

ANCA G. DELGADO

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EDUCATION

Postdoctoral Fellow, Environmental Engineering, Arizona State University, Tempe AZ,
2013-2016

Ph.D., Microbiology, Arizona State University, 2013

B.S., Microbiology, Arizona State University, 2008

PROFESSIONAL APPOINTMENTS

Assistant Professor of Environmental Engineering, School of Sustainable Engineering and
the Built Environment, Arizona State University

Assistant Research Scientist, Biodesign Swette Center for Environmental Biotechnology,
Arizona State University, 2016-2017

Associate Faculty, Arizona State University, School of Sustainable Engineering and the Built
Environment, Department of Environmental Engineering, 2015-2017

Postdoctoral Research Associate, Arizona State University, 2013-2016

Advisors: Rosa Krajmalnik-Brown and Bruce E. Rittmann

- Impact of advanced oxidation and microbial biodegradation on petroleum heavy-hydrocarbons in soils

Advisor: Rosa Krajmalnik-Brown

- Large-scale production of chlorinated solvent bioaugmentation microbial cultures for groundwater remediation

Graduate Research Assistant, Arizona State University, 2008-2013

Advisor: Rosa Krajmalnik-Brown

- Management of microbial communities to improve growth of chloroethene-respiring *Dehalococcoides*

Teaching Assistant, School of Life Sciences, Microbiology Department, Arizona State
University, 2008-2010

Undergraduate Researcher, School of Life Sciences, Microbiology Department, Arizona State
University, 2007-2008

Advisor: Yixin Shi

- Antimicrobial peptide resistance in *Salmonella typhimurium*

AWARDS AND RECOGNITIONS

- ASM Scientific Writing and Publishing Fellow. American Society for Microbiology, 2016
- Chevron International Travel Grant and Appreciation Award. Workshop of Hydrocarbon-Impacted Soils Pretreatment and Oxidants, Bandung, West Java, Indonesia, 2015
- Coauthor in Winner of Student Paper Competition (Fajardo-Williams et al.) at the Ninth International Conference on Remediation of Chlorinated and Recalcitrant Compounds in Monterey, CA, 2014
- Top Social Article by Microbial Cell Factories Journal for “Role of bicarbonate as a pH buffer and electron sink in microbial dechlorination of chloroethenes”, 2014
- ASU Serving University Needs (SUN) Award for Creativity, Excellent Performance, and Promoting ASU for Swette Center for Environmental Biotechnology and Krajmalnik-Brown lab websites, 2014-2016
- ASU Sun Award for Customer Satisfaction, Excellent Performance, Fostering Cooperation, and Promoting ASU for The Biodesign Night of the Open Door, 2014
- Student Paper Competition Winner, Battelle Eighth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, 2012
- Edward and Linda Birge Memorial Graduate Travel Award, ASU School of Life Sciences, 2012
- Travel Awards, ASU School of Life Sciences, 2010, 2012, 2013
- Best Graduate Student Oral Presentation, 50th Annual Meeting of the Arizona-Nevada Branch of the American Society for Microbiology (ASM), 2011

PUBLICATIONS

- Chen T, Yavuz BM, Delgado AG, Montoya G, Van Winkle D, Zuo Y, Kamath R, Westerhoff P, Krajmalnik-Brown R, Rittmann BE. 2017. Impacts of moisture content during ozonation of soils containing residual petroleum. Journal of Hazardous Materials (under review).
- Esquivel-Elizondo S, Delgado AG, Rittmann BE, Krajmalnik-Brown R. 2017. The effects of CO₂ and H₂ on CO-metabolism by pure and mixed microbial cultures. Biotechnology for Biofuels (accepted).
- Delgado AG, Fajardo-Williams D, Bondank E, Esquivel-Elizondo S, Krajmalnik-Brown R. 2017. Coupling bioflocculation of *Dehalococcoides mccartyi* to high-rate reductive dehalogenation of chlorinated ethenes. Environmental Science & Technology (accepted).
- Esquivel-Elizondo S, Delgado AG, Krajmalnik-Brown R. 2017. Evolution of microbial communities growing with carbon monoxide, hydrogen and carbon dioxide. FEMS Microbial Ecology. 93 (6): fix076.
- Chen T, Delgado AG, Maldonado J, Zuo Y, Kamath R, Westerhoff P, Krajmalnik-Brown R, and Rittmann BE. 2017 Interpreting the interaction between ozone and residual petroleum hydrocarbons in soil. Environmental Science & Technology 51 (1): 506-513.
- Esquivel-Elizondo S, Parameswaran P, Delgado AG, Maldonado J, Rittmann BE, Krajmalnik-Brown R. 2016. Archaea and Bacteria acclimate to high total ammonia in a methanogenic reactor treating swine waste. Archaea Special Issues on “To Cooperate or Compete? Archaea in Symbiosis”. <http://dx.doi.org/10.1155/2016/4089684>.

