Daehyuk Kim

Senior Researcher
Research Institute of Marine Systems Engineering (RIMSE), Seoul National University (SNU), Republic of Korea
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PROFESSIONAL EXPERIENCE

Mar 2025 – Present (RWTH Aachen)

Mechatronics of Mobile Propulsion (MMP), RWTH Aachen University, Germany

- **Gastwissenschaftler (Guest Researcher)**

Mar 2023 – Present (SNU)

Research Institute of Marine Systems Engineering (RIMSE), Seoul National University (SNU), Republic of Korea

- **Senior Researcher**, Jan 2024 – Present
- **Researcher**, Aug 2023 – Dec 2023
- **Postdoctoral Fellow**, Mar 2023 – July 2023

Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU), Republic of Korea

- **Instructor**, Sep 2023 – Feb 2025

Feb 2018 – Feb 2023 (HD Hyundai)

Maneuvering Control Research Team / R&D Team, Avikus, HD Hyundai Group, Republic of Korea

- **Senior Researcher (Team Leader)**, Jan 2021 – Feb 2023

Autonomous Ship Research Center, HD Korea Shipbuilding & Ocean Engineering (HD KSOE), HD Hyundai Group, Republic of Korea

- **Senior Researcher**, Nov 2020 – Dec 2020

Digital Transformation Business Division, HD Hyundai Marine Service, HD Hyundai Group, Republic of Korea

- **Senior Manager**, Mar 2019 – Oct 2020

Smart Ship Solution Development Team, HD Hyundai Heavy Industries, HD Hyundai Group, Republic of Korea

- **Senior Researcher**, Mar 2018 – Feb 2019

EDUCATION

Mar 2013 – Feb 2018 (SNU)

Ph.D. in Engineering, Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU), Republic of Korea

- **Thesis:** A Study on the Maneuvering Characteristics of a Damaged Surface Combatant Ship
- **Advisor:** Prof. Shin Hyung Rhee

Mar 2011 – Feb 2013 (SNU)

Master of Engineering, Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU), Republic of Korea

- **Thesis:** Study on the Auto Weather Vaning System of a DP Vessel by using Nonlinear Controller and Disturbance Observer
- **Advisor:** Prof. Nakwan Kim

Mar 2006 – Feb 2011 (SNU)

Bachelor of Engineering, Department of Naval Architecture and Ocean Engineering, Seoul National University (SNU), Republic of Korea

- **Thesis:** Study on the Calibration Technique of 5-hole Pitot Tube for Ship Wake Measurement
- **Advisor:** Prof. Shin Hyung Rhee

PUBLICATIONS

Journal Articles:

- **Kim, D.**, Rhee, S.H., Lee, K., Jang, W., Kim, B.G., Cho, Y.K., Kim, S., Cho, S., Cha, S., Kang, D., Kim, J., 2026. Physics-Constrained Additive Neural Networks for Identifiable and Unique Decomposition of Ship Operational Performance from Noon Report Data (Under review)
- **Kim, D.**, Fabricius, M., Kim, S., Rhee, S.H., Lee P.H., Park, D., Cho, Y., Oh, Y.S., 2026. A Quasi-Static Cable-TUV Equilibrium Model with Parameter Identification and Transfer for Operational Depth and End-to-End Towline Tension Prediction (Under review)
- **Kim, D.**, Rhee, S.H., Kim, S., Jang H., Han, J., Joo, S.J., Kim, S., Choi, S., Lee, A., 2026. Operational-Data-Driven, Distribution-Dependent In-Service Fuel Savings of PTO Shaft Generators with Envelope Occupancy and Voyage-Scale Potential (Under review)
- **Kim, D.**, Rhee, S.H., Park, J., Kang, S., Han, H., Lee, S.B., 2026. Operational Data-Driven Multi-Head Physics-Informed Neural Network for Full-Scale Performance Evaluation of Rotor Sails Installed on Ships (Under review)
- Krautwig, B., Wans, D., Temmen, T., Brinkmann, T., Lee, S.-Y., **Kim, D.**, Andert, J., 2026. Compensating environmental disturbances in maritime path following using deep reinforcement learning. J. Mar. Sci. Eng. 14 (4), 327. https://doi.org/10.3390/jmse14040327

