

KYRA HAN KYUL KIM

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EDUCATION

- 2019 **University of Delaware (Newark, DE)**
Ph.D., Hydrogeology
Dissertation: Spatiotemporal dynamics of biogeochemical reactions in an intertidal beach aquifer: a field, laboratory, and numerical modeling study.
Advisors: Holly A. Michael and William J. Ullman
- 2013 **University of Texas at Austin (Austin, TX)**
B.S., General Geology, *High Honors in Geology*
Thesis: The 2500 B.P. Savanna Expansion of west central Africa: humans or climate?
- University of Texas at Austin (Austin, TX)**
B.A., Music, Ethnomusicology (Instrument: piano)

WORK EXPERIENCE

- 2019-current NASA Postdoctoral Fellow, Jet Propulsion Laboratory (JPL)
2017-2019 Delaware Environmental Institute (DENIN) Environmental Fellow
2013-2017 Graduate Research Assistant, Hydrogeology Lab, Univ. of Delaware
2013 Geographic Information System (GIS) Analyst, Univ. of Texas
2011-2013 Undergraduate Research Assistant, Paleogeochimistry Lab, Univ. of Texas
2010 Intern, Geoscience Research at Storm Peak Program, reactive Hg research
2008 Intern, Jisung (now Jipyong) Law Firm, South Korea, document translator

PUBLICATIONS

- Kim, K.;** Z. Liu; M. Rodell; H. Beaudoin;... J. Reager (2020), An evaluation of remotely sensed and in-situ data sufficiency for SGMA-scale groundwater studies in the Central Valley, California, *invited*, *Journal of American Water Association*, in press (<https://doi.org/10.1111/1752-1688.12898>).
- Kim, K.;** J. Heiss; X. Geng; H. Michael (2020), Modeling hydrologic controls on particulate organic carbon contributions to beach aquifer biogeochemical reactivity, *Water Resources Research*, 56(10), <https://doi.org/10.1029/2020WR027306>.
- Kim, K.;** H. Michael; E. Field; W. Ullman (2019), Hydrologic shifts create complex transient distributions of particulate organic carbon and biogeochemical responses in beach aquifers, *Journal of Geophysical Research: Biogeosciences*, <https://doi.org/10.1029/2019JG005114>.
- Kim, K.;** J. Heiss; H. Michael; W. Cai; T. Laattoe; V. Post; W. Ullman (2017), Spatial patterns of groundwater biogeochemical reactivity in an intertidal beach aquifer, *Journal of Geophysical Research: Biogeosciences*, 122(10): 2548-2562, <https://doi.org/10.1002/2017JG003943>, **EOS Research Highlight**.

PUBLICATIONS IN PREPARATION

Kim, K.; J. Heiss; W. Ullman; H. Michael; W. Cai, Seasonal variation in dissolved inorganic carbon and total alkalinity fluxes across a shallow sandy beach aquifer: temperature and hydrological controls, in preparation.

Kim, K & J. Heiss, Methods in capturing the spatiotemporal dynamics of flow and biogeochemical reactivity in beach aquifers: A review, *invited*, in preparation for Water Special Issue.

Jankowski, S.; **K. Kim**; M. Sneed; J. Reager; C. Faunt, Mitigating regional subsidence using managed aquifer recharge: A modeling case study in the Central Valley, USA, in preparation.

PUBLISHED DATASETS

Kim, K. (2020), Modeling hydrologic controls on particulate organic carbon contributions to beach aquifer biogeochemical reactivity, *HydroShare*,
<http://www.hydroshare.org/resource/7e8f77da6bd345ed9bf74c0b7f7c911f>.

Kim, K. (2019), Cape Shores Porewater Data Compilation 2014-2015, *HydroShare*,
<https://doi.org/10.4211/hs.440e89b8cc8c4c43bdbc6176e8f38a70>.