PUBLICATIONS (cont.)

- Apul OG, Delgado AG, Kidd J, Alam F, Dahlen P, Westerhoff P. 2016. Carbonaceous nano-additives augment microwave-enabled thermal remediation of soils containing petroleum hydrocarbons. Environmental Science: Nano. 3: 997-1002.
- Chen T, Delgado AG, Yavuz BM, Proctor AJ, Maldonado J, Zuo Y, Westerhoff P, Krajmalnik-Brown R, Rittmann BE. 2016. Ozone enhances biodegradability of heavy hydrocarbons in soil. Journal of Environmental Engineering and Science. 11(1): 7-17.
- Delgado AG, Fajardo-Williams D, Kegerreis KL, Parameswaran P, Krajmalnik-Brown R. 2016. Impact of ammonium on syntrophic organohalide-respiring and fermenting microbial communities. mSphere 1(2):e00053-16.doi:10.1128/mSphere.00053-1.
- Apul OG, Dahlen P, Delgado AG, Sharif F, Westerhoff P. 2016. Treatment of heavy, long-chain petroleum-hydrocarbon contaminated soils using chemical oxidation. Journal of Environmental Engineering ASCE, DOI: 10.1061/(ASCE)EE.1943-7870.0001139.
- Delgado AG, Kang D-W, Nelson KG, Fajardo-Williams D, Miceli JFI, Done HY, Popat SC, Krajmalnik-Brown R. 2014. Selective enrichment yields robust ethene-producing dechlorinating cultures from microcosms stalled at *cis*-dichloroethene. PLoS ONE 9(6): e100654. doi:10.1371/journal.pone.0100654.
- Delgado AG, Fajardo-Williams D, Popat SC, Torres CI, Krajmalnik-Brown R. 2014. Successful operation of continuous reactors at short retention times results in high-density, fast-rate *Dehalococcoides* dechlorinating cultures. Applied Microbiology and Biotechnology 98(6): 2729-2737.
- Delgado AG, Parameswaran P, Fajardo-Williams D, Halden RU, Krajmalnik-Brown R. 2012. Role of bicarbonate as a pH buffer and electron sink in microbial dechlorination of chloroethenes. Microbial Cell Factories 11(128).
- Ziv-El M, Delgado AG, Yao Y, Kang DW, Nelson KG, Halden RU, Krajmalnik-Brown R. 2011. Development and characterization of DehaloR², a novel anaerobic microbial consortium performing rapid dechlorination of TCE to ethene. Applied Microbiology and Biotechnology 92(5): 1063-1071.

Publications in preparation

- Delgado AG, Chen T, Yavuz BM, Maldonado J, Alam F, Halloum I, Rittmann BE, Krajmalnik-Brown R. Ozone induces divergent but metabolically redundant bacterial communities in petroleum-hydrocarbon contaminated soils.
- Apul OG, Delgado AG, Arrowsmith S, Alam F, Westerhoff P, Krajmalnik-Brown R. Effect of liquid oxidants on petroleum hydrocarbons and soil microbial populations.

PATENT APPLICATIONS

- Krajmalnik-Brown R, Torres CI, Delgado AG, Popat SC, Fajardo-Williams D. Methods, system, and culture medium for production of dechlorinating microorganisms. PCT application #14/204,058; filed 03/14/2013.
- Rittmann BE, Lee H-S, Torres CI, Delgado AG, Halden RU, Krajmalnik-Brown R. Reduction of chlorinated compounds and toxic substances in groundwater and soils by H₂ supply generated from microbial electrolysis cells (MECs). Nationalized PCT # 13/583,322; filed 03/08/2011.
- Krajmalnik-Brown R, Halden RU, Delgado AG, Ziv-El M. Microbial cultures and methods for anaerobic bioremediation. Nationalized PCT #13/386,386; filed 07/23/2010.

