DANIEL K. CHA
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EDUCATION

Ph.D. *University of California, Berkeley* - Civil Engineering - 1990
Major field of study: Environmental Engineering
Minor: Chemical Engineering and Microbiology

M.S. *University of British Columbia (Canada)* – Bioresource Engineering - 1986
Major field of study: Environmental Engineering

B.S. *McGill University (Canada)* –Bioresource Engineering (Great Distinction) - 1984

PROFESSIONAL EXPERIENCE

2006 - *Professor*, Civil & Environmental Engineering, University of Delaware.
2000 – 2006 *Associate Professor*, Civil & Environmental Engineering, University of Delaware.
1995 - 2000 *Assistant Professor*, Civil & Environmental Engineering, University of Delaware.
1991 - 1995 *Assistant Professor*, Environmental Engineering, Illinois Institute of Technology, Chicago, IL.
1990 - 1991 *Consulting Engineer*, Novatec Consultants Inc., Vancouver, B.C., Canada
1987 - 1990 *Engineering Trainee/Assistant Engineer*, Sacramento Wastewater Treatment Plant, Sacramento, CA.

JOURNAL PUBLICATIONS

1. Chang, J. S., Cha, D. K., Radosevich, M., & Jin, Y. Different bioavailability of phenanthrene to two bacterial species and effects of trehalose lipids on the bioavailability. *Journal of Environmental Science and Health, Part A*, 1-7 (2020).
2. Saxena, S., Ebrazibakhshayesh, B., Dentel, S.K., Cha, D.K., Imhoff, P.T. "Drying of fecal sludge in 3D laminate enclosures for urban waste management" *Science of The Total Environment*, **672**, 927-937 (2019).
3. Saxena, S., Ebrazibakhshayesh, B., Dentel, S.K., Imhoff, P.T., Cha, D.K. "In-situ drying of faecal sludge in breathable membrane-lined collection containers" *Journal of Water, Sanitation & Hygiene for Development*" **9**, 281-288 (2019).
4. Tian, J., Jin, J., Chiu, P.C., Cha, D.K., Guo, M. Imhoff, P.T. "A pilot-scale, bi-layer bioretention system with biochar and zero-valent iron for enhanced nitrate removal from stormwater" *Water Research*, **148**, 378-387 (2019).
5. Kim, S., Kim, S., Ahmed, Z., Cha, D.K., Cho, J. "Flux model for the membrane distillation process to treat wastewater: Effect of solids concentration, *Journal of Membrane Science*, **566**, 396-405 (2018).

6. Maeng, M.H. and Cha, D.K. "Transesterification of waste activated sludge for biosolids reduction and biodiesel production" *Water Environ Research*, **90**, 180-186 (2018).
7. Oh, S.Y., Seo, Y.D., Kim, B.S., Kim, I.Y, Cha, D.K. "Microbial reduction of nitrate in the presence of zero-valent iron and biochar" *Bioresource Technology*, **200**, 891-896 (2016).
8. Chang, J.S., Cha, D.K., Radosevich, M., Jin, Y. "Effects of biosurfactant-producing bacteria on biodegradation and transport of phenanthrene in subsurface soil" *Journal of Environmental Science and Health. Part A*, **50**, 611-616 (2015).
9. Choi, Y.G., Park, B.J., Cha, D.K. "Enhancing biological treatment of dye wastewater with zero-valent iron." *Korean J. Chem. Eng*., **32**, 1812-1817 (2015)
10. Erdem, A., Metzler, D., Cha, D.K., Huang, C.P. "The short-term toxic effects of TiO_2nanoparticles toward bacteria through viability, cellular respiration, and lipid peroxidation." *Environ. Sci. Pollut. Res. Int.*, **22**, 17917 (2015).
11. Erdem, A., Metzler, D., Cha, D.K., Huang, C.P. "Inhibition of bacteria by photocatalytic nano-TiO2 particles in the absence of light" *Int. J. Environ. Sci. Technol.*, **12**, 2987-2996 (2015).
12. Arthur, R.D., Torlapati, J., Shin, K.H., Cha, D.K., Yoon, Y., Son, A. "Process control factors for microbial reduction of perchlorate in presence of zero-valent iron." *Frontiers of Environmental Science and Engineering* , **8**, 386-393 (2014)
13. Choi, O.K., Song, J.S., Cha, D.K., Lee, J.W. "Biodiesel production from wet municipal sludge: Evaluation of in situ transesterification using xylene as a cosolvent" *Bioresource Technology*, **166**, 51-56 (2014).
14. Ahn, S.C., Hubbard, B., Cha, D.K., Kim, B.J. "Simultaneous removal of perchlorate and energetic compounds in munitions wastewater by zero-valent iron and perchlorate respiring bacteria." *Journal of Environmental Science and Health. Part A*, **49**, 575-583 (2014).
15. Kim, N., Chun, S.K., Cha, D.K., Kim, C. "Determination of Siloxanes in Biogas by Solid-phase Adsorption on Activated Carbon." *Bull. Korean Chem. Soc*., **34**, 2353 (2013).
16. Jeon, J.H., Cha, D.K., Choi, D.H., Kim, T.D. "Spatial Analysis of Nonpoint Source Pollutant Loading from the Imha dam Watershed using L-THIA " Journal of Preventitive Veterinary Medicine, 55, 17-29 (2013).
17. Han, T., Han, J., So, M., Seo, J., Ahn, C., Min D.H., Yeon, S.Y., Cha, D.K., Kim, C.G. "The removal of 1,4-dioxane from polyester manufacturing process wastewater using an up-flow Biological Aerated Filter (UBAF) packed with tire chips." *Journal of Environmental Science and Health. Part A*, **47**, 117-129 (2012).
18. Ryu, H. W., Nor, S. J., Moon, K. E., Cho, K. S. , Cha, D. K., and Rhee, K. I. "Reduction of perchlorate by salt tolerant bacterial consortia" *Bioresource Technology*, **103** 279–285 (2012).
19. Ahn, S. C., Cha, D. K., Kim, B. J., and Oh, S. Y., **"**Detoxification of PAX-21 ammunitions wastewater by zero-valent iron for microbial reduction of perchlorate" *Journal of Hazardous Materials*, **192**, 909-914 (2011).
20. Nor, S. J., Lee, S. H., Cho, K. S. , Cha, D. K., Lee, K. I., and Ryu, H. W. "Microbial treatment of high-strength perchlorate wastewater" *Bioresource Technology*, **102**, 835–841 (2011).
21. Son, A. J., Schmidt, C. J., Shin, H., and Cha, D. K. "Microbial community analysis of perchlorate-reducing cultures growing on zero-valent iron" *Journal of Hazardous Materials*, **185,** 669–676 (2011).