AWARDS, SCHOLARSHIPS, GRANTS

Academic Fellowships

2019	2-year salary & travel funds	NASA Postdoctoral Fellowship, Universities Space Research Association
2017	2-year salary & research funds	Delaware Environmental Institute Environmental Fellowship

Research Grants

2018	\$1,944	International Association of Hydrogeologists 2018 Congress Attendance Travel Support
	\$1,000	The Consortium of Universities for the Advancement of Hydrologic Science, Inc. Instrumentation Discovery Grant
2017	\$1,500	Wharry Research Grant
	\$2,000	Univ. of Delaware Summer Doctoral Fellowship
2016	\$2,400	“Let’s Talk About Water” Challenge Grant, The Consortium of Universities for the Advancement of Hydrologic Science, Inc. & Delaware Environmental Institute
2015	\$1,412	Univ. of Delaware Professional Development Award 2015
2014	\$2,217	Univ. of Delaware Professional Development Award 2014

Undergraduate Scholarships

2013	\$12,000*	Univ. of Texas non-resident tuition waiver
2009-2013	\$3500/semester*	Univ. of Texas Jackson School of Geosciences Merit-based Scholarship, <i>highest GPA bracket</i>
2012	\$6,900	Wayne Franklin Bowman Endowed Presidential Scholarship
	\$1,412	Univ. of Texas Undergraduate Research Fellowship
	\$900/month*	Thomas and Ray Burke Student Job Program
	\$12,000*	GEO660A&B field course full tuition (top 10% student)
	\$12,000*	Univ. of Texas non-resident tuition waiver

*approximate amounts

TEACHING

Students Advised

- Fall 2020
- Water Data Lab (WaDL), Project PI and co-Mentor, “Groundwater bibliometric & Water Sentiment Project” with Neel Kandlikar and Neeraj Rattehalli
 - NASA DEVELOP Program (JPL) Scientific Lead & Mentor “*Central Valley Groundwater II: VIRGO software tool development*” with James Kitchens, Katie Lange, Vanessa Valenti, Elizabeth Perez
- Spring 2020
- NASA DEVELOP Program (JPL) Scientific Lead & Mentor “*Improving California groundwater assessments using GRACE and InSAR datasets for water resource management*” with James Kitchens, Marissa Dudek, Patrick Saylor, Forrest Corcoran
- Fall 2017
- Allie Bailey (Univ. of Delaware, Civil Engineering), “*Spatial patterns of groundwater biogeochemical reactivity in an intertidal beach aquifer on a weekly time-scale*”
- Summer 2016
- Sam Blackburn (Carleton College, Geology), “*Controls on microbial respiration in the sandy beach face at Cape Henlopen, DE*”
- Summer 2014
- Haley Glos (Univ. of Delaware, Marine Biosciences), “*Bromide tracer experiment to quantify submarine groundwater discharge at Cape Shores, DE*”

Courses Taught

- Jan. 04, 2019
- Introduction to PMWIN and PHT3D modeling short course, China University of Geosciences, Wuhan, China
- Spring 2018
- Teaching Assistant, Geological Hazards Laboratory, Univ. of Delaware
- Spring 2013
- Teaching Assistant, Research Field Methods for Environmental Sciences, Univ. of Texas

Pedagogy Training

- Spring 2018
- Center for Teaching and Assessment of Learning, Univ. of Delaware, developed upper-level geoscience course with complete syllabus and course materials

Guest Instructor

- Apr. 27, 2018
- Invited science lecturer, Eagle’s Nest Kindergarten
- July 2015, 2016, 2017
- Field lecturer, Taking an Interest in Delaware’s Estuary Camp
- July 2014
- Invited field lecturer, Univ. of Delaware Institute for Public Administration Water Resources Agency

INVITED PRESENTATIONS

- 2020 **Kim, K.***; W. Ullman; J. Heiss; H. Michael, *Spatiotemporal dynamics of intertidal biogeochemical reactions*, University of Texas at Austin, Sep. 18, 2020, virtual seminar.
- 2019 **Kim, K.***; W. Ullman; J. Heiss; H. Michael, *Spatiotemporal dynamics of carbon cycling in a beach aquifer*, JPL Carbon Club, Nov. 07, 2019, Pasadena, California.
- Kim, K.***; W. Ullman; J. Heiss; H. Michael, *Dynamic migration of chemical reactions in a beach aquifer*, CUAHSI-AGU Cyberseminar H3S, Apr. 04, 2019, [link here](#).
- Kim, K.***; W. Ullman; J. Heiss; H. Michael, *Dynamic migration of chemical reactions in a beach aquifer*, Hohai University, Jan. 11, 2019, Nanjing, China.

