Donghyeon Kim

Marine Physical Laboratory/Scripps Institution of Oceanography
University of California, San Diego 9500 Gilman Dr., La Jolla, CA 92093
+1-619-361-9281
dok054@ucsd.edu

RESEARCH INTERESTS

Underwater Acoustics, Sonar Array Processing, Passive Source Localization, Underwater Communication, Tomography, Machine learning.

EDUCATION

Ph.D., Convergence Study on the Ocean Science and Technology March 2017 – February 2023
Korea Maritime and Ocean University, Busan, Korea

- Dissertation title: "Long-range underwater acoustic communication in the East Sea : Sea-going experiment and performance."
  Dissertation Advisor: Jeasoo Kim, Professor of Ocean Engineering

M.S., Ocean Engineering March 2014 – February 2016
Korea Maritime and Ocean University, Busan, Korea

- Thesis title: "Computationally efficient algorithm for target echoes."
  Thesis Advisor: Jeasoo Kim, Professor of Ocean Engineering

B.S., Ocean Engineering March 2008 – February 2014
Korea Maritime and Ocean University, Busan, Korea

- *summa cum laude* (1/N in Ocean Engineering, 2/M in College of Ocean Science and Engineering
  GPA: 3.770 / 4.000 (4.27 / 4.50)

RESEARCH EXPERIENCE

Postdoctoral research scientist August 2024 – Present
MPL-SIO UCSD, San Diego, CA, USA

Research Professor March 2023 – July 2024
UVRC-KMOU, Busan, Korea

HONORS AND AWARDS

Awards

- *Early Career Award* hosted by the Acoustical Society of Korea, 2025
- *Excellence prize for student researchers hosted by the Ministry of Oceans and Fisheries*, The Korean Association of Ocean Science and Technology Societies, 2022
- *Best Student Paper Awards* at Meeting of the Acoustical Society of Korea, Nov. 2022
- *Best Student Paper Awards* at Meeting of the Acoustical Society of Korea, May. 2019
- *Best Student Paper Awards* at Meeting of the Acoustical Society of Korea, Nov. 2017

PATENTS

1. J. S. Kim, **D. Kim**, S. Cho, and J. Cho, *Motion detection processing method using acoustic signal*, filed by Korea Maritime and Ocean University, KR-20150146418, MAR 2017.

JOURNAL ARTICLES

23. **D. Kim** and G. Byun. (2026). *Journal of Theoretical and Computational Acoustics*, *"Green's function extrapolation with a generalized waveguide invariant."*
22. Y. Lee, **D. Kim**, and G. Byun. (2025). *Journal of the Acoustical Society of Korea*, *"Matched-field processing using phase compensation to correct array tilt mismatch."*
21. **D. Kim** and G. Byun. (2025). *Journal of the Acoustical Society of Korea*, *"Localization of multiple uncorrelated sources using matched field processing with multiple tilt constraints."*
20. Y. H. Choi, G. Byun, **D. Kim**, and J. S. Kim. (2025). *Sensors*, *"Adaptive steered frequency-wavenumber analysis for high-frequency source localization in shallow water."*
19. **D. Kim**, G. Byun, and J. Song, J. S. Kim, and H. C. Song. (2025). *Journal of the Acoustical Society of America*, *"Generalized Taylor expansion of the waveguide invariant for a homogenous waveguide with variable bathymetry (L)."*
18. **D. Kim**, G. Byun, and H. C. Song. (2025). *Journal of the Acoustical Society of America*, *"Double beamforming with a vertical receiver array and a ship of opportunity."*
17. **D. Kim**, G. Byun, S. Cho, and H. C. Song. (2025). *Journal of the Acoustical Society of America*, *"Striation-based beamforming for a ship of opportunity in shallow water."*
16. D. Kim, **D. Kim**, G. Byun, J. S. Kim, and H. C. Song. (2024). *Sensors*, *"Improvement of a Green's function estimation for a moving source using the waveguide invariant theory."*
15. G. Byun, **D. Kim**, and S. Byun. (2024). *Journal of the Acoustical Society of Korea*, *"Waveguide invariant-based source-range estimation in shallow water environments featuring a pit."*
14. **D. Kim**, G. Byun, D. Kim, and J. S. Kim. (2024). *Journal of the Acoustical Society of Korea*, *"The relationship between the array invariant-based ranging and the effective range in a weakly range-dependent environment."*
13. **D. Kim**, G. Byun, J. S. Kim, and K. C. Shin. (2024). *Journal of the Acoustical Society of Korea*, *"Gram-Schmidt process based adaptive time-reversal processing."*
12. S. Jeong, W. Chung, S. Shin, **D. Kim**, J. S. Kim, G. Byun, and D. Lee. (2023). *Geophysics and Geophysical Exploration*, *"Development of dolphin click signal classification algorithm based on recurrent neural network for marine environment monitoring."*
11. **D. Kim**, G. Byun, and J. S. Kim. (2022). *Sensors*, *"Direction-of-arrival estimation based on frequency difference–wavenumber analysis for sparse vertical array configuration."*
10. **D. Kim**, J. S. Kim, and J. Song. (2022). *JASA Express Letters*, *"Cancellation of dolphin sonar clicks in a communication signal based on adaptive time reversal processing."*
9. **D. Kim**, J. S. Kim, and J. Hahn. (2022). *Sensors*, *"Long-range underwater communication based on time reversal processing using various diversity methods."*
8. **D. Kim**, H. Park, J. S. Kim, and J. Hahn. (2022). *Journal of the Acoustical Society of Korea*, *"Application of ray-based blind deconvolution to long-range acoustic communication in deep water."*