22. Lee, J.W., Cha, D.K., Oh, Y.K., KO, K.B., and Jin, H.S. Wastewater screening method for evaluating applicability of zero-valent iron to industrial wastewater. *Journal of Hazardous Materials*, 180, 354-360 (2010).
23. Lee, J.W., Cha, D.K., Oh, Y.K., KO, K.B., and Song, J.S. Zero-valent Iron Pretreatment for Detoxifying Iodine in Liquid Crystal Display (LCD) Manufacturing Wastewater. *Journal of Hazardous Materials*, 164, 67-72 (2009).
24. Ryu, H.W., Yoo, S.K., Choi, J.M., Cho, K.S., Cha, D.K., Thermophilic biofiltration of H_2S and isolation of a thermophilic and heterotrophic H2S-degrading bacterium, *Bacillus* sp. TSO3, *Journal of Hazardous Materials*, **168**, 501–506 (2009).
25. Shin, K. H. and Cha, D. K. "Microbial Reduction of Nitrate in the Presence of Nanoscale Zero-Valent Iron" *Chemosphere*, **72**, 257-262 (2008).

26. Ahn, S. C., Oh, S. Y., Cha, D. K. "Enhanced Reduction of Nitrate by Zero-Valent Iron at Elevated Temperatures." *Journal of Hazardous Materials*, **156**, 17-22 (2008)
27. Lee, J. W, Cha, D.K., Kim, I. K., Son, A., and Ahn, K. H. "Fatty acid methyl ester (FAME) technology for monitoring biological foaming in activated sludge: Full scale plant verification." *Environmental Technology*, **29**, 199-206 (2008).
28. Oh, S. K., Chiu, P. C. and Cha, D. K. Reductive transformation of 2,4,6-trinitrotoluene, hexahydro-1,3,5-trinitro-1,3,5-triazine, and nitroglycerin by pyrite and magnetite. *Journal of Hazardous Materials***, 58,** 652-655 (2008).
29. Shin, K. H, Son, A., Cha, D. K., and Kim, K. W. "Review on Risks of Perchlorate and Treatment Technologies" *Journal of Korean Society of Environmental Engineering*, **29(9)**, 1060-1068 (2007).
30. Oh, S. Y., Cha, D. K., Chiu, P. C., and Kim, B. J. "Zero-valent iron treatment of RDX-containing and perchlorate-containing wastewaters from an ammunition-manufacturing plant at elevated temperatures." *Water Science and Technology*, **54(10)**, 47-53 (2006).
31. Oh, S. Y., Lee, J., Cha, D. K. and Chiu, P. C. "Reduction of Acrolein by Elemental Iron: Kinetics, pH Effect, and Detoxification" *Environmental Science and Technology*, **40**, 2765-2770 (2006).
32. Son, A., Lee, J. W., Chiu, P. C. and Cha, D. K. "Microbial Reduction of Perchlorate with Zero-valent Iron." *Water Research*, **40**, 2027-2032 (2006).
33. Oh, S. Y., Chiu, P. C., Kim, B. J. and Cha, D. K. "Enhanced reduction of perchlorate by elemental iron at elevated temperatures." *Journal of Hazardous Materials*, **B129**, 304-307 (2006).
34. Perey-Saxe, J., Lubenow, B. L., Chiu, P. C., Huang, C. P. and Cha, D. K. Enhanced biodegradation of azo dyes using an integrated elemental iron-activated sludge system: I. Evaluation of system performance. *Water Environment Research*, **78**, 19-25 (2006).
35. Perey-Saxe, J., Lubenow, B. L., Chiu, P. C., Huang, C. P. and Cha, D. K. Enhanced biodegradation of azo dyes using an integrated elemental iron-activated sludge system: II. Effects of physical-chemical parameters. *Water Environment Research*, **78**, 26-30 (2006).
36. Oh, S. Y., Chiu, P. C., Kim, B. J. and, Cha, D. K. "Zero-Valent Iron Pretreatment for Enhancing the Biodegradability of Hexahydro-1,3,5-trinitro-1,3,5 triazine (RDX)." *Water Research*, **39**, 5027-5032 (2005).
37. Oh, S. Y., Cha, D. K., Kim, B. J. and Chiu, P. C., "Reductive Transformation of Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine(HMX),

