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Contact

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Professional Appointments

- 2019-present Assistant Scientist (tenure-track), Dept. of Marine Chemistry & Geochemistry, Woods Hole Oceanographic Institution, Woods Hole, MA
- 2017-2019 Postdoctoral Research Associate, Dept. of Environmental Sciences, University of Virginia, Charlottesville, VA (advisor: Dr. Scott C. Doney)
- 2017 Postdoctoral Research Scientist, Division of Biology & Paleo Environment, Lamont-Doherty Earth Observatory, Columbia University, Palisades, NY (advisor: Dr. Hugh W. Ducklow)

Education

- 2017 Ph.D., Columbia University, Dept. of Earth & Environmental Sciences, Lamont-Doherty Earth Observatory, New York, NY. Dissertation: "*Microbial interactions in coupled climate-biogeochemical systems*" (advisor: Dr. Hugh W. Ducklow)
- 2012 M.S., University of Rhode Island, Graduate School of Oceanography, Narragansett, RI. Dissertation: "*Bloom formation of toxic raphidophyte *Heterosigma akashiwo* in response to ocean acidification*" (advisor: Dr. Susanne Menden-Deuer)
- 2010 B.S., Seoul National University, School of Earth & Environmental Sciences, Seoul, South Korea

Honors & Awards

- 2016 Antarctica Service Medal recipient, United States Antarctic Program
- 2014 C-MORE summer course participant, University of Hawai'i at Mānoa
- 2013 Dean's Fellow (*offered to top entering student*), Columbia University, Graduate School of Arts & Sciences
- 2012 Travel Award recipient, National Oceanic and Atmospheric Administration

Grants & Funding

- 2021 WHOI Independent Study Award (\$64,721). "*Developing a multi-scale modeling approach to reconcile the carbon budget in the ocean's twilight zone*"
- 2021 WHOI Independent Research & Development Award (\$68,412). "*Predicting coupled ice-ocean-biogeochemical interactions along the warming West Antarctic Peninsula*"
- 2020 WHOI Independent Research & Development Award (\$62,956). "*Quantifying microbial control of the global oceanic carbon sink*"

Professional Affiliations

- Member, American Geophysical Union (AGU)
- Member, European Geosciences Union (EGU)
- Member, The Oceanography Society (TOS)
- Member, Association for the Sciences of Limnology & Oceanography (ASLO)

Publications (peer-reviewed)

Kim, H. H., Luo, Y.-W., Ducklow, H. W., Schofield, O. M., Steinberg, D. K., and Doney, S. C. (2021). WAP-1D-VAR v1.0: development and evaluation of a one-dimensional variational data assimilation model for the marine ecosystem along the West Antarctic Peninsula, *Geoscientific Model Development*, 14, 4939–4975, <https://doi.org/10.5194/gmd-14-4939-2021>

Kim, H. H., Bowman, J. S., Luo, Y.-W., Ducklow, H. W., Schofield, O. M., Steinberg, D. K., and Doney, S. C. (2020). Microbial diversity-informed modelling of polar marine ecosystem functions, *Biogeosciences*. [preprint], <https://doi.org/10.5194/bg-2020-302>, *in revision*.

Kim, H., D. E. Lee, and H. W. Ducklow (2019). Winter extratropical cyclones as a potential driver of a long-term decline of bacterial production in the Sargasso Sea near Bermuda. *Geophysical Research Letters*, 46 (10), 5404–5412. <https://doi.org/10.1029/2018GL081243>

Kim, H., D. E. Lee, and H. W. Ducklow (2018). Mixing regime-dependent causality between phytoplankton and bacteria in the subtropical North Atlantic Ocean ecosystem. *Marine Ecology Progress Series*, 600, 41–53. <https://doi.org/10.3354/meps12643>

Kim, H., H. W. Ducklow, D. Abele, E. M. R. Barlett, A. G. J. Buma, M. P. Meredith, P. D. Rozema, O. M. Schofield, H. J. Venables, and I. R. Schloss (2018). Inter-decadal variability of phytoplankton biomass along the coastal West Antarctic Peninsula. *Philosophical Transactions of the Royal Society A*, 376 (2122), 20170174. <https://doi.org/10.1098/rsta.2017.0174>

Kim, H. and H. W. Ducklow (2016). A decadal (2002–2014) analysis for dynamics of heterotrophic bacteria in an Antarctic coastal ecosystem: Variability and physical and biogeochemical forcings. *Frontiers in Marine Science*, 3 (214), 1–18. <https://doi.org/10.3389/fmars.2016.00214>

Kim, H., S. C. Doney, R. A. Iannuzzi, M. P. Meredith, D. G. Martinson, and H. W. Ducklow (2016). Climate forcing for dynamics of dissolved inorganic nutrients at Palmer Station, Antarctica. *Journal of Geophysical Research: Biogeosciences*, 121 (9), 2369–2389. <https://doi.org/10.1002/2015JG003311>