- **Kim, D.**, Rhee, S.H., Kwon, K, Lee, J.I., Sung, D., Yang, H., Cha, S.W., Lee, H., Lee, C. and Park, H. Energy Efficiency Assessment based on IMO Indices for LNG Dual Fuel Engine based Electric Propulsion Coastal Passenger Ship. Energy Conversion and Management: X, 101646. https://doi.org/10.1016/j.ecmx.2026.101646
- **Kim, D.** Jang, S., Lee, J., Rhee, S.H., Kwon, H., Jeong, H., 2026. Ship Operational Data driven Fuel Efficiency Assessment for Shaft Generator using Input Convex Neural Network. Energy Reports, 15, 108993. https://doi.org/10.1016/j.egyr.2025.108993
- Lee, J., **Kim, D.**, Sung, D., Yang, H., Cha, W., 2025. Comprehensive techno-economic assessment of SOFC hybrid system in marine applications: A carbon emission framework perspective. Energy Reports, 14, 4150-4159. https://doi.org/10.1016/j.egyr.2025.11.034
- **Kim, D.**, Rhee, S.H., 2025. Data-driven framework with theoretical modelling to evaluate fuel savings through air lubrication system. Ocean Engineering, 316, 119920. https://doi.org/10.1016/j.oceaneng.2024.119920
- **Kim, D.**, Rhee, S.H., 2024. Data-driven modeling and regression analysis on ship resistance of in-service performance. International Journal of Naval Architecture and Ocean Engineering, 16, 100623. https://doi.org/10.1016/j.ijnaoe.2024.100623
- Seo, J., **Kim, D.**, Ha, J., Rhee, S., Yoon, H., Park, J., Seok, W., and Rhee, K., 2020. Captive model tests for assessing maneuverability of a damaged surface combatant with initial heel angle. Journal of Ship Research, 64(4), 392-406. https://doi.org/10.5957/JOSR.09180075
- **Kim, D.**, Seo, I., Rhee, K., Kim, N. and Ahn, J., 2015. A model test study on the effect of the stern interceptor for the reduction of the resistance and trim angle for wave-piercing hulls. Journal of Naval Architects of Korea, 52(6), 485-493. (Korean) https://doi.org/10.3744/SNAK.2015.52.6.485
- **Kim, D.** and Kim, N., 2014. An auto weather-vaning system for a DP vessel that uses a nonlinear controller and a disturbance observer. International Journal of Naval Architecture and Ocean Engineering, 6(1), 98-118. https://doi.org/10.2478/IJNAOE-2013-0166
- **Kim, D.**, Rhee, K. and Kim, N., 2014. The effect of hull appendages on maneuverability of naval ship by sensitivity analysis. Journal of Naval Architects of Korea, 51(2), 154-161. (Korean)
- **Kim, D.**, Kim, N., Seok, J. and Kim, B., 2013. Neural network based adaptive control for a flying-wing type UAV with wing damage. Journal of the Korean Society for Aeronautical and Space Sciences, 41(5), 342-349. (Korean) https://doi.org/10.5139/JKSAS.2013.41.5.342

Conferences Papers:

- **Kim, D.** and Rhee S.H., 2025. Operational data-driven nonlinear regression for ship resistance analysis. In Proceedings of Hull Performance & Insight Conference (HullPIC) 2025, 25-27 Feb 2025, Mülheim, Germany.
- **Kim, D.**, Rhee S.H., and Kim, B., 2024. Intelligent unmanned ship research through Imitation Learning based on Behavior Cloning. In Proceedings of 2024 Winter Conferences of Korean Society for Fluid Machinery, 4-7 Dec 2024, Jeju, Korea.

