

## Craig S. Criddle

Dept. of Civil and Environmental Engineering  
Stanford University  
Jerry Yang and Akiko Yamazaki  
Environment & Energy Building Room 151  
473 Via Ortega Mail code: 4020  
Stanford, CA 94305

Cell: (408) 910-9258  
Office: (650) 7a23-9032  
Facsimile: (650) 725-3164  
E-mail: criddle@stanford.edu

**Expertise:** microbial biotechnology for recovery of clean water, renewable energy, safe materials, and the knowledge needed to protect human and ecosystem health

**License** Professional Engineer in Michigan, License #6201041572

### Degrees

B.S. Civil and Environmental Engineering, with Chemistry minor 1982.  
Utah State University, Logan, Utah  
B.A. Spanish 1982. Utah State University, Logan, Utah  
M.S. Civil and Environmental Engineering, 1984. Utah State University, Logan,  
Utah  
Ph.D. Civil Engineering - Environmental Engineering & Science, 1990.  
Stanford University, Stanford, California

**License** Registered Professional Engineer in Michigan, License #6201041572  
(issued 5/14/1996; current license renewed through 10/31/2019)

### Experience

2016-present Division Lead for the Biofuel and Biomaterial Manufacturing Division of the NASA-funded Center for the Utilization of Biological Engineering in Space (CUBES).

2014-present Director, Codiga Resource Recovery Center, Stanford University, Stanford, CA

2008-present Senior Fellow (by courtesy), Woods Institute for the Environment, Stanford University.

2005-present Professor, Department of Civil and Environmental Engineering, Stanford University.

2004-2006 Chair Professor, Tsinghua University, Beijing China. Taught a short course for one week each summer and developed research linkages.

2003 Associate Chair, Department of Civil and Environmental Engineering, Stanford University.

1998-2005 Associate Professor, Department of Civil and Environmental Engineering, Stanford University, Stanford, CA. Lead Investigator for a large field-scale uranium remediation project at the Oak Ridge National Laboratory.

Courses taught: Aquatic Chemistry and Biology, Environmental Biotechnology, Environmental Biotechnology Laboratory, Pathogens and Disinfection.

1996-1998 Associate Professor, Department of Civil and Environmental Engineering, Michigan State University, East Lansing, MI. Teaching and research in Environmental Engineering. Principal investigator in the NSF Center for Microbial Ecology, in the NIEHS Environmental Toxicology Superfund Center, and in the Great Lakes and Mid-Atlantic hazardous Substance Research Center. Lead Investigator for the Schoolcraft Bioaugmentation Project, including pilot- and demonstration-scale aquifer bioaugmentation experiments. The National Ground Water Association named this project Outstanding Remediation Project for 2002.

Courses taught: Introduction to Environmental Engineering, Biological Processes in Environmental Engineering, Processes Design for Environmental Biotechnology, Advanced Environmental Control, Environmental Engineering Chemistry, Microbiology for Environmental Health Engineering.

1989-1996 Assistant Professor, Department of Civil and Environmental Engineering, Michigan State University.

1983-1989 Research Assistant, Stanford University.

1984-86 Teaching Assistant, Stanford University.

1983 Teaching Assistant, Utah State University.

1982-83 Research Assistant, Utah State University.

1981-83 Utah-Certified Operator, Hyrum Wastewater Trtmt Plant, Hyrum, UT.

1978-81 Engineering Aide. Clyde-Criddle-Woodward Consulting Engineers.

### **Honors & Honorary Societies**

Leavell Family Faculty Scholar, 1998-2001 - School of Engineering, Stanford University  
Withrow Distinguished Scholar Award 1996-97 - College of Engineering, Michigan State University

Nontenured Faculty Award 1992 - 3M Company

Outstanding Doctoral Thesis Award 1990 - presented by CH2MHill, Inc., and the Association of Environmental Engineering Professors

Outstanding Senior 1982 - Department of Civil and Environmental Engineering and College of Engineering, Utah State University

Tau Beta Pi

Phi Kappa Phi

### **Professional Service and Associations**

Member of American Society for Microbiology, American Chemical Society, Water Environment Federation, Association of Environmental Engineering and Science Professors, American Society of Civil Engineers (Membership no. 000011967987), **International Society of Microbial Ecology**

Manuscript reviewer for: Environmental Science and Technology, Biotechnology and Bioengineering, Water Research, Water Resources Research, Water Environment Research, Biodegradation, Journal of Environmental Quality, Journal of Environmental Engineering, Chemosphere, Journal of Hazardous Materials, Journal of Contaminant Hydrology, Soil Science Society of America Journal, Applied and Environmental Microbiology, Canadian Journal of Microbiology, Acta Chimica et Geochimica. and Aqua, Science.