Kim, H., Y. H. Kim, S.-G. Kang, and Y.-G. Park (2016). Development of environmental impact monitoring protocol for offshore carbon capture and storage (CCS): A biological perspective. *Environmental Impact Assessment Review*, 57, 139–150. <https://doi.org/10.1016/j.eiar.2015.11.004>

Kim, H. and S. Menden-Deuer (2013). Reliability of rapid, semi-automated assessment of plankton abundance, biomass, and growth rate estimates: Coulter Counter versus light

microscope measurements. *Limnology & Oceanography: Methods*, 11 (7), 381–393.
<https://doi.org/10.4319/lom.2013.11.382>

Kim, H., A. J. Spivack, and S. Menden-Deuer (2013). pH alters the swimming behaviors of the raphidophyte *Heterosigma akashiwo*: Implications for bloom formation in an acidified ocean. *Harmful Algae*, 26, 1–11. <https://doi.org/10.1016/j.hal.2013.03.004>

Invited presentations

2021 Scripps Institution of Oceanography, University of California San Diego, CA
 2020 Woods Hole Oceanographic Institution, Dept. of Biology, Woods Hole, MA
 2019 Seoul National University, School of Earth & Environmental Sciences, South Korea
 2019 Korea Polar Research Institute, South Korea
 2019 Chungnam National University, Ocean Environmental Sciences, South Korea
 2019 University of Delaware, School of Marine Science & Policy, Newark, DE
 2019 Woods Hole Oceanographic Institution, Dept. of Marine Chemistry & Geochemistry
 2017 University of Virginia, Dept. of Environmental Sciences, Charlottesville, VA
 2016 Princeton University, Atmospheric & Oceanic Sciences, Princeton, NJ
 2015 Seoul National University, School of Earth & Environmental Sciences, South Korea

Student & Postdoc Advising

Postdocs

2021 Ashley Dinauer, *National Science Foundation Postdoctoral Fellow*, Universität Bern, Switzerland, *expected to join the Kim Lab in December 2021

Students

2020 Oreoluwa Solanke, *WHOI Summer Student Fellow*, Columbia University, Dept. of Earth Science
 2018 Kira Baugh, *UVA-EVSC undergraduate mentee*, University of Virginia, Dept. of Environmental Sciences

Teaching Experience

MIT-WHOI Joint Program

Fall 2020 Instructor, MIT-WHOI 12.747 Modeling, Data Analysis & Numerical Techniques for Geochemistry

Columbia University

Fall 2016 Teaching assistant, UN1030 Oceanography
 2015-2016 Teaching Assistant, UN2100 Earth's Environmental System: Climate System
 2015 Guest Instructor, Double Discovery Center

University of Rhode Island

Fall 2012 Teaching Assistant, OCG301 General Oceanography
 2010-2012 Outreach Scientist, Office of Marine Programs

Abstracts & Presentations (*asterisk denotes student advisee)

Mete, O. Z., A. G. Dunlea, **H. H. Kim**, and T. J. Horner (2021). Distribution of dissolved barium in seawater: a machine learning approach. *WHOI Summer Student Fellow Presentation, Virtual*.

