

DONGWON KI

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Google scholar: <https://scholar.google.com/citations?user=EsK88WoAAAAJ&hl=en>

EDUCATION

Ph.D., Environmental Engineering, Arizona State University, 2011-2016

M.S., Civil and Environmental Engineering, Yonsei University, 2006-2008

B.E., Civil Engineering, Seoul National University of Science and Technology, 1999-2005

PROFESSIONAL APPOINTMENTS

Postdoctoral Research Associate, Arizona State University, 2016-present

Advisor: César I. Torres

- Combining electrochemical, -omics, and microscopic approaches to characterize transport limitations in anode-respiring bacteria biofilms
- Development of substrate loaded microbial fuel cells for powering remote sensors

Graduate Research Associate, Arizona State University, 2011-2016

Advisor: César I. Torres

- Anaerobic conversion of primary sludge to resources (H_2 , H_2O_2) in microbial electrochemical cells
- Toxic and degradation-resistant compound treatment using novel photo-induced microbial electrochemical cells
- Comparison of two anaerobic processes for wastewater treatment and energy generation

Lecturer, Department of Civil Engineering and Environmental Science, Korea Military Academy, 2009-2010

Associate Researcher, Korea Institute of Science and Technology, 2008-2010

Advisor: Kyu-Hong Ahn

- Commencing the modified soil bed filtration technology for improvement of river water quality and quantity
- Performance evaluation and improvement of ceramic panel for preventing growth of algae in water and wastewater treatment plants

Graduate Research Associate, Yonsei University, 2006-2008

Advisor: Joonhong Park

- Development of methods for classifying and mapping soil ecological quality using a decision tree algorithm

Industrial Internship, DAEWOO Institute of Construction Technology, 2007

- Study of soil microbial population from the petroleum oil contaminated site using the electrical resistance heating-soil vapor extraction (ERH-SVE)

PROFESSIONAL APPOINTMENTS (cont.)

Teaching Assistant, Department of Civil and Environmental Engineering, Yonsei University, 2006-2008

Assistant Researcher, Seoul National University, 2004-2005

Advisor: Moo Young Han

- Characterization of rainwater velocity and management of rainwater harvesting tank in the graduate school dormitory

Undergraduate Research Assistant, Hydrology Laboratory at Seoul National University of Science and Technology, 2003-2005

AWARDS AND RECOGNITIONS

Innovation Award for Best Technological Advancement for 2017 with the paper published, **Ki D**, Popat SC, Torres CI (2016) Reduced overpotentials in microbial electrolysis cells through improved design, operation, and electrochemical characterization. *Chem Eng J* 287: 181-188. ISMET, 2017.

Graduate Research Support Program Award. ASU, 2015-2016.

Interview Travel Grant Award in Graduate and Professional Student Association. ASU, 2015-2016.

Travel Grant Award in Graduate and Professional Student Association. ASU, 2015.

Graduate Research Support Program Award. ASU, 2014-2015.

Discovery Award for Best Scientific Paper for 2012 with the paper published, Popat SC, **Ki D**, Rittmann BE, Torres CI (2012) Importance of OH⁻ transport from cathodes in microbial fuel cells. *ChemSusChem* 5: 1071-1079. ISMET, 2012.

Oral Presentation Awards. Korean Society of Environmental Engineers, 2010

Paper Presentation Awards. Korean Society of Environmental Engineers, 2009

Dean's Scholarships (4 times per 4 semesters). Yonsei University, 2006-2007

Graduate 1st on The List in the Department of Civil Engineering. Seoul National University of Science and Technology, 2005

Dean's Scholarships (7 times per 8 semesters). Seoul National University of Science and Technology, 1999-2000, 2003-2005

PUBLICATIONS

1. D. Zhou, S. Dong*, **D. Ki***, B.E. Rittmann. 2018. Photocatalytic-induced electron transfer via anode-respiring bacteria at an anode that intimately couples ARB and a TiO₂ photocatalyst. *Chemical Engineering Journal*, 338, 745-751.
2. **D. Ki***, S.C. Popat, B.E. Rittmann, C.I. Torres. 2017. Hydrogen peroxide production in microbial electrochemical cells fed with primary sludge. *Environmental Science & Technology*, 51, 6139-6145.