Proposal reviewer for: Michigan Department of Natural Resources (Great Lakes Protection Fund); Michigan State University Research Initiation Grants program; the 1991, 1993, and 1995 Battelle Symposia on In Situ and On-Site Bioreclamation; the Illinois Department of Energy and Natural Resources; Nebraska Experimental Program to Stimulate Competitive Research; the United States Department of Agriculture, the National Science Foundation; the Petroleum Research Fund; Singapore government.

Co-Chair of the Session on Anaerobic/Aerobic Processes for the Degradation of Halogenated Organics at: the Third International Symposium on In Situ and On-Site Bioreclamation April 24-27, 1995, San Diego, CA; the Fourth International Symposium on In Situ and On-Site Bioreclamation. April 27 - May 1, 1997, New Orleans, LA; and the Fifth International Symposium on In Situ and On-Site Bioreclamation, April 19-23, 1999, San Diego, CA. Sponsored by Battelle.

Panel reviewer for the NSF Division of Earth Sciences, Environmental Geochemistry and Biogeochemistry, Arlington, Virginia, April 10-12, 1996.

1999 - 2001. Member of the Technical Advisory Committee for the Federal Integrated Biotreatment Research Consortium (flask-to-field). Reviewed projects funded by the Strategic Environmental Research and Development Program (SERDP).

Invited participant in the review of the Department of Energy NABIR bioaugmentation program at Oyster, Virginia, Virginia Beach, Virginia, November 15-18, 1999.

2000. Member of the technical advisory board for the Center for Biofilm Engineering, Montana State University.

Panel reviewer for the NSF Directorate for Engineering, Bioengineering and Environmental Systems, Arlington, Virginia, July 27-29, 2003.

Invited participant in the NSF conference: “Advancing the Quality of Water”, a conference held to identify promising directions for water research. University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, March 9-12, 2004.

Session Chair for “Fluorinated Organics in the Environment” at the Gordon Research Conference on Environmental Sciences: Water. Holderness School, New Hampshire. June 27 - July 2, 2004.

Invited participant in the NSF conference: “Complex Interacting Systems for a Sustainable Future”, a conference held to identify promising directions for research on complexity and sustainability, Clearwater, Florida, July 7-8, 2007.

AEESP Distinguished Lecturer Selection Committee, 2007-09.

Invited participant in the ISME-AWA Colloquium. Singapore, Jan 18-21, 2009.

Chair of the Science Advisory Board for “BEEM: Bioproducts and Enzymes from Environmental Metagenomes”, a project funded by through Genome Canada, the Province of Ontario, and private funds. Researchers are primarily associated with the Department of Chemical Engineering and Applied Chemistry, U. Toronto. 2011-2013.

Member of the Microplastics Review Panel of the Science and Technical Advisory Committee, Chesapeake Research Consortium 2016-2017.

### **Institutional Service**

- 2004-present CEE Department Service: Graduate admissions coordinator for Environmental Engineering and Science. Served on seven search committees, the Green Dorm Committee, led the Stanford-Palo Alto Water Team and the Codiga Resource Recovery Center design team.
- 2002-2003 Associate Chair, Department of Civil and Environmental Engineering, Stanford University. Served on School of Engineering Undergraduate Affairs Committee.
- 1999-2000 Member of CEE committee for ABET accreditation. Coordinator of graduate admissions for the Environmental Engineering and Science program,
- 1997-1998 Advisory Committee member, Department of Civil and Environmental Engineering, Michigan State University, East Lansing, Michigan.
- 1997-1998 Co-Principal Investigator, NSF Center for Microbial Ecology.
- 1994-1998 Bioremediation Thrust Group Co-Leader, NSF Center for Microbial

Ecology, Michigan State University.

- 1994 Graduate Studies Committee member, Department of Civil and Environmental Engineering, Michigan State University, East Lansing, Michigan.
- 1992-94 Coordinator of graduate admissions for the Environmental Engineering program, Department of Civil and Environmental Engineering, Michigan State University
- 1992-93 Executive Committee member, Center for Microbial Ecology, Michigan State University.
- 1981-82 Elected student representative for the College of Engineering, Utah State University College of Engineering, Logan, Utah. Directed student activities. Served on the Search Committee to select a new Dean of Engineering.