CONFERENCE PRESENTATIONS

- Delgado AG, Apul OG, Chen T, Yavuz BM, Rittmann BE, Westerhoff P, Krajmalnik-Brown R. Lifting the weight off crude oils- potentials and limitations of chemical oxidation and biodegradation in contaminated soils. AEEESP Research and Education Conference, Ann Arbor, MI, June 2017.
- Altizer M, Luna-Aguero M, Delgado AG, Torres CI, Krajmalnik-Brown R. Tracking hydrogen flux in soils to improve bioremediation potential site assessments. AEEESP Research and Education Conference, Ann Arbor, MI, June 2017.
- Chen T, Delgado AG, Yavuz BM, Maldonado J, Zuo Y, Kamath R, Westerhoff P, Krajmalnik-Brown R, Rittmann BE. Interpreting interactions between ozone and residual petroleum hydrocarbons in soil. Battelle Fourth International Symposium on Bioremediation and Sustainable Environmental Technologies, Miami, FL, May 2017.
- Altizer M, Luna-Aguero M, Delgado AG, Torres CI, Krajmalnik-Brown R. Measuring biotic soil hydrogen demand as a strategy for bioremediation potential assessment. Battelle Fourth International Symposium on Bioremediation and Sustainable Environmental Technologies, Miami, FL, May 2017.
- Cecillon S, Vogel TM, Altizer M, Delgado AG, Krajmalnik-Brown R. *Dehalococcoides* social networks in chlorinated solvent environments. Battelle Fourth International Symposium on Bioremediation and Sustainable Environmental Technologies, Miami, FL, May 2017.
- Altizer M, Delgado AG, Torres CI, Krajmalnik-Brown R. Follow the electrons: understanding the subsurface hydrogen flux. 56th Annual Meeting of the Arizona-Nevada Branch of the American Society for Microbiology, Tucson, AZ, April 2017.
- Delgado AG, Maldonado J, Alam F, Chen T, Yavuz BM, Rittmann BE, Krajmalnik-Brown R. Ozone induces divergent but metabolically redundant bacterial communities in petroleum-hydrocarbon contaminated soils. ISME16, Montreal, Canada, August 2016.
- Krajmalnik-Brown R, Delgado AG. Coupling biogeochemistry and fermentation processes to enhance reductive dechlorination. ISME16, Montreal, Canada, August 2016. (*Invited presentation*)
- Esquivel-Elizondo S, Delgado AG, Krajmalnik-Brown R. The effect of different syngas compositions on fermentation: pure culture vs enrichment culture. ISME16, Montreal, Canada, August 2016.
- Altizer M, Delgado AG, Luna Aguero M, Aguiar S, Krajmalnik-Brown R. Tracking the electrons: hydrogen flux and associated anaerobic microbial processes in saturated soil. ISME16, Montreal, Canada, August 2016.
- Esquivel-Elizondo S, Delgado AG, Krajmalnik-Brown R. The effect of different syngas compositions on fermentation: pure culture vs enrichment culture. Molecular Basis of Microbial One-Carbon Metabolism, Gordon Research Conference, Waterville Valley, NH, July 2016.
- Delgado AG, Halloum I, Shivana D, Mohana S, Fajardo-Williams D, Esquivel-Elizondo S, Krajmalnik-Brown R. Microbes breathing chlorinated carcinogens: "tiny" remediation solutions to major contamination challenges. MCC 10th Annual Biotech Symposium, Mesa Community College, Mesa, AZ, April 2016. (*Invited presentation*)
- Delgado AG, Krajmalnik-Brown R, Fajardo-Williams D, Halloum I. Nature's helpers: Using microorganisms to remove trichloroethene (TCE) from groundwater. American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, December 2015. (*Invited presentation*)

CONFERENCE PRESENTATIONS (cont.)