PUBLICATIONS (cont.)

3. D. Zhou, S. Dong*, J. Shi, X. Cui, **D. Ki***, C.I. Torres, B.E. Rittmann. 2017. Intimate coupling of N-doped TiO₂ photocatalyst and anode respiring bacteria for enhancing 4-chlorophenol degradation and current generation. *Chemical Engineering Journal*, 317, 882-889.
4. **D. Ki***, P. Parameswaran, S.C. Papat, B.E. Rittmann, C.I. Torres. 2017. Maximizing Coulombic recovery and solids reduction from primary sludge by controlling retention time and pH in a flat-plate microbial electrolysis cell. *Environmental Science: Water Research Technology*, 3, 333-339.
5. K. Hyun, J. Choi, **D. Ki**, J. Park, S. Ahn, H. Oh, Y.-K. Choung. 2016. Bathroom wastewater treatment in constructed wetlands with planting, non-planting and aeration, non-aeration conditions. *Desalination and Water Treatment*, 57(2), 709-717.
6. **D. Ki***, S.C. Papat, C.I. Torres. 2016. Reduced overpotentials in microbial electrolysis cells through improved design, operation, and electrochemical characterization. *Chemical Engineering Journal*, 287, 181-188.
7. **D. Ki**, P. Parameswaran, S.C. Papat, B.E. Rittmann, C.I. Torres. 2015. Effects of pre-fermentation and pulsed-electric-field treatment of primary sludge in microbial electrochemical cells. *Bioresource Technology*, 195, 83-88.
8. **D. Ki**, P. Parameswaran, B.E. Rittmann, C.I. Torres. 2015. Effect of pulsed electric field (PEF) pretreatment on primary sludge for enhanced bioavailability and energy capture. *Environmental Engineering Science*, 32, 831-937.
9. S.C. Papat, **D. Ki**, M.N. Young, B.E. Rittmann, C.I. Torres. 2014. Buffer pKa and transport govern the concentration overpotential in electrochemical oxygen reduction at neutral pH. *ChemElectroChem*, 1, 1909-1915.
10. S.C. Papat, **D. Ki**, B.E. Rittmann, C.I. Torres. 2012. Importance of OH⁻ Transport from Cathodes in Microbial Fuel Cells. *ChemSusChem*, 5, 1071-1079.
11. S.-Y. Won, **D. Ki**, M.H. Yoon, S.K. Maeng, K.-H. Ahn, J. Park, K.-G. Song. 2012. Effects of operation parameters on pollutants removal in a lab-scale multi-layered soil filtration system. *Journal of Korean Society of Environmental Engineers*, 34, 91-96.
12. J. Park, **D. Ki**, K. Kim, S.J. Lee, K.J. Oh. 2011. Using decision tree to develop a soil ecological quality assessment system for planning sustainable construction. *Expert System with Applications*, 38, 5463-5470.
13. K. Kim, **D. Ki**, K. Yoo, I.S. Son, K.J. Oh, J. Park. 2011. Decision-Tree-based data mining and rule induction for predicting and mapping soil bacterial diversity. *Environmental Monitoring and Assessment*, 178, 595-610.
14. I. Han, S. Congeevaram, **D. Ki**, B.-T. Oh, J. Park. 2011. Bacterial community analysis of swine manure treated with autothermal thermophilic aerobic digestion. *Applied Microbiology and Biotechnology*, 89, 835-842.
15. **D. Ki**, K.W. Cho, S.-Y. Won, K.-G. Song, K.-H. Ahn. 2010. Characteristics of soil and eco-friendly media for improving the filterability and water quality. *Journal of Korean Society of Water and Wastewater*, 24, 453-462.

PUBLICATIONS (cont.)