### **Refereed Journal Articles in Engineering and Science**

(H index = 65; no. citations = 16,525 as of 8/11/2020)

**ORCID Number: 0000-0002-2750-8547**

1. Criddle, C. S., P. L. McCarty, C. M. Elliott, and J. F. Barker, 1986. Reduction of hexachloroethane to tetrachloroethylene in groundwater. *J. Contaminant Hydrology* 1: 133-142.
2. Vogel, T. M., C. S. Criddle, and P. L. McCarty, 1987. Transformations of halogenated aliphatic compounds. *Environmental Science & Technology* 8 (21): 722-736.
3. Criddle, C. S., J. T. DeWitt, D. Grbic-Galic, and P. L. McCarty, 1990. Transformation of carbon tetrachloride by *Pseudomonas* sp. strain KC under denitrification conditions. *Applied and Environmental Microbiology*. 56 (11): 3240-3246.
4. Criddle, C. S., J. T. DeWitt, and P. L. McCarty, 1990. Reductive dehalogenation of carbon tetrachloride by *Escherichia coli* k-12. *Applied and Environmental Microbiology*. 56 (11): 3247-3254.
5. Criddle, C. S. and P. L. McCarty, 1991. Electrolytic model system for reductive dehalogenation in aqueous environments. *Environmental Science & Technology*. 25 (5): 973-978.
6. Criddle, C. S., 1993. The kinetics of cometabolism. *Biotechnology and Bioengineering* 41 (11): 1048-1056.

7. Chang, M. K., T. C. Voice, and C. S. Criddle, 1993. Kinetics of competitive inhibition and cometabolism in the biodegradation of benzene, toluene, and p-xylene by two *Pseudomonas* isolates. *Biotechnology and Bioengineering* 41 (11): 1057-1065.
8. Tatara, G., M. Dybas, and C. S. Criddle, 1993. Effects of medium and trace metals on the kinetics of carbon tetrachloride transformation by *Pseudomonas* sp. strain KC. *Applied Environ. Microbiol.* 59 (7): 2126-2131.
9. Chang, W.-K. and C. S. Criddle, 1995. Biotransformation of HCFC-22, HCFC-142b, HCFC-123, and HFC-134a by methanotrophic mixed culture MM1. *Biodegradation* 6:1-
10. Dybas, M. , G. Tatara, and C. S. Criddle, 1995. Localization and characterization of the carbon tetrachloride transformation activity of *Pseudomonas* sp. strain KC. *Applied Environ. Microbiol.* 61 (2): 758-762.
11. Wu, M. M., C. S. Criddle, and R. F. Hickey, 1995. Mass transfer and temperature effects on substrate utilization in brewery granules. *Biotechnology and Bioengineering* 46: 465-475.
12. Mayotte, T., M. Dybas, and C. S. Criddle, 1996. Bench-scale evaluation of bioaugmentation to remediate carbon tetrachloride-contaminated aquifer materials. *Ground Water* 34 (2): 358-367.
13. Shih, C., M. E. Davey, J. Zhou, J. M. Tiedje, C. S. Criddle, 1996. Effects of phenol feeding pattern on microbial community structure and cometabolism of trichloroethylene. *Applied Environ. Microbiol.* 62 (8): 2953-2960.
14. Xing, J., C. Criddle. R. Hickey, 1997. Long-term adaptive shifts in anaerobic community structure in response to a sustained cyclic substrate perturbation. *Microbial Ecology* 33:50-58.
15. Xing, J., C. Criddle, and R. Hickey, 1997. Effects of long-term substrate perturbation on an anaerobic community. *Water Research* 31 (9): 2195-2204.
16. Key, B., R. Howell, and C. S. Criddle, 1997. Fluorinated organics in the biosphere. *Environ. Science and Technol.* 31 (9): 2445-2454.
17. Chang, W.-K. and C. S. Criddle, 1997. Experimental evaluation of a model for cometabolism: prediction of simultaneous degradation of trichloroethylene and methane by a methanotrophic mixed culture. *Biotechnology and Bioengineering* 56 (5): 492-501.
18. Zhao, X., K. Doh, C. S. Criddle, and T. C. Voice, 1997. Accumulation of metabolic intermediates during shock loads in biological fluidized bed reactors. *J. Environmental Engineering* 123 (12): 1185-1193.
19. Key, B., R. Howell, and C. S. Criddle, 1998. Defluorination of organofluorine sulfur

compounds by *Pseudomonas* sp. strain D2. Environ. Science and Technol.32: 2283-2287.