- Subhas, A. V., **H. H. Kim**, K. O. Buesseler (2021). Navigating the ocean's role in carbon dioxide removal. *Ocean Decade: U.S. Launch Meeting, Virtual*.
- Kim, H. H.**, J. S. Bowman, Y.-W. Luo, H. W. Ducklow, O. M. Schofield, D. K. Steinberg, and S. C. Doney (2021). Combining microbial observations and biogeochemical modeling: variational data assimilation models. *Ocean Carbon & Biogeochemistry Meeting, Virtual*.
- Kim, H.**, J. S. Bowman, Y.-W. Luo, H. W. Ducklow, O. M. Schofield, D. K. Steinberg, and S. C. Doney (2020). Microbial diversity-informed modelling of the polar marine ecosystem functions. *AGU Fall Meeting, Virtual*.
- *Solanke, O. and **H. Kim** (2020). Quantifying the biogeochemical role of microbial communities at the Bermuda Atlantic Time-series Study site. *AGU Fall Meeting, Virtual*.
- *Solanke, O. and **H. Kim** (2020). Quantifying the biogeochemical role of microbial communities at the Bermuda Atlantic Time-series Study site. *WHOI Summer Student Fellow Presentation, Virtual*.
- Chamberlain, E., **H. Kim**, S. C. Doney, and J. S. Bowman (2020). Leveraging microbial community structure data to inform ecosystem modeling, an approach based on microbial community segmentation. *Ocean Sciences Meeting, San Diego, CA*.
- Kim, H.**, Y.-W. Luo, H. W. Ducklow, O. M. Schofield, D. K. Steinberg, and S. C. Doney (2020). Bacteria-mediated carbon cycling in the warming polar ocean revealed by data assimilation modeling. *Ocean Sciences Meeting, San Diego, CA*.
- Kim, H.**, Y.-W. Luo, H. W. Ducklow, O. M. Schofield, D. K. Steinberg, and S. C. Doney (2019). Data assimilative modeling of an Antarctic coastal ecosystem: Impacts of microbial food-web interactions on upper-ocean carbon cycling in a changing climate. *ASLO Aquatic Sciences Meeting, San Juan, PR*.
- Kim, H.**, Y.-W. Luo, and S. C. Doney (2019). Data assimilative ecosystem modeling of bacterial dynamics and upper-ocean carbon cycling in the coastal West Antarctic Peninsula. *University of Virginia, Charlottesville, VA*.
- *Baugh, K. R., **H. Kim**, and S. C. Doney (2019). The effects of hurricanes of the monthly anomalies of pH and dissolved inorganic carbon at the Bermuda Atlantic Time-series Study site. *Undergraduate Research Symposium, University of Virginia, Charlottesville, VA*.
- *Baugh, K. R., **H. Kim**, and S. C. Doney (2019). The effects of hurricanes of the monthly anomalies of pH and dissolved inorganic carbon at the Bermuda Atlantic Time-series Study site. *EnviroDay, University of Virginia, Charlottesville, VA*.
- Chamberlain, E., **H. Kim**, S. C. Doney, and J. S. Bowman (2019). Leveraging microbial community structure to inform trait-based modeling, an approach based on microbial community segmentation. *Trait-Based Approaches to Ocean Life Workshop, Buckinghamshire, U.K.*

- Kim, H.,** Y.-W. Luo, and S. C. Doney (2018). Data assimilative modeling of polar marine ecosystem dynamics using a variational adjoint scheme. *University of Virginia, Charlottesville, VA.*
- Kim, H.,** Y.-W. Luo, and S. C. Doney (2018). Data assimilative ecosystem modeling of bacterial dynamics and upper-ocean carbon cycling in the coastal West Antarctic Peninsula. *Ocean Carbon & Biogeochemistry Meeting, Woods Hole, MA.*
- Kim, H.,** D. E. Lee, and H. W. Ducklow (2018). Wintertime extratropical cyclones drive a long-term bacterial trend at the Bermuda Atlantic Time-series (BATS) site. *University of Virginia, Charlottesville, VA.*
- Kim, H.,** D. E. Lee, and H. W. Ducklow (2018). Wintertime extratropical cyclones drive a long-term bacterial trend at the Bermuda Atlantic Time-series (BATS) site. *Ocean Sciences Meeting, Portland, OR.*
- Ducklow, H. W., M. R. Stukel, J. S. Bowman, **H. Kim,** N. Cassar, R. Eveleth, Z. Li, S. Doney, S. F. Sailley, T. D. Jickells, A. R. Baker, R. Chance (2016). Exploring estimates of net community production and export along the Western Antarctic Peninsula (WAP), 1993-2014. *AGU Fall Meeting, San Francisco, CA.*
- Kim, H.** (2016). Palmer LTER: Revealing ecological interactions in the coupled climate-biogeochemical system based on observations and data-driven modeling. *Palmer Long-Term Ecological Research (LTER) Annual Meeting, New Brunswick, NJ.*
- Kim, H.,** S. C. Doney, R. A. Iannuzzi, M. P. Meredith, D. G. Martinson, D. E. Lee, and H. W. Ducklow (2016). Palmer LTER: Climate-biogeochemical coupling in an Antarctic coastal ecosystem. *Ocean Carbon & Biogeochemistry Meeting, Woods Hole, MA.*
- Kim, H.,** S. C. Doney, R. A. Iannuzzi, M. P. Meredith, D. G. Martinson, and H. W. Ducklow (2016). Climate-biogeochemical coupling in an Antarctic coastal ecosystem. *Ocean Sciences Meeting, New Orleans, LA.*
- Kim, H.** and H. W. Ducklow (2015). Physical forcing of bacterial dynamics at Palmer Station, Antarctica. *LTER All Scientists Meeting, Estes Park, CO.*
- Huete-Stauffer, T. M., C. Bunse, C. J. Closek, R. M. Gradoville, R. Mohamed, C. Moreno, J. Taylor, P. Wilburn, M. A. Budinich Abarca, T. Burrell, M. T. Gazitua Zavala, C. Gimpel, **H. Kim,** W. L. Liao, L. Peoples, A. Vislova (2015). Genomes to Biomes: C-MORE Summer Course on Microbial Oceanography. *ASLO Aquatic Sciences Meeting, Granada, Spain.*
- Kim, H.,** D. G. Martinson, R. A. Iannuzzi, and H. W. Ducklow (2014). Interannual variability in seasonal drawdown of dissolved inorganic nutrients at Palmer Station, Antarctica. *AGU Fall Meeting, San Francisco, CA.*
- Kim, H.,** D. G. Martinson, and H. W. Ducklow (2014). Physical and climate controls on drawdown of dissolved inorganic nutrients at Palmer Station: A 20-year study (1992-2012). *Palmer LTER Annual Meeting, Williamsburg, VA.*