- **Kim, D.**, 2023. Ship maneuvering motion identification based on operational data by using eXplanable AI method. In Proceedings of 2023 Summer Conferences of Smart Electric Smart & Electric Ship Research Association, Aug 24-25 2023, Seoul, Korea.
- **Kim, D.**, Ha, J. and Rhee, S.H., 2023. A research on the guideline development for optimal Williamson Turn through the modelling and simulation of naval ship maneuvering motion. In Proceedings of 2023 Warship Technology and Weapon Systems Seminar, Jun 8-9 2023, Busan, Korea.
- **Kim, D.** and Rhee, S.H., 2023. Strategy on the operational efficiency improvement for GHG regulation of shipping companies the based on ship operational data. In Proceedings of 2023 Conference of the Korean Association of Ocean Science and Technology Societies, May 2-4 2024, Busan, Korea.
- Choi, J., Kwon, K., Yoon, H., **Kim, D.** and Ryu, S., 2022. Development of integrated HILS system for autonomous vessel solution, In Proceedings of Global Conference of Naval Architecture and Ocean Engineering 2022, Nov 6-10 2022, Changwon, Korea.
- **Kim, D.**, Lee, H., Choi, H., Yoon, K., Jung, H. and Park, J., 2022. Case study of autonomous ship solution on electric propulsion smart ship. In Proceedings of 2022 Autumn Conference of the Korean Society of Marine Engineering, Oct 20-22 2022, Mokpo, Korea.
- **Kim, D.**, Park, J., Choi, H., Choi, H. and Jang W., 2022. Case study on the application of autonomous ship auto-piloting control systems for transoceanic crossing. In Proceedings of the 37th Conference Institute of Control, Robotics and Systems, Jun 22-24 2022, Geoje, Korea.
- Ryu, S., Choi, J., Chang, Y., Yoon, H., Min, Y., **Kim, D.** and Choi, H., 2022. Autonomous solution with digital twin technology for marine application, In Proceedings of 2022 Conference of the Korean Association of Ocean Science and Technology Societies, Jun 2-4, Jeju, Korea.
- Jung, D., Rho, M., Kim, K., Lee, J., **Kim, D.** and Jang, W., 2022. Route planning method for small vessels using Quad Trees. In Proceedings of 2022 Autumn Conference of Society of Naval Architects of Korea, Jun 2-4 2022, Jeju, Korea.
- Jung, D., Rho, M., Kim, K., Lee, J., **Kim, D.** and Jang, W., 2022. Development of a coastal sailing program for yachts. In Proceedings of the 2022 Winter Conference of Society for Computational Design and Engineering of Korea, Feb 9-12 2022, Jeju, Korea.
- Jung, D., Rho, M., Kim, K., Lee, J., **Kim, D.** and Jang, W., 2021. Route planning algorithm for small vessels in coastal navigation. In Proceedings of the 2021 Summer Conference of Society for Computational Design and Engineering of Korea, Aug 25-28 2021, Jeju, Korea.
- Seo, J., **Kim, D.**, Ha, J.S. Rhee, S.H., Yoon, H.K., Park, J., Seok, W.C., and Rhee, K.P., 2018. Captive Model Tests for Assessing Maneuverability of a Damaged Surface Combatant with Initial Heel Angle. In Proceedings of 32nd Symposium on Naval Hydrodynamics (SNH 2018), Aug 5-10 2018, Hamburg, Germany.
- **Kim, D.**, Rhee, K.P., Kim, N.W., Rhee, S.H. and Ahn, J.H., 2017. Research on pitch motion modeling and motion control algorithms for high-speed planing crafts in waves using system identification methods. In Proceedings of 2017 Autumn Conference of Society of Naval Architects of Korea, Nov 2-3 2017, Yeosu, Korea.

- Park, J., **Kim, D.**, Yeo, H.G., Rhee, S.H., Rhee, K.P., Kim, N.W. and Ahn, J.H., 2017. The Effect of the Side Hull's Longitudinal Location on the Maneuverability for a Trimaran from PMM Model Test. In Proceedings of 2017 Autumn Conference of Society of Naval Architects of Korea, Nov 2-3 2017, Yeosu, Korea.
- Jeong, H.S. Yeo, H.G., Park, J., **Kim, D.**, Seo, J., Park, K.S., Lee, S.I. and Rhee S.H., 2017. Study on the Shape of Appendage for Amphibious Armored Vehicle's Resistance and Attitude Improvement. In Proceedings of 2017 Autumn Conference of Society of Naval Architects of Korea, Nov 2-3 2017, Yeosu, Korea.
- Jeong, H.S. Yeo, H.G., Park, J., **Kim, D.**, Seo, J., Park, K.S., Lee, S.I. and Rhee S.H., 2017. Model Test Study on the Influence of Trim Tab on Running Attitude and Resistance of Amphibious Armored Vehicle. In Proceeding of 2017 Naval Ship Technology & Weapon Systems Seminar, Oct 26-27 2017. Busan, Korea.
- Ha, J., **Kim, D.**, Seo, J., Rhee, S.H., 2017. Development of 3DOF Dynamic Modeling Considering Asymmetry for Maneuverability of a Damaged Surface Combatant, In Proceeding of 2017 Naval Ship Technology & Weapon Systems Seminar, Oct 26-27 2017. Busan, Korea.
- **Kim, D.**, Park, J., Yeo, H., Rhee, K. and Rhee, S., 2017. PMM model testing research on the effect of auxiliary hulls on the maneuverability of waterjet-propelled trimarans. In Proceeding of 2017 Korea Towing Tank Conference (KTTC), Mar 11-12 2017. Incheon, Korea.
- **Kim, D.**, Rhee, K. and Kim, N., 2017. A comparable study on the regression based estimation method of linear hydrodynamic derivatives in ship maneuvering equation (Survey and comparison of hydrodynamic regressions). In Proceedings of the International Workshop on Ship Manoeuvring and Control (MACO 2017), Jan 14-16 2017, Shanghai, China.
- **Kim, D.**, Rhee, K., Kim, N. and Ahn, J., 2016. A development of maneuvering mathematical model for high speed planing vessel with water-jet propulsor. In Proceedings of 2016 Autumn Conference of the Korean Society of Ocean Engineers, Nov 17-18 2014, Busan, Korea.
- **Kim, D.**, Rhee, K., Kim, N. and Ahn, J., 2016. A research on the estimation of hydrodynamic derivatives in maneuvering motion for high speed planing hulls. Nov 3-4 2016, In Proceedings of 2016 Autumn Conference of Society of Naval Architects of Korea, Nov 3-4 2016, Changwon, Korea.
- **Kim, D.**, Rhee, K., Kim, N. and Ahn, J., 2016. A comparable study on the effect of the mathematical model of water-jet propulsion for the maneuverability of naval vessel. In Proceedings of 2016 Maritime Weapons Academic Conference, Oct 20-21 2016, Daejeon, Korea.
- **Kim, D.**, Rhee, K., Kim, N. and Ahn, J., 2015. An experimental study on the effect of bottom appendage (spray strip) for the performance in calm water of wave-piercing hull. In Proceedings of 2015 Autumn Conference of Society of Naval Architects of Korea, Nov 5-6 2015, Geojae, Korea.
- **Kim, D.**, Seo, I., Rhee, K., Kim, N. and Ahn, J., 2015. Comparative study on the model test results for wave-piercing hull form in calm water & waves. In Proceeding of 2015 Korea Towing Tank Conference (KTTC), Oct 29-30 2015, Busan, Korea.