16. C.H. Ahn, H. Oh, **D. Ki**, S.W. Van Ginkel, B.E. Rittmann, J. Park. 2008. Biofilm-community selection during autohydrogenotrophic reduction of nitrate and perchlorate in ion-exchange brine. *Applied Microbiology and Biotechnology*, 81, 1169-1177.
17. **D. Ki**, K. Yoo, J. Park. 2008. Microbial diversity and population dynamics of activated sludge microbial communities participating electricity generation in microbial fuel cell. *Water Science and Technology*, 58, 2195-2201.
18. **D. Ki**, H.G. Kang, S.E. Lee, J. Heo, J. Park. 2008. Sensitivity analysis of the effect of soil ecological quality information in selecting environmentally-friendly road route. *Journal of Soil and Groundwater Environment*, 13, 37-44.
19. **D. Ki**, J. Lee, P. Rho, J. Park. 2007. A weak correlation of field-determined soil microbial diversity with quantitative ecological map information and its methodological implication in estimation soil ecological quality. *Journal of the Korean Society of Civil Engineers*, 27, 703-710.
20. J. Park, S. Congeevaram, **D. Ki**, J.M. Tiedje. 2006. Use of stable isotope probing in selectively isolating target microbial community genomes from environmental samples for enhancing resolution in ecotoxicological assessment. *Molecular and Cellular Toxicology*, 2, 11-14.
21. J. Park, **D. Ki**. 2006. Research trends in classifying/assessing soil ecological quality and its potential applications. *Korean Geoenvironmental Society*, 7, 11-17.
22. J. Park, **D. Ki**, H. Oh. 2006. Methodological concepts for ecological soil classification and assessment and its potential applications in siting of mega-projects. *Housing and Urban Journal*, 89, 1-13.

Publications in preparations

1. **D. Ki**, C.I. Torres. Short-circuit operation in a single-chamber microbial peroxide producing cell.
2. **D. Ki**, C.I. Torres. Characterization of organic macromolecules and elements in *Geobacter sulfurreducens*.
3. **D. Ki**, P. Parameswaran, C.I. Torres. Estimating hydrolysis kinetics of primary sludge in batch methanogenic and microbial electrolysis cells. to *ES&T*
4. **D. Ki**, R. Kupferer III, C.I. Torres. High-rate stabilization of primary sludge in a single-chamber microbial H₂O₂ producing cell (sMPPC). Submitted to *ES&T*
5. **D. Ki**, M.N. Young, C.I. Torres. Hydrogen peroxide produced in microbial electrochemical cells: a review.

PATENT APPLICATIONS

1. S.C. Papat, **D. Ki**, B.E. Rittmann, C.I. Torres. Methods and systems for microbial fuel cells with improved cathodes. PCT application #PCT/US13/26943; filed 02/20/2013.
2. K.G. Song, K.W. Cho, J.W. Cho, H.S. Oh, **D. Ki**. Device for treating wastewater comprising nitrogen and phosphorus and a method for the same. US 20110247977 A1, PCT application #PCT/US12/834,576; filed 07/12/2010
3. K.-H. Ahn, K.G. Song, K.W. Cho, **D. Ki**, J.W. Cho, S.Y. Won, H.S. Oh, K.P. Kim. River water purification apparatus and method using treatment soil layer and permeable filtering medium layer. US 20110100905 A1, PCT application #PCT/US12/917919; filed 11/02/2010
4. K.-H. Ahn, K.G. Song, K.W. Cho, **D. Ki**, J.W. Cho, S.Y. Won, H.S. Oh, K.P. Kim. Equipment and method for water and stream purification using layered soil system (10-2009-0104967)
5. J. Park, **D. Ki**, J. Lee, T. Park, H. Kim. Method for estimating soil ecological quality from existing soil environmental data and method for mapping the result on geographic information system (10-2008-0032911)