- Kim, K.***; W. Ullman; J. Heiss; H. Michael, *Modeling the dynamics of particulate carbon and reactants across the intertidal aquifer*, China University of Geosciences Wuhan, Jan. 04, 2019, Wuhan, China.
- 2018 **Kim, K.***; H. Michael; J. Guimond; J. Heiss; C. Russoniello; C. Duque; A. Sawyer; W. Brooks; P. Kreyens, *Submarine groundwater discharge dynamics across scales*, Korea Institute of Geoscience and Mineral Resources, Groundwater and Ecohydrology Research Center Seminar, Sep. 06, 2018, Daejeon, South Korea.
- *presenting author**

CONFERENCE PRESENTATIONS

- 2019 Reager, J.; **K. Kim***; T. Farr; C. Faunt, *California's groundwater future: Relating subsidence and consumption in the Central Valley for SGMA*, poster, Oct. 21-24, 2019, Valencia, Spain.
- Kim, K.**; W. Ullman; H. Michael, *Spatiotemporal variability of chemical reactions in beach aquifer*, The Fourth Xiamen Symposium of Marine Environmental Sciences, oral presentation, Jan. 06-09, Xiamen, China.
- 2018 **Kim, K.**; H. Michael; W. Ullman, *Short-timescale variability in redox conditions of a coastal aquifer*, American Geophysical Union, oral presentation, Dec. 10-14, Washington, D.C.
- 2017 **Kim, K.**; H. Michael; W. Cai; W. Ullman, *Spatial distributions of biogeochemical reactions in freshwater-saltwater mixing zones of sandy beach aquifers*, American Geophysical Union, poster, Dec. 11-15, 2017, New Orleans, LA.
- Kim, K.**; H. Michael; W. Cai; W. Ullman, *Dynamic migration of biogeochemical reaction zones in an intertidal beach aquifer*, Geological Society of America, oral presentation, Oct. 22-25, 2017, Seattle, WA.
- Kim, K.**; H. Michael; W. Cai; W. Ullman, *Oxygen consumption and denitrification rates in sandy beach aquifers*, Delaware Environmental Institute Research Symposium, poster, Mar. 15, 2017, Newark, DE.
- 2016 **Kim, K.**; H. Michael; W. Ullman, *Spatial characterization of reactivity in an intertidal beach aquifer*, Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI) Biennial Symposium, poster, Jul. 24-27, 2016, Shepherdstown, WV.
- Kim, K.**; H. Michael; W. Ullman, *Spatial characterization of reactivity in an intertidal beach aquifer*, Delaware Environmental Institute Research Symposium, oral presentation, Mar. 16, 2016, Newark, DE.
- 2015 **Kim, K.**; H. Michael; W. Ullman, *Sediment and porewater oxygen demand in a sandy beach aquifer, Cape Henlopen, Delaware*, Geological Society of America Annual Meeting, oral presentation, Nov. 1-4, 2015, Baltimore, MD.
- Kim, K.**; H. Michael; W. Ullman, *Spatial dynamics of reactive zones in intertidal circulation cells*, Lewes Graduate Student Symposium, oral presentation, May 3, 2015, Lewes, DE.
- Kim, K.**; H. Michael; W. Ullman, *Physical and biogeochemical dynamics in the shallow freshwater-saltwater mixing zone of an intertidal beach aquifer (Cape Henlopen, Delaware)*, UD Graduate Research Forum, oral presentation, Apr. 21, 2015, Newark, DE.
- Kim, K.**; H. Michael; W. Ullman, *Physical and biogeochemical dynamics of intertidal beach mixing zones*, UD Annual Geoscience Poster Symposium, poster, Feb. 26, 2015, Newark, DE.
- 2014 **Kim, K.**; H. Michael; W. Ullman, *Relationship between the physical and biogeochemical dynamics in the shallow freshwater-saltwater mixing zone of an intertidal beach aquifer (Cape Henlopen,*