7. **D. Kim**, J. S. Kim, and J. Hahn. (2021). *Journal of the Acoustical Society of Korea, "Verification of the feasibility of higher-order modulation for long-range communication in deep water."*
6. **D. Kim**, D. Kim, J. S. Kim, and J. Hahn. (2021). *Journal of the Acoustical Society of Korea, "Long-range multiple-input-multiple-output underwater communication in deep water."*
5. **D. Kim**, H. Park, J. S. Kim, J. Park and J. Hahn. (2019). *Journal of the Acoustical Society of Korea, "Performance analysis of underwater acoustic communication based on beam diversity in deep water."*
4. H. Park, **D. Kim**, J. S. Kim, J. Hahn, and J. Park. (2019). *Journal of the Acoustical Society of Korea, "Performance improvement of long-range underwater acoustic communication in deep water using spatiotemporal diversity."*
3. Y. Choi, **D. Kim**, and J. S. Kim. (2019). *Journal of the Acoustical Society of Korea, "Direction finding based on Radon transform in frequency-wavenumber domain with a sparse array."*
2. S. Cho, **D. Kim**, and J. S. Kim. (2019). *Journal of the Acoustical Society of Korea, "Source depth discrimination based on channel impulse response."*
1. H. Park, **D. Kim**, J. S. Kim, H. C. Song and J. Hahn. (2018). *Journal of the Acoustical Society of Korea, "Performance analysis and verification of underwater acoustic communication simulator in medium long-range multiuser environment."*

PROFESSIONAL ACTIVITIES

Special session organizing chair

- International Conference of Theoretical and Computational Acoustics (ICTCA) 2025, Busan, Korea, 2025 [Session title: Model-based and data-driven approaches in underwater acoustics]

Invited talks

- 189^{th} Meeting of Acoustical Society of America – Joint with Acoustical Society of Japan, Hawaii, 2025 [D. Kim, G. Byun, and H. C. Song, *Estimating launch and reception angles with a single source and a vertical receiver array*]
- Applied Ocean Science (AOS) seminar, Scripps Institution of Oceanography, 2025
- Korea Maritime and Ocean University (KMOU), 2025
- Korea Research Institute of Ships & Ocean Engineering (KRISO), 2024
- Korea Maritime and Ocean University (KMOU), 2024

Journal referee for

- Journal of the Acoustical Society of America
- Journal of Theoretical and Computational Acoustics

FUNDED PROJECTS

6. (YT's funding), the U.S. Office of Naval Research (ONR), Researcher, 02/01/26 – Present.
5. Moving ship tomography, the U.S. Office of Naval Research (ONR), Researcher, 08/01/24 – 01/31/26.
4. Basic Science Research Program through the National Research Foundation of Korea (NRF), the Ministry of Education, RS-2023-00271645, P.I., 09/01/23 – 07/31/24.

3. Optimization of Transmission and Received Signals for Simultaneous Torpedo Operation: Research and Validation Equipment Implementation, LIG Nex1, Researcher, 06/01/23 − 04/30/24.
2. Ocean Environmental Survey Analysis and Sensor Deployment Strategy, Korea Institute of Ocean Science & Technology (KIOST), Researcher, 03/01/23 − 08/31/23.
1. Long Range Biomimetic Covert Underwater Acoustic Communication Research Laboratory (BC-4 : Study on Long-Range Underwater Acoustic Communication) through the National Research Foundation of Korea (NRF), the Ministry of Science and ICT, Hands-on staff (Ph.D. course), 12/01/17 − 12/15/22.

TEACHING EXPERIENCE

- (August 2026 − December 2026, for undergraduate students) TBD
- (August 2026 − December 2026, for graduate students) TBD
- (March 2022 − Jun 2022, for undergraduate students) Underwater Acoustics
- (March 2022 − Jun 2022, for graduate students) Advanced Engineering Mathematics
- (August 2022 − December 2022, for graduate students) Sonar Engineering
- (August 2022 − December 2022, for graduate students) Advanced Numerical Analysis
- (August 2023 − December 2023, for graduate students) Sonar Signal Processing

SEA-GOING EXPERIENCE

Since 2018, I have participated in extensive sea-going experiments. The purpose of these experiments is to establish the feasibility of long-range underwater acoustic communication in deep water near South Korea. My roles in these experiments are as follows: (1) Designing the entire experiment plan as hands-on staff (e.g., entire timetable, ship track, range between source and receiver, source/receiver depth, etc.), (2) collaborating with and communicating with companies that manufacture the source and receiving equipment, and (3) analyzing the experimental data obtained from the receiver.

TECHNICAL SKILLS

Acoustic Propagation Models

- KRAKEN, BELLHOP, RAM, OASES

Programming Languages

- MATLAB, LaTeX, Python