and Methylenedinitramine (MDNA) with Elemental Iron", *Environmental Toxicology and Chemistry*, **24**, 2812-2819 (2005).
38. Kim, S. D., Bae, J. E., Park, H. S., and Cha, D. K. Bioleaching of cadmium and nickel from synthetic sediments by *Thiobacillus ferrooxidans. Environmental Geochemistry and Health* , **27**, 229-235 (2005).
39. Chang, J. S, Radosevich, M., Jin, Y. and Cha, D. K. Enhancement of phenanthrene solubilization and biodegradation by trehalose lipid biosurfactants. *Environmental Toxicology and Chemistry*, **23**, 2816–2822 (2004).
40. Oh, S.Y., Cha, D. K., Kim, B. J., and Chiu, P. C. Reduction of nitroglycerin with cast iron: pathway, kinetics, and mechanisms. *Environmental Science and Technology*, **38**, 3723-3730 (2004).

41. Oh, S. Y., Cha, D. K., Chiu, P. C. and Kim, B. J. Conceptual technology comparison for pink water treatment: zero-valent iron/fenton reagent reactor, anaerobic fluidized bed reactor, and granular activated carbon, *Water Science and Technology*, **49**(5-6), 129-136 (2004).
42. Oh, S. Y., Chiu, P. C, Kim, B. J., and Cha, D. K., Enhancing fenton oxidation of TNT and RDX through pretreatment with zero-valent iron. *Water Research*, **37**, 4275-4283 (2003).
43. Oh, S. Y., Cha, D. K., Chiu, P. C. and Kim B. J. Enhancing oxidation of TNT and RDX in wastewater: pretreatment with elemental iron. *Water Science and Technology*, **47**(10), 93-99 (2003).
44. Oh, S. Y., Cha, D. K., Kim, B. J., and Chiu, P. C. Effect of adsorption on the transformation of TNT and RDX with elemental iron. *Environmental Toxicology Chemistry*, **21**, 1384-1389 (2002).
45. Perey, J. R., Chiu, P. C., Huang, C. P., and Cha, D. K. Zero-valent iron pretreatment for enhancing biodegradability of azo dyes. *Water Environment Research*, **74**, 221-225 (2002).
46. Oh, S. Y., Cha, D. K., and Chiu, P. C. Graphite-mediate reduction of 2,4-dinitrotoluene with elemental iron. *Environmental Science and Technology*, **36**, 2178-2184 (2002).
47. Ma, H., Kim, S. D., Cha, D. K., and Allen, H. E. Effect of copper binding by suspended particulate matter on toxicity. *Environmental Toxicology Chemistry*, 21, 710-714 (2002).
48. Kim, D. W., Cha, D. K**.**, Seo, H. Y., and Bak, J. B. Influence of growth rate on biosorption of heavy metals by *Nocardia amarae*. *J. Microbiol. Biotechnol*., **12**, 878-881 (2002).
49. Kim, D. W., Cha, D. K., Wang, J., and Huang, C. P. Heavy metal removal by activated sludge: influence of *Nocardia amarae*. *Chemosphere*, **46**(1), 137-142 (2002).
50. Dean, S. E., Jin, Y., Cha, D. K**.**, Wilson, S. V., Radosevich, M. Phenanthrene Degradation in Soil Co-Inoculated with Phenanthrene-Degrading and Biosurfactant-Producing Bacteria. *Journal of Environmental Quality*, **30**, 1126-1133 (2001).
51. Perey, J. R., Oh, S. Y., Cha, D. K., Chiu, P. C. and Huang, C. P., Enhancing Biodegradability of Refractory Aromatics: Pretreatment with Elemental Iron, *Ex Situ Biological Technologies*, 149-155 (2001).
52. Lampron, K. J., Chiu, P. C. and Cha, D. K. Reductive dehalogenation of chlorinated ethesnes with elemental iron: the role of microorganisms.*Water Research*, **35**, 3077-3084 (2001).
53. Kim, S. D., Gu, M. B., Allen, H.E. and Cha, D. K. Physicochemical factors affecting the sensitivity of *Ceriodaphnia dubia* to copper. *Environmental Monitoring and Assessment***.** **70**, 105-116 (2001).