- Delgado AG, Halloum I, Chen T, Yavuz BM, Maldonado J, Alam F, Kong D, Edwards EA, Rittmann BE, Krajmalnik-Brown R. Bioremediation of petroleum hydrocarbon-contaminated soil following ozone pretreatment. Battelle Third International Symposium on Bioremediation and Sustainable Environmental Technologies, Miami, FL, May 2015.
- Chen T, Yavuz BM, Delgado AG, Proctor AJ, Zuo Y, Westerhoff P, Rittmann BE. Ozone enhances the bioavailability of residual heavy hydrocarbons in soil. Battelle Third International Symposium on Bioremediation and Sustainable Environmental Technologies, Miami, FL, May 2015.
- Fajardo-Williams D, Delgado AG, Torres CI, Krajmalnik-Brown R. Bioreactor design for high-rate dechlorination of chlorinated solvent-contaminated groundwater. Remtec, Westminster, CO, March 2015.
- Halloum I, Delgado AG, Hagan MA, Torres CI, Krajmalnik-Brown R. Large-scale continuous production of microbial cultures for bioremediation of chlorinated solvents. AZBio Expo 2014, Scottsdale, AZ, June 2014.
- Fajardo-Williams D, Delgado AG, Torres CI, Krajmalnik-Brown R. Coupling bioflocculation of *Dehalococcoides* to high-dechlorination rates. Battelle Ninth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 2014. (*Winner of student paper competition*)
- Charles MNC, Delgado AG, Fajardo-Williams D, Pycke BFG, Krajmalnik-Brown R, Elliot G, Wolf K, Halden RU. Investigating the use of the “*In Situ* Microcosm Array” (ISMA) technology for site-specific remediation of dissolved chlorinated solvents in groundwater. Fourth Annual SSEBE Graduate Research Symposium, ASU, Tempe, AZ, March 2014.
- Charles MNC, Delgado AG, Fajardo-Williams D, Pycke BFG, Krajmalnik-Brown R, Elliot G, Wolf K, Halden RU. Investigating the use of the “*In Situ* Microcosm Array” (ISMA) technology for site-specific remediation of dissolved chlorinated solvents in groundwater. AZ Water Association Research Workshop. Transforming Research into Practice: Finding Solutions to Arizona Water Challenges, Tempe, AZ, January 2014.
- Delgado AG, Nelson KG, Done HY, Fajardo-Williams D, Miceli JF, III, Kang D, Krajmalnik-Brown R. Pristine and contaminated environments yield robust trichloroethene to ethene-respiring consortia: the impact of enrichment techniques. 113th General Meeting of the American Society for Microbiology, Denver, CO, May 2013.
- Parameswaran P, Popat SC, Delgado AG, Torres CI. Efficient conversion of sucrose to electric current in a Microbial Electrolysis Cell (MEC) anode through homoacetogen-anode respiring bacteria (ARB) partnership. 113th General Meeting of the American Society for Microbiology, Denver, CO, May 2013.
- Delgado AG, Kegerreis KL, Parameswaran P, Halden RU, Krajmalnik-Brown R. Effect of ammonia on trichloroethene dechlorinating communities containing *Dehalococcoides*. 112th General Meeting of the American Society for Microbiology, San Francisco, CA, June 2012.
- Delgado AG, Parameswaran P, Fajardo-Williams, Halden RU, Krajmalnik-Brown. Role of bicarbonate as a pH buffer and electron sink in microbial dechlorination of chloroethenes. Eighth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, May 2012. (*Winner of student paper competition*)
- Krajmalnik-Brown R, Parameswaran P, Ziv-El M, Delgado AG, Halden RU, Torres CI, Rittmann BE. Beneficial role of homoacetogens in microbial electrochemical and dechlorinating systems. AEESP Education and Research Conference, Tampa, FL, July 2011.

CONFERENCE PRESENTATIONS (cont.)

- Delgado AG, Ziv-El M, Halden RU, Krajmalnik-Brown R. Microbial trichloroethene detoxification. 50th Annual Meeting of the Arizona-Nevada Branch of the American Society for Microbiology, Flagstaff, AZ, April 2011. (*Winner of best oral presentation*)
- Delgado AG, Ziv-El M, Torres CI, Parameswaran P, Halden RU, Krajmalnik-Brown R. Role of pH buffer on TCE reduction and composition of dechlorinating consortia. ISME13, Seattle, WA, August 2010.
- Torres CI, Delgado AG, Parameswaran P, Krajmalnik-Brown R. Enrichment and isolation of anode respiring bacteria from environmental sources using a low – potential poised anode. ISME13. Seattle, WA, August 2010.
- Ziv-El M, Delgado AG, Muto KG, Halden RU, Krajmalnik-Brown R. Molecular-biological characterization of a novel, sediment-free mixed culture showing exceptionally rapid dechlorination of trichloroethene to ethene. ISME13. Seattle, WA, August 2010.

