://dx.doi.org/10.1080/09349847.2014.934496

Improvement of Crack Sizing Performance by using Nonlinear Ultrasonic Technique, International Journal of Precision Engineering and Manufacturing, 15.11, 2461-2464 (2014), IF: 1.9 (Q3) https://dx.doi.org/10.1007/S12541-014-0614-4

In-line Ultrasonic Monitoring for Sediments stuck on Inner Wall of a Polyvinyl Chloride Pipe, The Scientific World Journal, 731621 (2014), IF: 1.219 (Q3) https://dx.doi.org/10.1155/2014/731621

6) Domestic Journal Papers

Application based on Generative AI and Prompt Engineering to Improve Children's Literacy, Smart Media Journal, 13.8, 26-38 (2024) https://dx.doi.org/10.30693/SMJ.2024.13.8.26

Autoencoder-Based Restoration of Multi-Channel Sensor Signal Loss, Journal of the Korean Society for Nondestructive Testing, 44.3, 213-218 (2024) http://dx.doi.org/10.7779/JKSNT.2024.44.3.213

Pump State Classification using Automated Machine Learning based on Feature Extraction, Journal of the Korean Society for Nondestructive Testing, 44.2, 81-88 (2024) http://dx.doi.org/10.7779/JKSNT.2024.44.2.81

Feature Extraction-based Anomaly Detection on Time-series Data, Journal of the Korean Society for Nondestructive Testing, 44.1, 24-29 (2024) http://dx.doi.org/10.7779/JKSNT.2024.44.1.24

Unsupervised Domain Adaptation for Classification of Imbalanced Time Series Data, Journal of the Korean Society for Nondestructive Testing, 43.6, 458-467 (2023) http://dx.doi.org/10.7779/JKSNT.2023.43.6.458

Bayesian Optimization for 3D Source Localization from Multi-channel Time-series Signals, Journal of the Korean Society for Nondestructive Testing, 43.1, 60-68 (2023) http://dx.doi.org/10.7779/JKSNT.2023.43.1.44

Performance Comparison of a Surrogate Model of Acoustic Wave Propagation According to Sampling Methods, Journal of the Korean Society for Nondestructive Testing, 43.1, 60-68 (2023) http://dx.doi.org/10.7779/JKSNT.2023.43.1.60

Deep Learning for 3D Source Localization from Acoustic Emission Signals, Journal of the Korean Society for Nondestructive Testing, 42.1, 34-42 (2022) https://dx.doi.org/10.7779/JKSNT.2022.42.1.34

Video-based Deep Learning for Pipe Vibration Frequency Visualization, Transactions of the Korean Society for Noise and Vibration Engineering, 32.1, 89-96 (2022) https://doi.org/10.5050/KSNVE.2022.32.1.089

Video-based Deep Learning for Pipe Leakage Visualization, Transactions of the Korean Society for Noise and Vibration Engineering, 31.5, 521-528 (2021) https://dx.doi.org/10.5050/KSNVE.2021.31.5.521

Pipe Thickness Estimation by Deep Learning of Pulsed Eddy Current Time-Series Data, Journal of the Korean Society for Nondestructive Testing, 41.3, 164-171 (2021) https://dx.doi.org/10.7779/JKSNT.2021.41.3.164

Characteristic Analysis of Data Preprocessing for 3D Point Cloud Classification Based on a Deep Neural Network: PointNet, Journal of the Korean Society for Nondestructive Testing, 41.1, 19-24 (2021) https://dx.doi.org/10.7779/JKSNT.2021.41.1.19

Real-time Visitor's Behavior Analysis System via Ultra-Wide Band Radar, Smart Media Journal, 8.4, 85-90 (2019) https://doi.org/10.30693/SMJ.2019.8.4.85

Measurement of Elastic Constants by simultaneously Sensing Longitudinal and Shear Waves as an Overlapped Signal, Journal of the Korean Society for Nondestructive Testing, 36.2, 138-148 (2016) https://dx.doi.org/10.7779/JKSNT.2016.36.2.138

Relative Measurement of Acoustic Nonlinear Parameters and Comparison of Sensitivity to Thermal Aging, AIP Conference Proceedings, 1650.1 (2015) https://doi.org/10.1063/1.4914692

Influence of Laser Beam Profiles on the Frequency Bandwidth of Laser-generated Surface Acoustic Waves, 2014 IEEE Far East Forum on Nondestructive Evaluation/Testing, 221-224 (2014) https://dx.doi.org/10.1109/FENDT.2014.6928267

Feasibility of MFC (Macro-fiber Composite) Transducers for Guided Wave Technique, Journal of the Korean Society for Nondestructive Testing, 33.3, 264-269 (2013) https://dx.doi.org/10.7779/JKSNT.2013.33.3.264

Frequency Characteristics of Surface Wave Generated by Single-line Pulsed Laser Beam with Two Kinds of Spatial Energy Profile Models: Gaussian and Square-like, Journal of the Korean Society for Nondestructive Testing, 32.4, 347-354 (2012) https://dx.doi.org/10.7779/JKSNT.2012.32.4.347

7) Registered Patents

Method and System for Adaptive Data Augmentation Training for Shape Classification	10-2791079 (2025)
Apparatus and Method for Self-Learning Based on Feedback Data	10-2773449 (2025)
Device and Method for Generating Query	10-2751376 (2025)
Method and Apparatus for Detecting Anomaly Based on Deep Learning Considering Uncertainty	10-2717776 (2024)
Method for Estimating Coordinates of Virtual Object	10-2316389 (2021)
Method for Acquiring Physical Status Information Using Non-contact Sensor	10-2249237 (2021)
Method for Optimizing Sleep	10-2133314 (2020)
Imaging Device Using Non-linear Property of Ultrasonic Wave and Method for the Same	10-1883987 (2018)
Slit Mask for generating Laser-generated Surface Wave using Elastic Tube	10-1719433 (2017)
Slit Mask for generating Laser-generated Surface Wave using Screen of Folding Fan Shape	10-1719434 (2017)
Thickness Meter using Ultrasonic Wave and Thickness Measuring Method of the Same	10-1550706 (2015)

8) Books

Discovering the Difference with AI Communication Books (2025)
https://www.yes24.com/product/goods/142072097