54. Chang, J. H., Qiang, Z., Huang, C. P., and Cha, D. K. "Electroosmotic flow rate: a semiempirical approach." Nuclear Site Remediation (edited by Eller, P. G. and Heineman, W. R., American Chemical Society, Washington, DC, pp 247 (2000).
55. Qiang, Z., Chang, J. H., Huang, C. P., and Cha, D. K. "Oxidation of selected polycyclic aromatic hydrocarbons by the Fenton's reagent: effect of major factors including organic solvent." Nuclear Site Remediation (edited byEller, P. G. and Heineman, W. R., American Chemical Society, Washington, DC, pp 187 (2000).
56. Niec, J. H. and Cha, D. K. "Influence of anoxic selectors on heavy metal removal by activated sludge." *Biotechnol. Bioprocess Eng*., **5**, 431 (2000).
57. Cha, D. K., Chiu, P. C., Chang, J. S. and Kim, S. D. Hazardous waste: treatment technologies. *Water Environment Research*, **72** (2000) (Annual literature review paper).
58. Kim, S. D., Ma, H., Allen, H. E. and Cha, D. K. Influence of dissolved organic matter on the toxicity of copper to *Ceriodaphnia dubia*: effect of complexation kinetics. *Environmental Toxicology Chemistry*, **18**, 2433-2437 (1999).
59. Cha, D. K., Fuhrmann, J. J., Kim, D. W. and Golt, C. M. Fatty acid methyl ester (FAME) analysis for monitoring *Nocardia* levels in activated sludge. *Water Research*, **33**, 1964-1966 (1999).
60. Ma, H., Kim, S. D., Cha, D. K., and Allen, H. E. Effect of kinetics of complexation by humic acid on the toxicity of copper to *Ceriodaphnia dubia*. *Environmental Toxicology and Chemistry*, **18**, 828-837 (1999).
61. Kim, S.D., Kilbane, J. J., and Cha, D. K. Prevention of acid mine drainage by sulfate reducing bacteria: organic substrate addition to mine waste piles. *Environmental Engineering Science*, **16**, 139-145 (1999).
62. Cha, D. K., Chiu, P. C., Kim, S. D. and Chang, J. S. Hazardous waste: treatment technologies. *Water Environment Research*, **71**, 870 (1999) (Annual literature review paper).
63. Wang, J., Huang, C. P., Allen, H. E., Cha, D. K**.** and Kim, D. W. Adsorption characteristics of dye onto sludge particulates. *Journal of Colloid & Interface Science*, **208**, 518-528 (1998).
64. Lampron, K. J., Chiu, P. C. and Cha, D. K. Biological reduction of trichloroethene supported by Fe(0). *Bioremediation Journal*, **2**, 175-181 (1998).
65. Park, A. J., Cha, D. K., and Holsen, T. M. Enhancing solubilization of sparingly soluble organic compounds by biosurfactants produced from *Nocardia erythropolis*. *Water Environment Research*, **70**, 351-355 (1998).
66. Cha, D. K., Chiu, P. C., Sarr, D. and Kim, D. W. Hazardous waste: treatment technologies. *Water Environment Research*, **70**, 705-720 (1998) (Annual literature review paper).
67. Cha, D. K., Song, J. S., and Sarr, D. Hazardous waste treatment technologies. *Water Environment Research*, **69**, 676-689 (1997) (Annual literature review paper).
68. McCue, J. J., Holsen, T. M., Gauger, W. K., Kelley, R. and Cha, D. K. Effect of amorphous ferrous sulfide on the microbial reductive dechlorination of PCB Aroclor 1242. *Environmental Toxicology and Chemistry*, **15**, 1071-1082 (1996).
69. Moschandreas, D. J., Cha, D. K**.** and Qian, J. Measurement of indoor bioaerosol concentrations by a direct counting method. ASCE *Journal of Environmental Engineering*, **122**, 374-378 (1996).
70. Cha, D. K., Song, J. S., Kim, B. J., and Sarr, D. Hazardous waste treatment technologies. *Water Environment Research*, **68**, 575-586 (1996) (Annual literature review paper).

71. Su, M. C., Cha, D. K., and Anderson, P. R. Influence of selector technology on heavy metal removal by activated sludge: secondary effects of selector technology. *Water Research*, **29**, 971-976 (1995).
72. Cha, D. K., Jenkins, D., Lewis, W. P., Kido, W. H. Closure to discussion of process control factors influencing *Nocardia* populations in activated sludge. *Water Environment Research*, **65**, 93 (1993).
73. Cha, D. K., Jenkins, D., Lewis, W. P., Kido, W. H. Process control factors influencing *Nocardia* populations in activated sludge. *Water Environment Research*, **64**, 37-43 (1992).

PATENTS

Hubbard, B., Attavane, A., Cha, D. K. and Chiu, P. C. "Integrated Nanoscale Zero-Valent Iron–Hydrogen Peroxide (nZVI-H 2 O 2) Technology for Rapid and Complete Destruction of Insensitive Munitions Constituents in Explosive Production Wastewaters" Provisional application filed in 2019.

Kim, B. J., Oh, S. Y., Chiu, P. C. and Cha, D. K. "System for destroying hazardous waste resultant from the production of energetics such as explosives" U.S. Patent No. 7,479,259 (2009).

Cha, D. K., Oh, S. Y., Chiu, P. C. and Kim, B. J. "Process for treating waste from the production of energetics" U.S. Patent No. 7,445,717 (2008).

Cha, D. K., Chiu, P. C., Oh, S. Y., Lee, J. W. "Process for Treating Refractory Wastewater Using Zero-Valent Iron Treatment and Biodegradation." Korean Patent No. 10-0735635 (2007).