SEMINAR PRESENTATIONS

- Delgado AG. Total Petroleum Hydrocarbons (TPH): Principles, Methods, and Analyses. Part of the Workshop for TPH Analyses, Rice University, Houston, TX and Texas A&M, College Station, TX, March 2016.
- Delgado AG, Kamath R, Krajmalnik-Brown R. Bioremediation of hydrocarbon-impacted soils. Part of Workshop of HIS Pretreatment and Oxidants, Institute of Technology Bandung, West Java, Indonesia, August 2015.
- Delgado AG, Kamath R, Apul OG, Chen T, Yavuz BY, Rittmann BE, Westerhoff P, Krajmalnik-Brown R. Chemical oxidants: applications for remediation of petroleum hydrocarbons. Part of Workshop of HIS Pretreatment and Oxidants, Institute of Technology Bandung, West Java, Indonesia, August 2015.
- Kamath R, Delgado AG, Apul OG, Westerhoff P, Krajmalnik-Brown R. Surfactant-enhanced remediation of petroleum hydrocarbons. Part of Workshop of HIS Pretreatment and Oxidants, Institute of Technology Bandung, West Java, Indonesia, August 2015.
- Delgado AG. Evaluation of bioremediation and advanced oxidation in heavy petroleum hydrocarbon-impacted soil. ASU Environmental Engineering Seminar, School of Sustainable Engineering and the Built Environment, Tempe, AZ, April 2015.

COURSES TAUGHT

- CEE 565 Contaminant Fate and Transport**, ASU School of Sustainable Engineering and the Built Environment, Fall 2017
- CEE 361 Introduction to Environmental Engineering**, ASU School of Sustainable Engineering and the Built Environment, Summer 2015. Instructor: 4.81/5; Course: 4.77/5
- MIC 302 Advanced Bacteriology Laboratory**, ASU School of Life Sciences, Spring 2009 and Fall 2009
- MIC 206 Introductory Microbiology Laboratory**, ASU School of Life Sciences, Fall 2008 and Summer 2009

Participation as guest lecturer

CEE 598 Data Synthesis for Environmental Engineering, ASU School of Sustainable Engineering and the Built Environment, Spring 2017

CEE 598 Biotransformations, ASU School of Sustainable Engineering and the Built Environment, Spring 2014 and Spring 2016

CEE 361 Introduction to Environmental Engineering, ASU School of Sustainable Engineering and the Built Environment, Fall 2015

STUDENTS AND RESEARCHERS ADVISED

Current Ph.D. students

Evelyn M. Miranda, Biological Design

Erik Poppleton, Biological Design

Srivatsan Mohana Rangan, Environmental Engineering (*co-advised with Rosa Krajmalnik-Brown*)

Current M.S. students

Aide Robles, Environmental Engineering

Sayalee Joshi, Chemical Engineering

Shefali Rao, Environmental Engineering

Current Postdocs

Chao Zeng, Environmental Engineering (*advised with Rosa Krajmalnik-Brown and Paul Westerhoff*)

Current undergraduate students

Aatikah Mouti, Biology

Theodora Yellowman, Biochemistry

Participation as a thesis/dissertation committee member

Sofia Esquivel-Elizondo, Environmental Engineering Ph.D.

Caitlyn Hall, Environmental Engineering Ph.D.

Marisol Luna Aguero, Civil Engineering B.S. Honors

Emily Bondank, Civil Engineering B.S. Honors

PROFESSIONAL SERVICE

Manuscript reviewer for Applied and Environmental Microbiology, Applied Microbiology and Biotechnology, Biodegradation, Environmental Engineering and Management Journal, Environmental Science & Technology, ISME Journal, Journal of Hazardous Materials, Journal of Visualized Experiments (JoVE), Science of the Total Environment, Water Research

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

PROFESSIONAL SERVICE (cont.)

Website Developer and Committee Member of the following:

Swette Center for Environmental Biotechnology: <http://www.environmentalbiotechnology.org>

Krajmalnik-Brown Lab: <http://krajmalnik.environmentalbiotechnology.org>

Night of the Open Doors Organizing Committee Member, Biodesign Institute, ASU, 2013-2014

PROFESSIONAL MEMBERSHIPS

Environmental Engineering and Science Professors (AEESP)

American Geophysical Union (AGU)

American Society for Microbiology (ASM)

International Society for Microbial Ecology (ISME)