- **Kim, D.**, Seo, I., Rhee, K., Kim, N. and Ahn, J., 2014. An experimental study on the performance in calm water & waves for wave-piercing high speed naval ships. In Proceedings of 2014 Autumn Conference of Society of Naval Architects of Korea, Nov 6-7 2014, Changwon, Korea.
- **Kim, D.**, Seo, I., Rhee, K., Kim, N. and Ahn, J., 2014. An experimental study on the performance in calm water & waves for wave-piercing high speed monohull. In Proceedings of 2014 Maritime Weapons Academic Conference, Oct 30-31 2014, Daejeon, Korea.
- **Kim, D.**, Kim, N, Cho, H. and Kim, S., 2014. A guidance logic development for wake homing guidance system, In Proceedings of the 14th International Conference on Control, Automation and Systems (ICCAS 2014), Oct 22-25 2014, Ilsan, Korea.
- **Kim, D.**, Seo, I., Rhee, K., Kim, N. and Ahn, J., 2014. An experimental study on the effect of stern interceptors on the resistance & running attitude for wave-piercing high speed monohulls., In Proceedings of 2014 Autumn Conference of the Korean Society of Ocean Engineers, Oct 16-18 2014, Jeju, Korea.
- **Kim, D.** and Kim, N., 2014. Development of guidance law for tracking target's wake trajectory. In Proceedings of the 10th Maritime Weapons Academic Conference, 18-19 2014, Jinhae, Korea.
- **Kim, D.**, Kim, N., Cho, H. and Kim, S., 2014. The estimation and guidance method for tracking of target ship wake. In Proceedings of the 24th Conference Institute of Control, Robotics and Systems (ICROS 2014), May 29-30 2023, Daegu, Korea.
- **Kim, D.**, Rhee, K. and Kim, N., 2013. Estimation of the maneuverability of twin propeller-twin rudder naval ships. In Proceedings of 2013 Autumn Conference of Society of Naval Architects of Korea, Jul 7-8 2013, Ulsan, Korea.
- **Kim, D.** and Kim, N., 2013. A robust control method for a submerged body by using disturbance observer. In Proceedings of 2013 Conference of the Korean Association of Ocean Science and Technology Societies, May 23-24 2013, Jeju, Korea.
- **Kim, D.** and Kim, N., 2012. Adaptive backstepping controller design and simulation for a dynamic positioning vessel, In Proceedings of 2012 Advanced Maritime Engineering Conference (AMEC), Dec 10-12 2012, Taipei, Taiwan.
- **Kim, D.**, Kim, N., Seok, J. and Kim, B., 2012. Neural network based adaptive control for wing damaged UAV, In proceedings of 2012 Seminar of Aerospace Weapon Systems Development, 1 Nov 2012, Daejeon, Korea.
- **Kim, D.**, Park. J., Kim, S. and Kim, N., 2012. Dynamic positioning control of offshore floating structure by using backstepping control technique, In Proceedings of 2012 Conference of the Korean Association of Ocean Science and Technology Societies, May 31-Jun 1 2012, Daegu, Korea.