CONFERENCE PRESENTATIONS AND INVITED LECTURES

"Field Demonstration of an Integrated Nanoscale Zero Valent Iron–Hydrogen Peroxide Process for Complete Destruction of Munitions Compounds in Wastewater." Annual SERDP-ESTCP Technical Symposium and Workshop, Washington, DC (2019).

"Field Demonstration of Integrated Nanoscale Zero Valent Iron–Hydrogen Peroxide Process for Complete Destruction of Munitions Compounds in Wastewater" Annual SERDP-ESTCP Technical Symposium and Workshop, Washington, DC (2018).

"Denitrification by Zero-valent Iron-supported Mixed Cultures" Annual US-Korea Conference in Science and Technology (UKC2017), Washington, DC (2017).

"Enhancement of anaerobic degradability of wastewater sludge by pre-extraction of biodiesel". Proceedings of 5th International Symposium on Energy from Biomass and Waste, Venice, Italy (2014).

"Transesterification of Waste Activated Sludge for Reduction of Excess Sludge Generation and Biodiesel Production" Water Environment Federation Annual Technical Exhibition and Conference and Exposition, Chicago, IL (2013).

"Transesterification of Waste Activated Sludge for Reduction of Excess Sludge Generation and Biodiesel Production" Annual Chesapeake Water Environment Association Conference, Ocean City, MD (2013).

"Microbial Reduction of Nitrate with Zero-valent Iron in High Sulfate Water" Annual ESTCP Technical Symposium and Workshop, Washington, DC (2011).

"Converting Wastewater Treatment Facilities to Biorefinery: Production of Biofuel and Bioplastic", Invited Seminar Series, Department of Chemical Engineering, Soongshil University, Seol, Korea (2011). **[Invited lecture]**

"Zero-valent Iron Technology for Wastewater Treatment", Department of Environmental Engineering, Inha University, Inchon, Korea (2011). **[Invited lecture]**

"Zero-valent Iron Technology for Wastewater Treatment", Korea Institute of Construction Technology, Ilsan, Korea (2011). **[Invited lecture]**

"Rapid Infiltration System for Enhanced Removal of Nitrate from Secondary Effluent" The Sixth International Conference on Sustainable Water Environment, Newark, DE (2010).

"Production of Biodiesel from Wastewater Treatment Plant Microorganisms" The Sixth International Conference on Sustainable Water Environment, Newark, DE (2010).

"Zero-valent Iron Process for Treating Emerging Contaminants", The first biennial USACE Research and Development Conference, Memphis, TN. (2009).

"Demonstration Results for Innovative RDX Wastewater Treatment Pilot Plant"
The first biennial USACE Research and Development Conference, Memphis, TN. (2009).

"Pilot-scale Demonstration/Validation of Innovative Zero-valent Iron Treatment Technology: Ultimate Solution for RDX-Containing Wastewater and Pink Water" Annual ESTCP Technical Symposium and Workshop, Washington, DC (2009).

"Converting Wastewater Treatment Facilities to Biorefinery: Production of Biofuel and Bioplastic", *Invited Seminar Series in Green Growth Technology*, Ulsan City, Korea (2009). **[Invited lecture]**

"Zero-valent Iron Technology for Wastewater Treatment", Ewha Womans University, Seoul, Korea (2009). **[Invited lecture]**

"Treatment of Perchlorate-Contaminated Wastewater Using Zero-valent Iron at Elevated Temperatures", The IWA World Water Congress and Exhibition, Vienna, Austria (2008).

"Pilot-Scale Evaluation of Zero-Valent Iron Technology: Treatment of RDX Wastewater" Annual ESTCP Technical Symposium and Workshop, Washington, DC (2008).

"Removal of Perchlorate and Energetic Compounds by Zero-valent Iron and Perchlorate Respiring Bacteria" Annual ESTCP Technical Symposium and Workshop, Washington, DC (2008).

"Zero-valent Iron Technology for Wastewater Treatment", Sung Kyun Kwan University, Suwon, Korea (2008). **[Invited lecture]**

"Development of Microbial Perchlorate Treatment Technology", National Institute of Environmental Research, Korea Ministry of Environment (2008). **[Invited lecture]**

"Zero-valent Iron Technology for Wastewater Treatment" Yonsei University, Seoul, Korea (2008). **[Invited lecture]**

"Integrating Process Engineering and Microbiology to Advance Wastewater Treatment Technology" One-week Short Course, Yonsei University, Seoul, Korea (2008). **[Invited lecture]**

"Zero-valent Iron Technology for Wastewater Treatment" Hyundai Engineering, Seoul, Korea (2008). **[Invited lecture]**

"Microbial Reduction of Perchlorate in Ammunitions Wastewater: Detoxification by Elemental Iron" Annual Meeting of Society of Environmental Toxicology and Chemistry, Milwaukee, WI (2007)

"Zero-valent Iron Technology for Treatment of Pink Water: Pilot-scale Demonstration" Annual ESTCP Technical Symposium and Workshop, Washington, DC (2007).

"Pilot-Scale Evaluation of Zero-Valent Iron Technology: Treatment of RDX Wastewater" Annual ESTCP Technical Symposium and Workshop, Washington, DC (2007).