CONFERENCE PRESENTATIONS

1. **D. Ki**, R. Kupferer III, C.I. Torres. Primary sludge to valuable chemicals, hydrogen peroxide (H₂O₂), in microbial electrochemical cells: H₂O₂ production and in-situ sludge treatment. WEF Residuals and Biosolids, Phoenix, AZ, 2018.
2. C. Wilson, S. Hart, S. Brown, M.N. Young, **D. Ki**, C.I. Torres. Microbial Electrochemical Cells as An Alternative to Biochemical Methane Potential Tests for Analyzing Batch Anaerobic Digestion Kinetics. WEF Residuals and Biosolids, Phoenix, AZ, 2018.
3. S. Hart, M.N. Young, **D. Ki**, S. Brown, C. Wilson, P. Parameswaran, C.I. Torres. Improved Characterization of Anaerobic Digestion Kinetics of Mixed Sludges With and Without Thermally Pretreated WAS. WEF Residuals and Biosolids, Phoenix, AZ, 2018.
4. S. Papat, M. Young, **D. Ki**, A. Xie, B.E. Rittmann, C.I. Torres. Factors that affect cathodic hydrogen peroxide production for water and wastewater treatment applications. American Chemical Society National Meeting, Washington, DC, 2017.
5. **D. Ki**, S.C. Papat, R. Kupferer III, B.E. Rittmann, C.I. Torres. Microbial hydrogen peroxide producing cells (MPPCs) fed with primary sludge. AEESP, June, 2017.
6. **D. Ki**, S.C. Papat, B.E. Rittmann, C.I. Torres. Hydrogen peroxide production in a flat-plate microbial electrochemical cell semi-continuously fed with primary sludge. NA-ISMET, Stanford University, October, 2016.
7. **D. Ki**, P. Parameswaran, S.C. Papat, B.E. Rittmann, C.I. Torres. Maximizing Coulombic recovery from primary sludge by changing retention time and pH in a flat-plate microbial electrolysis cell. AP-ISMET, Busan, South Korea, August, 2016.
8. **D. Ki**, S.C. Papat, C.I. Torres. On design, operation, and characterization of microbial electrochemical cells with reduced overpotentials. Electrochemical Society meeting, San Diego Convention Center, May, 2016.

CONFERENCE PRESENTATIONS (cont.)

9. M.N. Young, **D. Ki**, M. Stadie, J. Thompson, N. Chowdhury, S.C. Papat, B.E. Rittmann, C.I. Torres. Tailoring microbial fuel cells for production of hydrogen peroxide. Electrochemical Society meeting, San Diego Convention Center, May, 2016.
10. **D. Ki**, S.C. Papat, C.I. Torres. Towards microbial electrochemical cell design and operation with low overpotentials. ISMET, Arizona State University, October, 2015.
11. **D. Ki**, P. Parameswaran, S.C. Papat, B.E. Rittmann, C.I. Torres. Enhancing Coulombic recovery from primary sludge in microbial electrochemical cells. ISMET, Arizona State University, October, 2015.
12. **D. Ki**, P. Parameswaran, S.C. Papat, B.E. Rittmann, C.I. Torres. Energy recovery from primary sludge using microbial electrochemical cells (MXCs). AEESP, Yale University, June, 2015.
13. **D. Ki**, P. Parameswaran, S.C. Papat, B.E. Rittmann, C.I. Torres. Energy recovery from primary sludge using microbial electrochemical cells (MXCs). AZ Water Association Annual Conference, May, 2015.
14. **D. Ki**, S.C. Papat, P. Parameswaran, B.E. Rittmann, P.J. Evans, C.I. Torres. Kinetic study of microbial hydrolysis and anode respiration in microbial electrochemical cells (MXCs) fed with primary sludge. NA-ISMET, Pennsylvania State University, May, 2014.
15. **D. Ki**, P. Parameswaran, C.I. Torres. Kinetic study of microbial hydrolysis of primary sludge for microbial electrochemical cells. AZ Water Association Annual Conference. May, 2013.
16. S.C. Papat, **D. Ki**, B.E. Rittman, C.I. Torres. On cathodic potential losses in microbial fuel cells, NA-ISMET, Cornell University, October, 2012.
17. **D. Ki**, K.-G. Song, S.-Y. Won, K.W. Cho, K.-H. Ahn. Comparative evaluation of river water purification capacity between conventional and modified soil block systems in different influent concentrations and flow velocities, International Conference on Wetland Systems for Water Pollution Control, Venice, Italy, October, 2010.
18. **D. Ki**, K.-G. Song, S.-Y. Won, K.W. Cho, K.-H. Ahn. Comparative study of eco-friendly media and permeation types for improvement of river water quality and quantity, International Conference on Wetland Systems for Water Pollution Control, Venice, Italy, October, 2010.
19. **D. Ki**, K.-G. Song, B.-R. Lim, K.W. Cho, K.-P. Kim, K.-H. Ahn. Application study of attached algae growth and microbial community structure depending on the drainage canal materials of sedimentation basin in water treatment plants, European Desalination Society, Baden-Baden, Germany, May, 2009.
20. K. Kim, **D. Ki**, I. Son, K.J. Oh, J. Park. Application of artificial intelligence to planning sustainable construction: an ecological quality assessment of soil, International Conference on Sustainable Energy Technologies, Seoul, Korea, August, 2008.
21. **D. Ki**, K.J. Oh, J. Heo, J. Park. Monitoring and mapping of soil microbial diversity using artificial intelligence algorithms from GIS-based soil environmental properties. International Symposium on Advanced Environmental Monitoring, Honolulu, February, 2008.