Kim, H. and S. Menden-Deuer (2014). Effects of ocean acidification-induced swimming behaviors on population distributions and primary production of the raphidophyte *Heterosigma akashiwo*. *Ocean Sciences Meeting, Honolulu, HI.*

Kim, H. and S. Menden-Deuer (2012). Future-ocean $p\text{CO}_2$ condition alters the movement behaviors of the toxic *Heterosigma akashiwo*: implications for harmful algal bloom formation in an acidifying ocean. *International Conference on Harmful Algae, Changwon, South Korea.*

Kim, H. and S. Menden-Deuer (2011). Feasibility of rapid, automated assessment of phytoplankton abundance, biomass, and growth rate: Coulter Counter vs. light microscope. *U.S. Symposium on Harmful Algae, Austin, TX.*

Proceedings & Books

Nam, S. H., **H. Kim**, and C. Y. Hwang (2015). Blue Planet Earth Series: 4. Polar Research, Approaching with Science. *eBook, Books I & I, KSI*

Kim, H. and S. Menden-Deuer (2014). Estimating the effects of ocean acidification-induced behavioral shifts on primary production of *Heterosigma akashiwo*. *Proceedings of the International Society for the Study of Harmful Algae*

Kim, H. and Y. H. Kim (2013). Review of environmental risk assessment, regulations, standards on Carbon Capture and Storage. *Development of Technology for CO₂ Marine Geological Storage Research & Development Report*

Academic Service

WHOI institutional service

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| 2021-present | First Year Student Academic Advising Committee |
| 2020-present | Thesis Committee Member of Noah Germolus (MIT-WHOI Joint Program, advisor: Dr. Elizabeth Kujawinski) |
| 2020-2021 | Dept. of Marine Chemistry & Geochemistry seminar organizer |

Session organizer & panelist

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| 2019 | Session organizer/co-chair, "Changing biogeochemistry and ecology across polar aquatic systems in the 21 st century", Aquatic Sciences Meeting, San Juan, PR. |
| 2018 | Session organizer/co-chair, Postdoctoral Symposium, University of Virginia, Charlottesville, VA. |
| 2017 | Science panelist/poster judge, Polar-ICE Student Polar Research Symposium, Rutgers University |
| 2016 | Science panelist, film screening, "Antarctic Edge: 80 degrees South", Columbia University Alumni Associations STEM Day, Columbia University |

Service at academic conferences

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| 2020 | Student presentation evaluator, American Geophysical Union Fall Meeting |
| 2020 | Student poster evaluator, Ocean Sciences Meeting |
| 2019 | Mentor, ASLO Multicultural Program, Aquatic Sciences Meeting |
| 2018 | Student poster evaluator, Ocean Sciences Meeting |
| 2015 | Student poster evaluator, LTER All Scientists Meeting |

Manuscript reviewer

- Remote Sensing of Environment
- Journal of Experimental Marine Biology and Ecology
- Geoscientific Model Development
- Biogeosciences
- Journal of Geophysical Research: Biogeosciences
- Scientific Reports
- Limnology & Oceanography
- Ecosystems
- Global Change Biology
- Terrestrial, Atmospheric and Oceanic Sciences
- Philosophical Transactions of the Royal Society A
- PLoS ONE
- Frontiers in Marine Science

Outreach & work experience

- 2016-2017 Vice President, Columbia University Korean-American Scientists & Engineers Association, Columbia University, New York, NY
- 2013 Environmental consultant (part-time), RPS-ASA, South Kingstown, RI
- 2012 Volunteer, Environmental Protection Agency, Narragansett, RI
- 2012 Science Fair Volunteer, America's Cup World Series, Newport, RI
- 2011 Science Saturday, University of Rhode Island, Narragansett, RI

Research Cruises

- 2015-2016 ARSV *Laurence M. Gould*, Palmer LTER cruise, West Antarctic Peninsula
- 2014 R/V *Kilo Moana*, C-MORE Microbial Oceanography: Genomes to Biomes cruise, central North Pacific
- 2011 R/V *Endeavor*, North Atlantic Spring Bloom cruise, Gulf of Maine
- 2010 R/V *Tamyang*, Shipboard Training course, East/Japan Sea