"Removal of Perchlorate and Energetic Compounds by Zero-valent Iron and Perchlorate Respiring Bacteria" Annual ESTCP Technical Symposium and Workshop, Washington, DC (2007).

"Microbial Removal of Perchlorate in Ammunition Wastewater: Detoxification by Elemental Iron" Annual ESTCP Technical Symposium and Workshop, Washington, DC (2007).

"Simultaneous Removal of Perchlorate and Energetic Compounds by Zero-valent Iron and Perchlorate Respiring Bacteria" Annual US-Korea Conference, Washington, DC (2007).

"Simultaneous Removal of Perchlorate and Energetic Compounds by Zero-valent Iron and Perchlorate Respiring Bacteria" Annual ESTCP Technical Symposium and Workshop, Washington, DC (2006).

"Design and Operation of a Zero-Valent Iron Demonstration unit at Holston Army ammunition plant" Annual ESTCP Technical Symposium and Workshop, Washington, DC (2006).

"Community Analysis of Perchlorate-reducing Cultures Growing on Zero-Valent Iron" Annual US-Korea Conference, Teaneck, NJ (2006).

"Acrolein Reduction with Elemental Iron: Pathway, Kinetics, and Enhanced Biodegradability" The 230th ACS National Meeting, Division of Environmental Chemistry, Washington, DC (2005).

"Microbial reduction of perchlorate with zero-valent iron" The 78th Annual WEFTEC Conference, Washington, DC (2005).

"Enhanced Reduction of Perchlorate by Elemental Iron at Elevated Temperature" The 78th Annual WEFTEC Conference, Washington, DC (2005).

"Microbial Reduction of Perchlorate with Elemental Iron" The Eighth International Symposium on In Situ and On-Site Bioremediation, Baltimore, MD (2005).

"Reduction of RDX, HMX, and Methylenedinitramine with Cast Iron: Products, Kinetics, and Mechanisms" The 228th ACS National Meeting, Division of Environmental Chemistry, Philadelphia, PA (August 22-26, 2004).

"Reduction of Nitroglycerin with Cast Iron: Pathway, Kinetics and Mechanisms" The 228th ACS National Meeting, Division of Environmental Chemistry, Philadelphia, PA (August 22-26, 2004).

"Effect of Copper on Viable Populations and Community Structures of Nitrifiers and Heterotrophs in Activated Sludge" The 77th Annual WEFTEC Conference, New Orleans, LA (2004).

"Enhanced Biodegradation of Phenanthrene by Trehalose Lipid Biosurfactants" The 14th Annual European Meeting of Society of Environmental Toxicology and Chemistry, Prague, Czech Republic (2004)

"Physical-chemical parameters influencing elemental iron-mediated reduction of azo dye" The 76th Annual WEFTEC Conference, Los Angeles, CA (2003).

"Inhibition of Nitrification in Activated Sludge by Copper: Effect of different MCRTs" The 13th Annual European Meeting of Society of Environmental Toxicology and Chemistry, Hamberg, Germany (2003)

"Enhancing Fenton Oxidation of TNT and RDX: Pretreatment with zero-valent iron" The 75th Annual WEFTEC Conference, Chicago, Il (2002).

"Enhanced Biodegradability of Azo Dyes through Pretreatment with Elemental Iron" The 75th Annual WEFTEC Conference, Chicago, Il (2002).

"Fatty Acid Analysis for Monitoring *Nocardia* Levels in Activated Sludge." Annual UKC Conference, Seoul, Korea (2002).

"*Nocardia* in Activated Sludge: Monitoring and Control." Symposium on Wastewater Reclamation and Reuse for Sustainability, Kwangju, Korea (2002).

"Zero-valent Iron Pretreatment for Enhancing Biodegradability of Recalcitrant Aromatics" SK Chemical Research Institute, Suwon, Korea (2002). **[Invited lecture]**

"Fatty Acid Analysis for Monitoring Microbial Populations in Biological Wastewater Treatment Processes" Seoul National University, Seoul, Korea (2002). **[Invited lecture]**

"Zero-valent Iron Pretreatment for Enhancing Biodegradability of Azo Dyes in Wastewater." The 74th Annual Conference and Exposition of Water Environment Federation, Atlanta, GA (2001).

"Enhancing Biodegradation of TNT and Heterocyclic Nitramines in Wastewater: Pretreatment with Elemental Iron." The 74th Annual Conference and Exposition of Water Environment Federation, Atlanta, GA (2001).

"Reductive Dehalogenation of Chlorinated Ethenes with Elemental Iron: The Role of Microorganisms." UKC-MIT Conference at Massachusetts Institute of Technology, Cambridge, MA (2001). **[Invited lecture]**

"Monitoring Nitrifying Microbial Communities in Wastewater Treatment Processes: Application of Fatty Acid Analysis" The 73rd Annual Conference of Water Environment Federation, Anaheim, CA (2000).

"Is Food-borne Cadmium more Bioavailable than Sorbed/water-borne Cadmium?" The 21th Annual Meeting of Society of Environmental Toxicology and Chemistry, Nashville, TN (2000).

