Jihwan Kim

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EDUCATION

Ph.D. in Physical Oceanography **2019–**

School of Earth and Environmental Sciences, College of Natural Sciences, Seoul National Univ. **2023**

Graduated as the youngest and fastest to complete a Ph.D. in Physical Oceanography in Korea

B.S. in Earth Science Education **2013–**

College of Education, Seoul National University **2018**

**Compulsory Military Service in 2015–2016

RESEARCH INTERESTS

- Pelagic fisheries and upper-ocean current systems in the Northwestern Pacific
- Statistical forecasting methods for fisheries and environmental data
- Machine learning applications for sustainable fishing practices, including super-resolution of coarse spatial-temporal data and forecasting future fishing grounds

SKILLS

- **Languages**: Native Korean, Professional working proficiency in English and Japanese
- **Programming**: Expert in MATLAB, Python, Julia, Fortran, and Front-end (Vue, React, Flutter)
- **Data analysis**: Expert in Spatio-temporal data analysis (EOF analysis, CSEOF analysis), Regression analysis, Data visualizations, GIS, and Machine-learning based time-series prediction using TensorFlow
- **Data management**: Highly skilled in Data warehousing (MySQL, Dashboard)
- **Application**: Expert in MS Office (Excel, Word, and PowerPoint)

TEACHING EXPERIENCE

- **Teaching Assistant at Seoul National University**

  Physical Oceanography (Spring 2019)

  Observation and Comprehension of Natural Disasters (Fall 2019, Spring 2020)

  Theory and Practice in Computational Sciences 1 (Spring 2022)

- **Lectures at Seoul National University**

  Computational Science: Subject Research (The Missing Semester of CS Education) (Spring 2021)

HONORS AND AWARDS

- **JOISS Marine Science Big Data Competition** **2021–2022**
  2nd Prize rewarded by Chairman of the Korea Oceanographic Society (2021 and 2022, respectively). JOISS Marine Science Big Data Competition is selected as the UN Ocean Decade Activity.
- **Succeeding Generations of Fundamental Sciences Fellowship** **2019–2020**
  Selected in the field of Oceanography. Seoul National University awarded a full scholarship to graduate students who can be a succeeding leader of education and research in fundamental sciences.
- **Travel Grants for Young Scientists**
  PICES 30th annual meeting in Busan, Republic of Korea (2022)

EXPERIENCE

- **Ocean Engineer, Sustainable Fisheries Management Team, Collecte Localisation Satellites (CLS) – France & Japan** **2025–**
  - Directed oceanographic analysis to optimize tuna fishing vessel operations, ensuring compliance with safety regulations and sustainable fishing guidelines
  - Utilized real-time oceanographic data and predictive modelling to monitor tuna fishing vessel operations, enhancing operational efficiency and fuel conservation.
  - Played a key role in the design and implementation of the CATSAT system, a satellite-based fisheries monitoring solution, contributing to improved vessel tracking, data collection, and fisheries management decision-making.
- **Data & Fisheries Science Advisor to the North Pacific Fisheries Commission** **2024–**
  - **Resource Management - Pacific Saury**:
    - Delivered presentations and prepared publications on the spatial-temporal variability in catch per unit effort of Pacific saury (*Cololabis saira*) and its relationship with interannual basin-scale environmental variability in the North Pacific.
    - Presented research on stochastic statistical simulations for forecasting the spatial-temporal distribution of Pacific saury based on observational data in the Northwestern Pacific.
    - Developed and presented the "Physically Consistent Super-Resolution of Pacific Saury Spatio-Temporal Distribution Using Multi-head Attention U-Net."

- **Resource Management - Chub Mackerel**:
  - Investigated and reported on the effects of Kuroshio Current variability and the Pacific Decadal Oscillation on the recent decline in Chub Mackerel (*Scomber japonicus*) catch in the Northwestern Pacific during the 2020s.
- **GIS & Data Integration**:
  - Developed a GIS-based mapping system to visualize and analyze Neon Flying Squid catch and effort data submitted by North Pacific Fisheries Commission members.
- **Compliance Analytics & Reporting**:
  - Designed matching algorithms to integrate Vessel Monitoring System (VMS) data with submitted transshipment documents, high seas boarding inspection reports, and Automatic Identification System data, thereby detecting potential non-compliance.
  - Produced and presented comprehensive reports on Fisheries Overview, Transshipment Overview, and VMS Overview at North Pacific Fisheries Commission Meetings in Osaka (2024 and 2025).
  - Compiled the 2024 North Pacific Fisheries Commission Fisheries and Marine Resources Inventories for inclusion in the Food and Agriculture Organization's Fisheries and Resources Monitoring System.