20. Dybas, M. J., M. Barcelona, S. Bezborodnikov, S. Davies, L. Forney, O. Kawka, T. Mayotte, L. Sepulveda-Torres, K. Smalla, M. Sneathen, J. Tiedje, T. Voice, D. Wiggert, M. E. Witt and C. S. Criddle, 1998. Pilot-scale evaluation of bioaugmentation for in-situ remediation of a carbon tetrachloride-contaminated aquifer. Environ. Science and Technol.32 (22): 3598-3611.

21. Sepulveda-Torres, L., N. Rajendran, M. Dybas, and C. S. Criddle, 1999. Generation and initial characterization of *Pseudomonas stutzeri* KC mutants with impaired ability to degrade carbon tetrachloride. Archives of Microbiology 171 (6): 424-429.

22. Fernandez, A. S. Huang, S. Seston, J. Xing, R. Hickey, C. Criddle, and J. Tiedje, 1999. How stable is stable? Function and community composition. Applied Environ. Microbiol. 65 (8): 3690-3696.

23. Witt, M. E., M. J. Dybas, R. M. Worden, and C. S. Criddle, 1999. Motility-enhanced bioremediation of carbon tetrachloride-contaminated aquifer sediments. Environ. Science and Technol.33: 2958-2964.

24. Witt, M. E., M. J. Dybas, D. C. Wiggert, and C. S. Criddle, 1999. Use of bioaugmentation for continuous removal of carbon tetrachloride in model aquifer columns. J. of Environmental Engineering Science. 16 (6): 475-485.

25. Hyndman, D. W., M. J. Dybas, L. Forney, R. Heine, T. Mayotte, M. S. Phanikumar, G. Tatara, J. Tiedje, T. Voice, R. Wallace, D. Wiggert, X. Zhao, and C. S. Criddle, 2000. Hydraulic characterization and design of a full-scale biocurtain, Ground Water 38(3): 462-474.

26. Hashsham, S., A. Fernandez, S. Dollhopf, F. Dazzo, J. Tiedje, R. Hickey, and C. Criddle, 2000. Parallel processing of substrate correlates with greater functional stability in methanogenic bioreactor communities perturbed by glucose, Applied Environ. Microbiol. 66 (9): 4050-4057.

27. Fernandez, A., S. Hashsham, S. L. Dollhopf, L. Raskin O. Glagoleva, F. B. Dazzo, R. F. Hickey, and F. Dazzo, C. Criddle and J. Tiedje. 2000. Flexible community structure correlates with stable community function in methanogenic bioreactor communities perturbed by glucose, Applied Environ. Microbiol. 66 (9): 4058-4067.

28. Dohlhopf, S. L., S. A. Hashsham, F. Dazzo, R. F. Hickey, C. S. Criddle, and J. M. Tiedje. 2001. The impact of fermentative organisms on carbon flow in methanogenic systems under constant low substrate conditions, Appl. Microbiol Biotechnol. 56: 531-538.

29. Sepulveda-Torres, L. D., J. Zhou, C. Guasp, J. Lallucat, D. Knaebel, J. L. Plank, and C. S. Criddle, 2001. *Pseudomonas* sp. strain KC represents a new gemnovar within

*Pseudomonas stutzeri*, International Journal of Systematic and Evolutionary Microbiology 51: 2013-2019.