"*Nocardia* in Activated Sludge: Monitoring and Control." Inha University, Inchon, Korea (2000). **[Invited lecture]**

"Chronic toxicity of copper on *daphnia magna*: effect of feeding copper-laden algae." The 20th Annual Meeting of Society of Environmental Toxicology and Chemistry, Philadelphia, PA (1999).

"Influence of dissolved organic matter on the toxicity of copper to *Ceriodaphnia dubia*: effect of complexation kinetics." The 72nd Annual Conference of Water Environment Federation, New Orleans, LA (1999).

"Effect of biosurfactants produced from *Rhodococcus erythropolis* on mineralization of phenanthrene." The 31th Mid-Atlantic Industrial and Hazardous Waste Conference, Storrs, CT (1999).

"Microbial reductive dehalogenation of chlorinated ethenes coupled with the corrosion of Fe^{o}." The 30th Mid-Atlantic Industrial and Hazardous Waste Conference, Philadelphia, PA (1998).

"*Nocardia* in activated sludge: monitoring and control." The Graduate school seminar series in engineering, The City University of New York, NY (1998). **[Invited lecture]**

"Fatty acid methyl ester (FAME) analysis for monitoring microbial communities in wastewater treatment processes." DuPont Company, Wilmington, DE (1998). **[Invited lecture]**

"Fate of heavy metals in *Nocardia* foaming activated sludge." The 70th Annual Conference of Water Environment Federation, Chicago, IL (1997).

"Aquatic toxicity of copper on *Ceriodaphnia dubia*: effect of copper complexation kinetics." The 18th Annual Meeting of Society of Environmental Toxicology and Chemistry, San Francisco, CA (1997).

"In-situ biotreatment of acid mine drainage from mine waste pile." The 29th Mid-Atlantic Industrial and Hazardous Waste Conference, Roanoke, VA (1997).

"Accumulation of heavy metal ions by *Nocardia amarae.*" The 2nd International Conference on Microorganisms in Activated Sludge and Biofilm Processes, Berkeley, CA (1997).

"Kinetics of copper partitioning to dissolved organic matter." 1997 ICA Environmental Program Workship, Toronto, Canada. **[Invited lecture]**

"Aquatic toxicity of copper on *Ceriodaphnia dubia*: effect of copper complexation kinetics." The 17th Annual Meeting of Society of Environmental Toxicology and Chemistry, Washington, D.C. (1996).

"Enhancing solubilization of sparingly soluble organic compounds by biosurfactants produced from *Nocardia erythropolis*." The 69th Annual Conference of Water Environment Federation, Dallas, Taxas (1996).

"Engineering Concepts for Bioremediation" 1996 Earth Day Environment Workshop, Seoul Korea. **[Invited lecture]**

"Bioremediation" 1996 International Symposium on Environment Conservation, Tague, Korea. **[Invited lecture]**

"Engineering Concepts for Bioremediation" Invited Seminar, Kwangju Institute of Science & Technology, Kwangju, Korea (1996). **[Invited lecture]**

"Evaluation of anaerobic filter for the treatment of candy company wastewater" 14th Annual Conference of Illinois Water Pollution Control Association, Peoria, IL. (1993).

"Use of biosurfactants produced by *Nocardia amarae* for removal of hydrocarbons from aqueous

solutions" IAWPRC Sixteenth Biennial Conference, Washington, D.C. (1992).

"Evaluation of aerobic selector technology for heavy metal removal by activated sludge." 13th Annual Conference of Illinois Water Pollution Control Association, Bloomingdale, IL. (1992).

"Biotechnology and Pollution Control" 1992 Biotechnology Seminar Series, Argonne National Laboratory. **[Invited lecture]**

"Process Control Factors Influencing Nocardia Populations in Activated Sludge." 63rd Annual Conference of Water Pollution Control Federation, Washington, D.C. (1990).

SPONSORED RESEARCH CONTRACTS AND GRANTS

Funding Source, Title, Date	**Role**
DOD Environmental Security Technology Certification Program (ESTCP), "Field demonstration of an integrated nano-scale zero-valent hydrogen peroxide process for complete destruction of munitions compounds in wastewater", 5/1/19 – 4/30/22 (Co-PI: Pei Chiu)	PI
Center for Food Systems and Sustainability (CENFOODS), "Converting Food Waste to Energy Through Sequential Aerobic and Anaerobic Digestion", 8/2018 – 12/2020 (Co-PIs: Amy S. Biddle, Kimberly L. Bothi, Michael J. Chajes)	PI
Delaware Solid Waste Authority, "Bio-digester for On-site Digestion of Food Waste", 11/1/17 – 12/31/20 (Co-PI: Michael J. Chajes)	PI
HKF Technology, "Pilot-Scale Investigation of an Integrated Biological-Zero-Valent Iron Technology for Nitrate Removal from Water", 9/15 – 8/16 (Co-PI: Pei Chiu).	PI
Bill and Melinda Gates Foundation, "Breathable Membrane Enclosures for Fecal Sludge Stabilization", 11/13 – 8/16 (PI – Steven K. Dentel; Co-PI: Paul Imhoff).	PI (as of 8/15)
SAC Co., Korea, "Breathable Membrane Technology: Adaptation to Drying of Treatment Plant Sludges", 6/14 – 8/16 (PI – Steven K. Dentel).	Co-PI
DE Department of Transportation, "Integrating Zero-valent Iron and Biochar Amendments in Green Stormwater Management Systems for Enhanced Treatment of Roadway Runoff - Field Demonstration", 9/15 – 8/16 (PI – Imhoff; Co-PIs: Chiu, Maresca, Guo).	Co-PI
*DE Department of Transportation***, "**Integrating Zero-valent Iron and Biochar Amendments in Green Stormwater Management Systems for Enhanced Treatment of Roadway Runoff: Phase II Field Demonstration", 9/12 – 8/15 (Co-PIs: Imhoff, Chiu, Maresca, Guo).	PI