- Delaware*), Geological Society of America Annual Meeting, oral presentation, Oct. 19-24, 2014, Vancouver, BC.
- 2013 **Kim, K.**; T. Shanahan; V. Anderson, *The 2500 B.P. rainforest crisis of Western Cameroon: humans or climate?*, UT Jackson School of Geosciences Research Symposium, poster, Feb. 2, 2013, Austin, TX.
- 2010 **Kim, K.**; D. Schlotter; Z. Valdez, *Gaseous elemental mercury in the atmosphere*, Howard University Program of Atmospheric Sciences Seminar, oral presentation, Nov. 5, 2010, Washington D.C.

CONTRIBUTED ABSTRACTS

- 2019 Michael, H.; **K. Kim**; J. Heiss; J. Guimond; W. Ullman; C. Chan; S. McAllister, Dynamic hydrologic and biogeochemical processes along coastlines as potential targets for biogeophysical methods, American Geophysical Union, invited presentation, Dec. 9-13, 2019, San Francisco, CA.
- 2017 Michael, H.; **K. Kim**; J. Guimond; J. Heiss; W. Ullman; A. Seyfferth, *Hydrologic influence on redox dynamics in estuarine environments*, American Geophysical Union, invited presentation, Dec. 11-15, 2017, New Orleans, LA.
- Michael, H.; C. Duque; X. Geng; J. Guimond; J. Heiss; **K. Kim**; M. Koneshloo; P. Kreyens; C. Russionello; K. Scott; X. Yu, *Submarine groundwater discharge across scales from marsh to shelf*, Geological Society of America, invited presentation, Oct. 22-25, 2017, Seattle, WA.
- Field, E.; K. Hoppes, **K. Kim**; H. Michael; T. Hanson and C. Chan, *The microbial role in nutrient cycling in a dynamic coastal aquifer system*, Goldschmidt Conference (Geochemical Society), Aug. 13-18, 2017 Paris, France.
- Michael, H.; C. Duque; J. Heiss; **K. Kim**; K. C. Scott; W. Brooks and C. Russionello, *Upscaling physical-biogeochemical linkages controlling land-sea solute fluxes*, The Association for the Sciences of Limnology and Oceanography (ASLO) Aquatic Sciences Meeting, oral presentation, Feb. 26-Mar. 3, 2017, Honolulu, HI.
- 2016 Michael, H.; X. Yu; J. LeMonte; D. Sparks; **K. Kim**; J. Heiss; W. Ullman; J. Guimond and A. Seyfferth, *Geochemical response to hydrologic change along land-sea interfaces*, American Geophysical Union Annual Meeting, poster, Dec. 12-16, 2016, San Francisco, CA.
- Michael, H.; J. Heiss; **K. Kim**; W. Ullman; C. Russionello; C. Duque and T. Brooks, *The influence of groundwater flowpaths and mixing on nutrient fluxes to estuaries and the ocean*, Geological Society of America Annual Meeting, invited presentation, Sep. 25-28, 2016 Denver, CO.
- Field, E.; K. Hoppes; **K. Kim**; H. Michael; T. Hanson and C. Chan, *Just another day at the beach? The microbial role in iron and sulfur cycling in a beach aquifer system*, International Symposium on Microbial Ecology, oral presentation, Aug. 21-26, 2016, Montreal, Canada.

***presenting author**

PROFESSIONAL SERVICES AND OUTREACH

Services to Discipline

- 2020
- Primary convener, American Geophysical Union Session H087. *Advances in subsurface characterization and monitoring using ground-based and remote geophysical, hydrogeological methods*, with Adrian Borsa, Deqiang Mao, Chen Wang, virtual conference.
 - Organizer, “A Practical Guide to InSAR for Science and Applications Workshop” with Tom Farr, Jet Propulsion Laboratory, Pasadena, CA.