RESEARCH PROJECTS

Ongoing Projects:

Jan 2026 – Nov 2026	**Development and Analysis of the Motion Model** • PI: Prof. Shin Hyung Rhee • Institution: Seoul National University	LIG Nex1, Republic of Korea
Oct 2025 – May 2027	**Development of Efficiency Performance Modeling and Estimation Techniques for Marine Propulsion Systems** • PI: Prof. Shin Hyung Rhee • Institution: Seoul National University	Hanwha Ocean, Republic of Korea
Sep 2025 – Aug 2026	**Development of Physics–Data Hybrid Modeling and Optimal Control Algorithms for Electrically Propelled Ships Based on Real Operational Data** • PI: Dr. **Daehyuk Kim** • Institution: Seoul National University	Ministry of Science and ICT in Korea, Republic of Korea (Sejong Science Fellowship, Overseas Research Track)
Jun 2025 – May 2028	**Development and Demonstration of a Physics–AI-Based Ship Carbon Management System for ETS and GFI (Carbon Tax) Regulatory Compliance** • PI: Dr. **Daehyuk Kim** • Institution: Seoul National University	Ministry of SMEs and Startups (MSS), Republic of Korea
Mar 2025 – Apr 2026	**Initial Motion Analysis of Underwater Pneumatic Launching Bodies** • PI: Prof. Shin Hyung Rhee • Institution: Seoul National University	LIG Nex1, Republic of Korea
Jun 2024 – Nov 2027	**Onboard Launch and Recovery Technology for Unmanned Surface Vessel: Development of Seakeeping and Maneuvering Motion Models** • PI: Prof. Shin Hyung Rhee • Institution: Seoul National University	LIG Nex1, Republic of Korea

Completed Projects:

Mar 2025 – Nov 2025	**Ship Intelligent Performance Diagnostics & Operational Control (SHIPDOC)** • PI: Dr. Sung-Yong Lee • Institution: RWTH Aachen University	Ministry of Science and ICT in Korea, Republic of Korea
Mar 2025 – Nov 2025	**Ship operational data driven integrated performance and status analysis (SHIPdata)** • PI: Dr. Sung-Yong Lee • Institution: RWTH Aachen University	RWTH Aachen University, Germany

Mar 2025 – Nov 2025	**Design of Algorithms for Ship Performance Evaluation and Analysis** • PI: Dr. **Daehyuk Kim** • Institution: Seoul National University	Oceanways, Republic of Korea
Feb 2024 – Mar 2025	**Research on Underwater Behavior of Vehicle Body for Mobility Operation in Various Driving Environments, Development of Vehicle Body Underwater Driving Technology to Respond to Flooding Situations** • PI: Prof. Shin Hyung Rhee • Institution: Seoul National University	Hyundai Motor Group, Republic of Korea
Feb 2024 – Jun 2024	**Research on Next-Generation Autonomous Ship Technology Planning** • PI: Dr. **Daehyuk Kim** • Institution: Seoul National University	Samsung Heavy Industries, Republic of Korea
Apr 2024 – Aug 2025	**Seawater Supply System Design Technology for Warship Hull Cooling** • PI: Prof. Shin Hyung Rhee • Institution: Seoul National University	Hanwha Ocean, Republic of Korea
Apr 2023 – Aug 2024	**Exploratory Study on Pump-Jet Propulsion Systems** • PI: Dr. **Daehyuk Kim** • Institution: Seoul National University	Hanwha Ocean, Republic of Korea
Apr 2022 – Jul 2023	**Development of a Propeller Cavitation Performance Analysis Module in Stern Wake Flow Using OpenFOAM** • PI: Dr. **Daehyuk Kim** • Institution: Seoul National University	Hanwha Ocean, Republic of Korea
Nov 2023	**Data Analysis and Classification Project for Enhancing the Utilization of Ulsan Taehwa Lake Data** • PI: Dr. **Daehyuk Kim** • Institution: Seoul National University	Ulsan ICT Propulsion Agency (UIPA), Republic of Korea
Sep 2023 – Oct 2023	**Data Analysis/Processing Project for Ulsan Taehwa Ship: Ship Performance Improvement Service Development** • PI: Dr. **Daehyuk Kim** • Institution: Seoul National University	Ulsan ICT Propulsion Agency (UIPA), Republic of Korea