- **Postdoctoral Fellowship in the North Pacific Fisheries Commission and Tokyo University of Marine Science and Technology** **2023–2024**
  - **Resource Management - Pacific Saury**:
    - Prepared a presentation and publication titled "The Interannual to Decadal Relationship Between Total Catch Variability of Pacific Saury (*Cololabis saira*) and Basin-Scale Ocean Environmental Variability in the North Pacific."
  - **Resource Management - Chub Mackerel**:
    - Prepared a presentation and publication on "Assessment of the Interannual to Decadal Relationship Between Catch and Population Variability of Chub Mackerel (*Scomber japonicus*) in Japan and Basin-Scale Ocean Environmental Variability in the North Pacific."
  - **Catch Reporting Measures**:
    - Developed strategic measures for reprinting catches to improve accuracy in fisheries reporting.
  - **GIS-Based Mapping**:

- Designed and implemented a GIS-based mapping system for Neon Flying Squid catch and effort data from North Pacific Fisheries Commission members.

- **IUU Fishing Measures**:
  - Developed algorithms for the Vessel Monitoring System to detect IUU fishing vessels.
  - Created algorithms to integrate and match air surveillance data with VMS data for enhanced detection and monitoring.

- **High school Science Teacher** **2018–2019**
  Earth Science Teacher at Sehwa High School, Seoul, Republic of Korea

- **Auxiliary Policeman (Compulsory Military Service)** **2015–2016**
  Strike Force of the Police in Gangwon Province, Republic of Korea

EXPERIENCE IN FUNDED PROJECT

- **A study on upstream-downstream connectivity of the western boundary current in the North Pacific and its relationship with mesoscale eddy activity** **2019–2023**
  funded by the National Research Foundation of the Republic of Korea
  investigates the Kuroshio current variability and its ecological impact variability

- **Seychelles-Chagos Thermocline Ridge Pilot Time-series Observation Initiative**
  funded by the Korea Institute of Ocean Science Technology
  investigates upwelling and related ecological variability in Seychelles-Chagos Thermocline Ridge

- **East Asian Seas Time-series** **2021– 2023**
  funded by the Ministry of Land, Transport and Maritime Affairs, Korea
  investigates ocean-environmental variability (physical, biological, etc.) in the East/Japan Sea

FIELD EXPERIENCE

- **The East China Sea and Yellow Sea (CTD, ADCP, DO sampling)**
  R/V ONNURI (Jul 2022)

- **The Korea/Tsushima Strait (Induced voltage measurement on submarine cable)**
  Submarine cable voltage measurement between Busan, Republic of Korea and Hamada, Japan.
  Volume transport through the Korea/Tsushima Strait can be estimated from the motion-induced

voltage on submarine cable across the strait. Submarine cable voltage observations were stopped on May 17, 2017 owing to a measurement equipment failure and re-initiated on Dec 13, 2020. Jihwan Kim devised and built a new observation solution, a new data analysis method, and a cloud data server.