CONFERENCE PRESENTATIONS (cont.)

22. **D. Ki**, K. Yoo, S.-H. Kim, J. Park. Microbial diversity and population dynamics of activated sludge microbial communities participating electricity generation in microbial fuel cell. ASPIRE Conference and Exhibition, Perth, Australia, October, 2007.
23. **D. Ki**, M.-H. Park, G.-H. Park, J. Park. Thermophilic microbial population dynamics in a petroleum-contaminated site treated with electrical resistance heating-soil vapor extraction (ERH-SVE). International Meeting of the Federation of Korean Microbiological Societies. Seoul, Korea, October, 2007.
24. **D. Ki**, J. Lee, K. Yoo, S.-H. Kim, J. Park. Analysis of biofilm forming communities participation in electricity generation in activated-sludge-seeded microbial fuel cells. American Society for Microbiology, Toronto, Canada May, 2007.
25. **D. Ki**, J. Lee, J. Park. Methodology study for classifying soil ecological quality using microbial diversity information. International Meeting of the Microbiological Society of Korea, Pyoungchang, Korea, May, 2007.
26. H. Oh, **D. Ki**, J. Lee, J. Park. A new culture method for detecting antibiotic resistant oligotrophic microorganisms in the environment, International Conference on Toxicogenomics, Incheon, Korea, November, 2006.
27. J. Park, **D. Ki**, W.J. Sul, S. Congeevaram, J.M. Tiedje. Use of stable isotope probing to explore time-dependent dynamics of PCB-degradative population dynamics in biphenyl-fed soil microbial communities. Annual Meeting of the Federation of Korean Microbiological Societies. Seoul, Korea, October, 2006.

PROPOSALS (written with and submitted by postdoc advisor)

Title	Sponsor	Total (\$)	PIs	Status
Microbial Peroxide Producing Cells for in-situ H ₂ O ₂ Production, Wastewater Sludge Minimization, and Water Reuse	ESTCP	-	Tender, Torres, Parameswaran, Goldman	Submitted
Sludge treatment with a short circuited, H ₂ O ₂ producing microbial/carbon catalyst coupled with anaerobic digestion	WRF	149,415	Torres, Ki	Submitted
Enhanced food waste digestion coupled with a hydrogen peroxide producing microbial/carbon catalyst and mesophilic anaerobic digestion	EREF	200,000	Torres, Ki	Pre-proposal accepted
Landfill leachate treatment by advanced oxidation processes coupled with the produced hydrogen peroxide from microbial peroxide producing cell	EREF	200,000	Torres, Ki	Not funded
Role of diverse microorganisms for treating wastewater sludge in microbial peroxide producing cells	IDT	25,000	Ki	Not funded
Investigating the role of aerobic microorganisms in microbial peroxide producing cells	NSF	329,563	Torres	Not funded
Advanced lignocellulosic biorefinery for high rate production of 1,3-propanediol and hydrogen peroxide in Microbial Electrochemical Reactors	USDA	500,000	Torres, Parameswaran	Not funded
Converting food wastes to hydrogen peroxide using microbial electrochemical technology to reduce odor and treat leachate wastewater	EREF	220,000	Torres, Ki	Not funded