Sep 2023 – Oct 2023	**Data Analysis/Processing Project for Ulsan Taehwa Ship: Development of Operational Performance Prediction Service using Machine Learning** • PI: Prof. Sewon Kim • Institution: Sejong University	Ulsan ICT Propulsion Agency (UIPA), Republic of Korea
Sep 2023 – Oct 2023	**Data Analysis/Processing Project for Ulsan Taehwa Ship: Optimal Route Search Algorithm using Reinforcement Learning and Monte Carlo Tree Search** • PI: Prof. Taewan Kim • Institution: Seoul National University	Ulsan ICT Propulsion Agency (UIPA), Republic of Korea
Nov 2022 – Feb 2025	**The 2nd, 3rd and 4th Artificial Intelligence Training for Smart Ocean Mobility** • PI: Prof. Jong Hun Woo • Institution: Seoul National University	HD Korea Shipbuilding & Ocean Engineering in Korea (KSOE), Republic of Korea
Apr 2021 – Dec 2022	**Demonstration of AI-Based Heavy Cargo Mobile Logistics Platform** • PI: Dr. **Daehyuk Kim** • Institution: Avikus, HD Hyundai Group	Ministry of Science and ICT in Korea, Republic of Korea
Jan 2021 – Feb 2023	**Development of Smart Port-Autonomous Vessel Integration Technologies** • PI: Dr. **Daehyuk Kim** • Institution: Avikus, HD Hyundai Group	Ministry of Oceans and Fisheries, Republic of Korea
Jan 2021 – Feb 2023	**Development of Autonomous Navigation Systems with Intelligent Route Decision-Making Capabilities** • PI: Dr. **Daehyuk Kim** • Institution: Avikus, HD Hyundai Group	Ministry of Oceans and Fisheries, Republic of Korea
Jan 2021 – Feb 2023	**Development and Performance Testing of Autonomous Intelligent Navigation Systems** • PI: Dr. **Daehyuk Kim** • Institution: Avikus, HD Hyundai Group	Ministry of Trade, Industry and Energy, Republic of Korea
Jan 2021 – Dec 2021	**Development of Advanced Navigation Assistance System for Naval Ships** • PI: Dr. **Daehyuk Kim** • Institution: Avikus, HD Hyundai Group	Hyundai Heavy Industries in Korea, Republic of Korea

Sep 2017 – Oct 2017	**(DSME Ocean Engineering Center 4th Year) Research on Estimating Maneuverability Derivatives of Submersibles and Surface Vessels Using SNUFOAM** • PI: Prof. Shin Hyung Rhee • Institution: Seoul National University	Daewoo Shipbuilding & Marine Engineering, Republic of Korea
Feb 2017 – Jan 2018	**Development of Hydrodynamic Performance Analysis and Attitude Control Technology for Unmanned Vessels** • PI: Prof. Shin Hyung Rhee • Institution: Seoul National University	Korea Institute of Ocean Science and Technology, Republic of Korea
Mar 2017 – Jan 2018	**Construction and Testing/Analysis of a Scale Model for Amphibious Systems** • PI: Prof. Shin Hyung Rhee • Institution: Seoul National University	Agency of Defense Development (ADD), Republic of Korea
Dec 2016 – Dec 2017	**Study on Cooperative Control and Maintenance of Formation under Variation of Pitch and Yaw Angles** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Defense Acquisition Program Administration (DAPA), Republic of Korea
Nov 2016 – Oct 2017	**Jangbogo-III (3,000ton Class Submarine) Batch-II Exploratory Development: CFD Analysis** • PI: Prof. Shin Hyung Rhee • Institution: Seoul National University	Defense Acquisition Program Administration (DAPA), Republic of Korea
Apr 2016 – Sep 2018	**Development of Virtual Test Framework for Autonomous Surface Surveillance and Target Recognition Software** • PI: Prof. Myung-Il Roh • Institution: Seoul National University	Ministry of National Defense (MND), Republic of Korea
Apr 2016 – Jul 2017	**Evaluation of Stability for SWASH-Type High-Speed Test Vessel** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Ministry of National Defense (MND), Republic of Korea
Jun 2016 – Jul 2018	**Study on Hydrodynamic Analysis Technology for High-Speed Maneuvering Vessels** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Ministry of National Defense (MND), Republic of Korea

Dec 2015 – Feb 2017	**Development of an Actual Usage Measurement System for Tax-Exempt Fuel in Fisheries** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Ministry of Oceans and Fisheries, Republic of Korea
Nov 2015 – Nov 2017	**Modeling of Underwater Dynamic Behavior of High-Mobility Submerged Vehicles** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Defense Acquisition Program Administration (DAPA), Republic of Korea
Nov 2015 – Feb 2017	**High-speed Towing Tank Model Test for Multi-phase Flow Surface Vessel** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Ministry of National Defense (MND), Republic of Korea
Dec 2015 – Feb 2017	**Research on Cavity Maintenance and Control with Variation in Angle of Attack and Injection** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Defense Acquisition Program Administration (DAPA), Republic of Korea
Nov 2014 – Feb 2017	**A Study on the Running Characteristics of Super-Cavitating Underwater Vehicle** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Defense Acquisition Program Administration (DAPA), Republic of Korea
Jul 2014 – Jun 2016	**Coning Motion Model Test for Next-Generation Medium Torpedos** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Agency of Defense Development (ADD), Republic of Korea
Feb 2013 – Dec 2014	**Research on Initial Motion Modeling and Robust Control Techniques for Forced Ejection Underwater Vehicles** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Agency of Defense Development (ADD), Republic of Korea
Nov 2012 – May 2015	**Optimal Motion Modeling for Submarine Complex Maneuver Analysis** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Ministry of National Defense (MND), Republic of Korea