- 2019 • Program Committee Chair and Panel moderator, 4th Delaware Environmental Institute Research Symposium, Newark, DE.
- 2018 • The International Association of Hydrogeologists Congress coordination staff, Korea Institute of Geoscience and Mineral Resources, Daejeon, South Korea.
- Program Committee and Panel moderator, 3rd Delaware Environmental Institute Research Symposium, Newark, DE.
- 2017 • Co-organizer, “Let’s Talk About Water” panel event, Univ. of Delaware, Newark, DE.
- 2015 • Panel moderator, “Understanding Environmental Challenges”, Univ. of Delaware Research Forum, Newark, DE.

Services to University

- 2019 • Geological Sciences Department Graduate Student Mentor
- 2017 • Geological Sciences Department Faculty-Graduate Liaison
- Secretary, Graduate Student Government
- 2016 • Vice President, Graduate Student Government
- Graduate Student Representative for Campus Framework Working Group
- 2015 • Departmental Senator, Geological Sciences, Graduate Student Government

Journal Reviews

Biogeochemistry, Journal of Hydrology, Water Resources Research

Professional Memberships

Geological Society of America, American Geophysical Union, National Ground Water Association

FIELD AND ANALYTICAL SKILLS

Software: ArcGIS, MATLAB, Canvas

Instruments: Costech CHN Analyzer, Bayshore Instruments Membrane Inlet Mass Spectrometer, SEAL Autoanalyzer, Shimadzu TOC Analyzer, Teledyne TOC Analyzer, Apollo SciTech DIC Analyzer, Apollo SciTech Total Alkalinity Titrator, ApolloSciTech Spec pH, Biotage RapidTrace, 10AU Turner Fluorometer, CEM MARS 6 Microwave Digestion System, sample preparation for gas-liquid chromatography (urea separation, fatty acid methyl ester methods, transfers).

Field: Participated in various geologic field excursions and efforts, both domestic and international **2013** Top 10% student in GEO660A&B (UT), an intensive six-week geology field course **2013-2019** Planned and led several field campaigns for groundwater well construction and deployment (via hand-augering), sensor network wiring and installation, porewater sampling, sediment vibracoring, and horseshoe crab egg collection **2019** PADI Open Water Scuba Certified, participated in a trip to Anilao, Batangas, Philippines led by Dr. M. Bayani Cardenas to obtain ocean geochemical transects.

R/V PELICAN (Aug. 13-22, 2018): Expedition to Gulf of Mexico

MEDIA COVERAGE

- 2018 Delaware Environmental Institute, Students in Action Highlight, “Kyra Han Kyul Kim, Beach Chemist”: <http://www.denin.udel.edu/2018/10/16/kyra-han-kyulkim-beach-chemist/>, Oct.15, 2018.

- 2017 EOS Earth and Space Science News, Research Spotlights, “Sandy beaches are hotbeds of biochemical activity”: <https://eos.org/research-spotlights/sandy-beaches-are-hotbeds-of-biochemical-activity>, Nov. 30, 2017.
- Delaware Beach Life, “Studying the Coast: Cleaning up our waters”:
<https://www.delawarebeachlife.com/shop/single-issues/may-2017>, May Issue, 2017.
- UDaily Events Articles, “Let’s talk about water: Earth Month event to feature film, panel discussion on coastal water issues”: <http://www.udel.edu/udaily/2017/april/earth-month-film-screening/>, April 11, 2017.
- 2016 WVUD 91.3 Rise and Science Radio Show Ep. 18, “When groundwater meets seawater, and the science behind the shrinking dead sea”:
<http://www.udrisesandscience.com/podcasts/2016/10/4/episode-18-when-groundwater-meets-seawater-and-the-science-behind-the-shrinking-dead-sea>, Oct. 4, 2016.
- Cape Shores Newsletter, “The mysterious ‘plastic octopuses’ explained”:
<https://www.edocr.com/v/kj2vmank/kyrakim/Research-explanation-for-Cape-Shores-Lewes-DE>, Jul. 13th, 2016.
- UDaily Research Articles, “UD researchers study reactions that occur when groundwater, saltwater meet in coastal aquifers”: <http://www1.udel.edu/udaily/2016/feb/fresh-salt-water-021116.html>, Feb. 11, 2016.