PROFESSIONAL MEMBERSHIP

Environmental Engineering and Science Professors (AEESP)

International Society for Microbial Electrochemistry and Technology (ISMET)

PROFESSIONAL SERVICE

Manuscript reviewer (over 10 papers reviewed) for *Environmental Science & Technology*, *Water Research*, *Environmental Science: Water Research and Science*, *Environmental Engineering Science*, *Scientific Reports*, *Journal of Renewable and Sustainable Energy*, *Separation Science and Technology*, and *Fuel Cells*

Organizing Committee Member of the International Society for Microbial Electrochemistry and Technology (ISMET) Meeting, Tempe, AZ, 2015

Website Developer and Committee Member of the following:

- Swette Center for Environmental Biotechnology:
<http://www.environmentalbiotechnology.org>
- Torres Lab: <http://torres.environmentalbiotechnology.org>

Night of the Open Doors Organizing Committee Member, Biodesign Institute, ASU, 2013-2017

Coordinator of the team (MBfR & MXC) for the Open Door at Biodesign Institute, ASU, 2018

Graduate and Professional Student Association, Research Grant Reviewer, ASU, 2014-2016

Graduate and Professional Student Association, Travel Grant Reviewer, ASU, 2014-2016

COURSE TAUGHT (Lecturer and TA)

1. **Solid Waste Engineering**, Korea Military Academy Environmental Science, Spring 2010
2. **Water Pollution and Laboratory**, Korea Military Academy Environmental Science, Fall 2009
3. **Introduction to Environmental Science**, Korea Military Academy Environmental Science, Spring 2009
4. **System Design of Infrastructures**, Yonsei University Civil and Environmental Engineering, Spring 2007
5. **Environment Sanitary Engineering**, Yonsei University Civil and Environmental Engineering, Spring 2006, 2007
6. **Solid Waste Treatment and Disposal**, Yonsei University Civil and Environmental Engineering, Fall 2006

LABORATORY MENTORSHIP

The students listed were advised by César I. Torres and other faculty within or collaborators of the Biodesign Swette Center for Environmental Biotechnology.

M.S. students

Francisco Brown, Chemical Engineering, 2018- present
Rick Kupferer III, Environmental Engineering, 2017-2018
Warren Scott Shearman, Chemical Engineering, 2015-2016

Undergraduate students

Lincoln Mtemari, Chemical Engineering Honors, 2017-2018
Diana Zermeno, Chemical Engineering, 2017-2018
Rick Kupferer III, Environmental Engineering, 2016-2017
Sarah Brown, Sustainability, 2017; Swette Center for Environmental Biotechnology
Sustainability Internship Awardee
Francisco Brown, Chemical Engineering Honors, 2015-2016; Swette Center for Environmental
Biotechnology Sustainability Internship Awardee
Julia Thompson, Chemical Engineering Honors, 2014-2015; Fulton Undergraduate Research
Initiative (FURI) Awardee; W.L. Gore and Associates Research Awardee
Warren Scott Shearman, Chemical Engineering, 2014-2015; Fulton Undergraduate Research
Initiative (FURI) Awardee

High school students

Tabarak Abdelhabib, 2014-2015; Winner of Bronze Medal in Environmental Science Division
and Women in Science Award at AZ Science and Engineering Festival 2015
Beyza Celik, 2014-2015