Sep 2012 – Dec 2017	**Advanced Hull Form Specialized Research Laboratory for Next-Generation Warships – Research on Predicting Seakeeping and Maneuvering Performance of Future Warships** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Ministry of National Defense (MND), Republic of Korea
May 2012 – Apr 2015	**Research on Supercavitating Underwater Vehicle Attitude Control Techniques in Transitional Regions** • PI: Prof. Nakwan Kim • Institution: Seoul National University	Ministry of Education, Republic of Korea

TEACHING

Teaching Experiences:

2nd Semester, 2024	**Signal Processing**	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)
1st Semester, 2024	**Digital Computer Concept and Practice**	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)
2nd Semester, 2023	**Digital Computer Concept and Practice**	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)

Teaching Assistant (TA) Experiences:

2nd Semester, 2013	**Ship Maneuvering and Control**	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)
1st Semester, 2013	**Principles of Ship Control**	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)
1st Semester, 2012	**Principles of Ship Control**	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)

SCHOLARSHIP

2nd Semester, 2013	**Lecture & Research Scholarship**	KRW 5,677,000	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)
1st Semester, 2013	**Lecture & Research Scholarship**	KRW 3,471,000	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)
1st Semester, 2013	**SNU Development Fund Scholarship**	KRW 2,375,000	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)
2nd Semester, 2012	**Brain Korea 21**	KRW 3,900,000	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)
1st Semester, 2012	**Lecture & Research Scholarship**	KRW 5,087,000	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)
1st Semester, 2008	**National Scholarship for Science and Engineering**	KRW 2,915,000	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)
1st Semester, 2007	**National Scholarship for Science and Engineering**	KRW 2,774,000	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)
2nd Semester, 2006	**National Scholarship for Science and Engineering**	KRW 3,500,000	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)
1st Semester, 2006	**National Scholarship for Science and Engineering**	KRW 3,500,000	Department of Naval Architecture and Ocean Engineering (NAOE), Seoul National University (SNU)

INVITED LECTURES AND TALKS

21 Oct 2025	**Advanced Maritime Mobility Envisioned by the Next Generation** • Research Stay, Achievements, and Perspectives on Advanced Maritime Mobility: Insights from RWTH Aachen University, Germany, and Europe	International Maritime Mobility Forum 2025
18 Oct 2024	**Special Invited Lecture** • Current Status of Smart, Digital, and Autonomous Ship Technology Development	Korea Electrotechnology Research Institute
10 Sep 2024	**National Assembly Policy Seminar** • The importance of operational performance in warships: Beyond design performance, its impact on mission success, offensive capabilities, and defense in future naval operations	The National Assembly of the Republic of Korea
15 Nov 2024	**World Advanced Vision Expo (WAVE) 2024** • Artificial Intelligence technology and the transformation of the shipbuilding and maritime Industry: The gap between reality and ideal	Ulsan City
09 Jan 2024	**2024 Special Lecture on Naval Ship Design** • Unmanned technology application design	Seoul National University
02 Nov 2023	**Ulsan Cluster The 3rd Biz Forum** • Technology trend and core technologies for Digital ship, smart ship, and autonomous ship	Korea Industrial Complex Corporation
06 Oct 2023	**SW Knowledge Plus Lecture for Everyone** • Autonomous ships: Technology, innovation, and the future at sea	Chungnam National University
16 Jun 2023	**2023 Korea Maritime Week and the Ministerial Conference** • Strategy to improve operational efficiency and respond to greenhouse gas regulations based on ship digital actual operation data	Ministry of Oceans and Fisheries

06 Jan 2023	**Special Invited Lecture** • Technology of autonomous ship solutions	Korea Maritime & Ocean University
06 Dec 2022	**Interview from Hart Energy** • Strategy for the commercialization of autonomous ship systems • **Link:** Hart Energy Interview Article	Hart Energy of USA
23 Nov 2022	**Joint Performance Exchange Meeting** • Autonomous Vessel Revolution (Innovative Technologies for Autonomous Ship Bridge)	Korea Offshore & Shipbuilding Association
24 Nov 2022	**Shipbuilding and marine ICT convergence technology seminar and meeting** • Trend of smart & autonomous ship	Korea Industrial Complex Corporation
20 Nov 2022	**Interview from Energy Economy Newspaper** • Autonomous navigation technology makes it easy to significantly reduce fuel and greenhouse gases • **Link:** Energy Ecomony Newspapaer of Korea Article	Energy Economy Newspaper of Korea
26 Oct 2022	**2022 World Ocean Forum** • Commercialization status of low-level autonomous ship solution • **Link:** 2022 World Ocean Forum Video	Ministry of Oceans and Fisheries of Korea
30 Sep 2022	**DigiMariner** • Innovative technologies for autonomous ship bridge (Transoceanic autonomous technology) • **Link:** USA Maritime TV Video	USA Maritime TV
29 Sep 2022	**The 3th K-Mobility Forum** • The future that autonomous ship will change • **Link:** E-daily News Video	KG Group E-daily News
17 Jun 2022	**Special Invited Lecture** • Technology of autonomous ship solutions	Chungnam National University