PRESENTATIONS

- **2024 Vessel Monitoring System Overview** **Mar, 2025**
  8th TCC Meeting, Osaka, Japan, Mar 20, 2025
- **2024 Transshipment Overview**
  8th TCC Meeting, Osaka, Japan, Mar 19, 2025
- **Revised GIS-based mapping system for Neon Flying Squid (*Ommastrephes bartramii*) catch and effort data from members of the North Pacific Fisheries Commission** **Dec, 2024**
  14th SSC PS meeting, Tokyo, Japan, Dec 18, 2024
- **Spatial-temporal variability in catch per unit effort of Pacific saury (*Cololabis saira*) and its relationship to interannual basin-scale environmental variability in the North Pacific** **Aug, 2024**
  13th SSC PS meeting, Online, Aug 27, 2024
- **Effects of Kuroshio Current Variability and Pacific Decadal Oscillation on Recent Decline in Chub Mackerel (*Scomber japonicus*) Catch in the Northwestern Pacific in the 2020s** **Jul, 2024**
  9th TWG CSMA Meeting, Yokohama, Japan, Jul 19, 2024
- **Vessel Monitoring System Overview from 2022 to 2023** **Apr, 2024**
  7th TCC Meeting, Osaka, Japan, Apr 9, 2024
- **A GIS-based mapping system for Neon Flying Squid (*Ommastrephes bartramii*) catch and effort data from members of the North Pacific Fisheries Commission** **Dec, 2023**
  12th SSC PS meeting, Nanaimo, Canada, Dec 18, 2023
- **The interannual to decadal relationship between total catch variability of Pacific saury (*Cololabis saira*) and basin-scale ocean environmental variability in the North Pacific** **Dec, 2023**
  12th SSC PS meeting, Nanaimo, Canada, Dec 12, 2023
- **Monitoring volume transport through measurement of cable voltage across the Korea Strait Since November 2020** **Nov, 2022**
  Korea Oceanographic Society Autumn Conference, Gangneung, Republic of Korea, Nov 2, 2022
- **Interannual variability of barotropic sea level difference across the Korea/Tsushima Strait and its relationship to upper-ocean currents variability in the western North Pacific** **Sep, 2022**
  PICES-2022 annual meeting, Busan, Republic of Korea, Sep 30, 2022

- **Interannual variability of barotropic sea level difference across the Korea/Tsushima Strait and its relationship to upstream Kuroshio variability** **Mar, 2022**
  Ocean Sciences Meeting, Online Everywhere, Mar 3, 2022
- **Interannual variability of Yellowfin tuna (*Thunnus albacares*) and Bigeye tuna (*Thunnus obesus*) catches in the southwestern tropical Indian Ocean and its relationship to climate variability** **Dec, 2020**
  AGU Fall Meeting, Online Everywhere, Dec 7, 2020
- **Potential Predictability of Skipjack Tuna (*Katsuwonus pelamis*) Catch in the Western Central Pacific** **Oct, 2019**
  Korea Oceanographic Society Autumn Conference, Gangneung, Republic of Korea, Oct 31, 2019

PUBLICATIONS

- **Jihwan Kim** and Hanna Na (2022), Interannual Variability of Yellowfin Tuna (*Thunnus albacares*) and Bigeye Tuna (*Thunnus obesus*) Catches in the Southwestern Tropical Indian Ocean and Its Relationship to Climate Variability, *Frontiers in Marine Science*, **9**, 857405
- **Jihwan Kim**, Hanna Na, Young-Gyu Park, and Young Ho Kim (2020), Potential Predictability of Skipjack Tuna (*Katsuwonus pelamis*) Catches in the Western Central Pacific, *Scientific Reports*, **10**, 3193.

MANUSCRIPT SUBMITTED

- **Jihwan Kim**, Libin Dai, Christopher N. Rooper, Yi-Jay Chang, Jhen Hsu, Hyejin Song, Vladimir Kulik, Mei-chin Juan, Robert Day, Aleksandr Zavolokin, Rentaro Mitsuyu, and Toshihide Kitakado, Spatio-temporal variability of density distribution of Pacific saury (Cololabis saira) and its relationship to basin-scale Ocean environmental variability in the North Pacific
- **Jihwan Kim**, Christopher N. Rooper, Shota Nishijima, Kazuhiro Oshima, Robert Day, and Aleksandr Zavolokin, Effects of Kuroshio Current Variability and Pacific Decadal Oscillation on Recent Decline in Chub Mackerel (*Scomber japonicus*) Catch in the Northwestern Pacific in the 2020s

MANUSCRIPT IN PREPARATION

- **Jihwan Kim**, Libin Dai, Christopher N. Rooper, Shinichiro Nakayama, Yi-Jay Chang, Jhen Hsu, Hyejin Song, Vladimir Kulik, Me-chin Juan, Robert Day, Aleksandr Zavolokin, Rentaro Mitsuyu, and Toshihide Kitakado, Stochastic statistical simulations of spatial-temporal distribution of Pacific saury (*Cololabis saira*) and its forecast based on observational data in the Northwestern Pacific

- **Jihwan Kim** and Hanna Na, Assessment of the Favorable Ocean Conditions and Potential Predictability of Annual Catch amounts of Skipjack tuna (*Katsuwonus pelamis*), Yellowfin tuna (*Thunnus albacares*), and Bigeye Tuna (*Thunnus obesus*) in the Western Central Pacific