Town of Middletown, DE, "Engineered Rapid Infiltration System for Enhanced Removal of Nitrate from Secondary Effluent: Phase II Field Demonstration", 7/12 – 5/15 (PI – Bill Ritter).	Co-PI
DE Department of Transportation, **"**Integrating Zero-valent Iron and Biochar Amendments in Green Stormwater Management Systems for Enhanced Treatment of Roadway Runoff", 9/11 – 8/12 (Co-PIs: Imhoff, Chiu, Maresca, Guo).	PI
TSK Water Co., Korea, "Disintegration of Waste Activated Sludge by In-situ Transestrification for Reduction of Excess Sludge", 9/10 –12/11.	PI
Town of Middletown, DE, "Engineered Rapid Infiltration System for Enhanced Removal of Nitrate from Secondary Effluent at Middletown Wastewater Treatment Plant", 1/10 – 7/12 (PI – Bill Ritter).	Co-PI
US Army Engineering Research and Development Center/ Chesapeake Watershed Cooperative Ecosystems Studies Unit, "Development of Appropriate Treatment Technology for PAX-21 Manufacturing Wastewater", 7/08 – 12/08.	PI
US Army Corps of Engineers, "Simultaneous Removal of Perchlorate and Energetic Compounds by Zero-Valent Iron and Perchlorate Respiring Bacteria", 4/06 – 12/08.	PI
DoD Environmental Security Technology Certification Program (ESTCP) "Pilot-Plant Evaluation of Integrated Iron Treatment of Pink Water", 01/05 – 12/08 (Co-PI: Pei Chiu).	PI
U.S. Environmental Protection Agency, "Short-term Chronic Toxicity of Photocatalytic Nanoparticles to Bacteria, Algae, and Daphnid", 8/04-7/07 (PI – C.P. Huang).	Co-PI
LG Engineering and Construction Corp. "Enhancing Biodegradability of Refractory Compounds in Wastewater Treatment Facilities using Zero-valent Iron", 04/04-05/06 (Co-PI: Pei Chiu).	PI
US Army Construction Engineering Research Lab, "Reductive Removal of Aqueous Perchlorate by Elemental Iron", 03/04 – 12/05 (Co-PIs: Pei Chiu).	PI
International Copper Association, "Effect of Copper on Nitrifying and Heterotrophic Populations in Activated Sludge", 07/01 – 10/03 (Co-PI: Herbert E. Allen).	PI
Korea Institute of Science and Technology, "Fatty acid analysis for monitoring microbial communities in wastewater treatment processes", 08/00 – 12/03.	PI
US Army Construction Engineering Research Lab, "Iron Pretreatment of Nitroglycerin", 04/02 – 05/03 (Co-PI: Pei Chiu).	PI

Water Environment Research Foundation, "Enhancing biodegradability of refractory aromatics in wastewater: pretreatment with elemental iron", 05/00 – 08/02 (Co-PIs: Pei Chiu, C.P. Huang).	PI
US Army Corps of Engineers , "Anaerobic Treatment of Pink Water", 04/00 – 09/01 (Co-PI: Pei Chiu).	PI
Water Environment Research Foundation, " Chemistry of natural and wastewater organic matter and effects on copper toxicity", 10/99 – 09/02 (PI - Herbert E. Allen).	Co-PI
U.S. Environmental Protection Agency, "Fate and transport of heavy metals in subsurface: effect of polymer-surfactant aggregates", 1998 – 2001 (PI - Steven K. Dentel).	Co-PI
DuPont Company, "Fatty acid methyl ester (FAME) technology for monitoring nitrifying populations in mixed cultures", 1998 - 2000.	PI
University of Delaware Research Foundation, "Fatty acid analysis for monitoring microbial communities in wastewater treatment processes", 1998 - 1999.	PI
U.S. Geological Survey, "The effect of biosurfactants on the fate and transport of nonpolar organic contaminants in porous media", 1997 – 1999 (PI - Mark Radosevich, University of Tennessee).	Co-PI
U.S. Department of Energy, "Electrochemical processes for in-situ treatment of contaminated soils", 1996 – 1999 (PI - C. P. Huang).	Co-PI
International Copper Association, "Bioavailability of Copper: Effects of Chemical Speciation", 1996 - 1998 (Co-PI: Herbert E. Allen).	PI
US Environmental Protection Agency, "Enhancing biodegradation of sorbed hydrophobic compounds using nonionic surfactants", 1995 – 1997 (PI - H. Ted Chang, IIT).	Co-PI
US Army Corps of Engineers, "Bioleaching of heavy metals from contaminated solids", 1993 – 1994.	PI