2 Jun 2022	**KBS News** • Autonomous transoceanic voyage • **Link:** KBS News	Korean Broadcasting System (KBS)
20 Jan 2022	**Special Invited Lecture** • Technology of autonomous ship solutions	Pukyong National University
19 Jan 2022	**2022 Regular Academic Conference of Korean Society for Design Optimization** • Development of autonomous ship navigation assistance and automation solution technology	Korean Society for Design Optimizatoin
08 Dec 2021	**The 4th Industry-Academia Joint Workshop** • Special lecture for smart ship	Korea Offshore & Shipbuilding Association

PROFESSIONAL AFFILIATIONS

Aug 2022 – Present	**Smart & Electric Ship Research Association of Korea** **Title:** Executive committee member and secretary
Jan 2022 – Dec 2025	**The Society of Naval Architects of Korea** **Title:** Cooperative Director and Member
Jul 2023 – Dec 2023	**AI-based Heavy Cargo Mobile Logistics Platform Demonstration Project** **Title:** Expert advisory member
May 2023 – Dec 2023	**Advisory Committee on Design/Build Criteria for Surface Ships Adopting Autonomous Navigation Technology** **Title:** Expert advisory member
Apr 2023 – Dec 2023	**A Study on the Establishment of Strategies for Fostering Specialized Ship Types for Small and Medium-Sized Shipbuilders** **Title:** Expert advisory member

SKILLS

Marine Dynamics and Control:

- Ship Maneuvering Control System Design

- Dynamics Modelling for Marine Structures
- Control Algorithm Research
- Marine Navigation, Guidance and Control

Smart and Autonomous Ship Technology:

- Ship Performance Monitoring Systems
- Machine Learning in Maritime Applications
- Ship and Shipping Digitalization

Marine Hydrodynamics:

- Marine Hydrodynamics
- Experimental Fluid Dynamics
- Model Test based Performance Analysis

REFERENCES

Prof. Shin Hyung Rhee

- **Title:** Professor and Chair of Department of Naval Architecture and Ocean Engineering
- **Institution:** Department of Naval Architecture and Ocean Engineering (NAOE) / Research Institute of Marine Systems Engineering (RIMSE), Seoul National University
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- **Description:**

Professor Dr. Shin Hyung Rhee established a distinguished academic career in fluid dynamics modeling and computational hydrodynamics, building on his early collaboration with Fluent, a leading provider of computational fluid dynamics (CFD) solutions. Since his appointment as an Associate Professor at Seoul National University in 2007, he has devoted nearly two decades to research and education in naval architecture and ocean engineering. He served as the President of the Society of Naval Architects of Korea and the Korean Society for Computational Fluid Dynamics, demonstrating his recognized leadership and long-standing contributions to the field.

Mr. Seunghyup Ryu

- **Title:** Senior Vice President and Head of Digital Research Lab
- **Institution:** HD Korea Shipbuilding & Ocean Engineering
- **Email:** seunghyup.ryu@ksoe.co.kr, ssiori@naver.com
- **Description:**

Senior Vice President Mr. Ryu is a veteran with over 20 years of experience specializing in marine engine research. In 2018, he led the engine division of the Hybrid Electric Propulsion Smart Ship Project at HD Hyundai, while serving as the key technical counterpart for the ship sector. The collaboration from the project's planning phase through its successful delivery in 2022 demonstrated his exceptional expertise in system integration and technical leadership. His deep understanding of propulsion control and coordination between ship and engine systems played a pivotal role in advancing the development of next-generation autonomous and hybrid vessels.

Prof. Jakob Andert

- **Title:** Universitätsprofessor (Full Professor)
- **Institution:** Mechatronics in Mobile Propulsion (MMP), RWTH Aachen University
- **Email:** andert@mmp.rwth-aachen.de
- **Description:**

Professor Dr. Jakob Andert is the head of the Teaching and Research Area Mechatronics in Mobile Propulsion at RWTH Aachen University, a position he has held since 2021. With a strong background in hybrid and electric propulsion systems, he previously served as a Junior Professor for Mechatronic Systems for Combustion Engines and as a Project Manager at FEV GmbH, where he led international development programs for electrified powertrains.