30. Sepulveda-Torres, L., A. Huang, H. Kim, and C. S. Criddle, 2002. Analysis of regulatory elements and genes required for carbon tetrachloride degradation in *Pseudomonas stutzeri* strain KC. J. Molecular Microbiology and Biotechnology 4: 151-161.
31. Phanikumar, M. S., D. W. Hyndman, D. C. Wiggert, M. J. Dybas, M. Witt, and C. S. Criddle, 2002. Simulation of microbial transport and carbon tetrachloride biodegradation in intermittently-fed aquifer columns. Water Resources Research 4, 1-13.
32. Dybas, M. J. D. W. Hyndman, R. Heine, K. Linning, J. Tiedje, T. Voice, R. Wallace, D. Wiggert, X. Zhao, R. Artuz, and C. S. Criddle, 2002. Development, operation, and long-term performance of a full-scale biocurtain utilizing bioaugmentation. Environ. Science and Technol 36: 3635-3644.
33. Phanikumar, M. S., D. W. Hyndman, and C. S. Criddle, 2002. Biocurtain design using reactive transport models. Ground Water Monitoring and Remediation 23: 1-11.
34. Crosby, L. D., and C. S. Criddle, 2003. Understanding systematic error in microbial community analysis techniques as a result of ribosomal RNA (rrn) operon copy number. BioTechniques 34: 790-803.
35. Middleton, S. M., R. Bencheikh-Latmani, M.R. Mackey, M. H. Ellisman, B. M. Tebo, and C. S. Criddle, 2003. Cometabolism of Cr(VI) by *Shewanella oneidensis* MR-1 produces cell-associated reduced chromium and inhibits growth. Bioengineering and Biotechnology. 83 (6): 627-637.
36. Ward, M. J., Q. S. Fu, K. Rhoads, C. H. Yeung, A. M. Spormann, and C. S. Criddle, 2003. A derivative of the menaquinone precursor 1,4-dihydroxy-2-naphthoate is involved in the reductive transformation of carbon tetrachloride by *Shewanella oneidensis* MR-1. Applied Microbiology and Biotechnology. 63: 551-577.
37. Ayala-del-Rio, H. L., S. J. Callister, C. S. Criddle, and J. M. Tiedje, 2004. Correspondence between community structure and function during succession in phenol- and phenol-plus-trichloroethene-fed sequencing batch reactors. Applied Environ. Microbiol. 70: 4950-4960.
38. Wu, W., B. Gu, M. W. Fields, M. Gentile, Y-K. Ku, H. Yan, S. Tiquias, T. Yan, J. Nyman, J. Zhou, P. M. Jardine, and C. S. Criddle. 2005. Reduction of uranium(VI) by denitrifying biomass. Bioremediation Journal 9(1):1-13
39. Higgins, C. P., J. A. Fields, C. S. Criddle, and R. G. Luthy. 2005. Quantitative determination of perfluorochemicals in sediments and domestic sludge. Environ. Science and Technology 39: 3946-56.



40. Gu, B., W. Wu, M. W. Fields, M. A. Ginder-Vogel, H. Yan, S. Fendorf, C. S. Criddle, and P. M. Jardine, 2005. Bioreduction of uranium in a contaminated soil column. *Environ. Science and Technology* 39:4841-4847.
41. Nyman, J. L., T. L. Marsh, M. Ginder-Vogel, M. Gentile, S. Fendorf, and C. S. Criddle. 2005. Heterogeneous response to biostimulation for U(VI) reduction in replicated sediment microcosms. *J. Biodegradation* 16:1-14.
42. Benchaekh-Latmani, R., S. M. Williams, L. Haucke, C. S. Criddle, L. Wu, J. Zhou, and B. M. Tebo. 2005. Global transcription profiling of *Shewanella oneidensis* MR-1 during Cr(VI) and U(VI) reduction. *Applied Environ. Microbiol.* 71(11): 7453-7460
43. Fields, M. W., T. Yan, S.-K. Rhee, S. L. Carroll, P. M. Jardine, D. B. Watson, C. S. Criddle, and J. Zhou. 2005. Impacts on microbial communities and cultivable isolates from groundwater contaminated with high levels of nitric acid-bearing uranium waste. *FEMS Microbial Ecology* 53:417-428.
44. Luo, J., Cirpka, O.A., Wu, W-M., Fienen, M.N., Jardine, P.M., Mehlhorn, T.L., Watson, D.B., Criddle, C.S., Kitanidis, P.K. 2005. Mass-transfer limitations for nitrate removal in a uranium-contaminated aquifer. *Environ. Sci. Technol.* 39(21), 8453-8459.
45. Hwang, C., W.-M.Wu, T. Gentry, J. Carley, S.L. Carroll, C. Schadt, D. Watson, P.M. Jardine, J. Zhou, R.F. Hickey, C.S. Criddle, and M.W. Fields. 2006. Changes in microbial community structure correlate with stressed operating conditions during start-up of a field-scale denitrifying fluidized bed reactor. *Applied Microbiology and Biotechnology* 71:748-760.
46. Luo, J., W-M. Wu, M. N. Fienen, P. M. Jardine, T. L. Mehlhorn, D. B. Watson, O. A. Cirpka, C. S. Criddle, and P. K. Kitanidis. 2006. A nested cell approach for in situ remediation. *Groundwater* 44: 266-274.
47. Luo, J., Cirpka, O.A., Fienen, M.N., Wu, W-M., Mehlhorn, T.L., Carley, J., Jardine, P.M., Criddle, C.S., Kitanidis, P.K. 2006. A parametric transfer function methodology for analyzing reactive transport in nonuniform flow. *J. Contam. Hydrol.* 83(1-2): 27-41.
48. Fields, M.W., C.E. Bagwell, S.L. Carroll, T. Yan, X. Liu, D.B. Watson, P.M. Jardine, C. S. Criddle, T. Hazen, and J. Zhou, 2006. Phylogenetic and functional biomarkers as indicators of bacterial community responses to mixed-waste contamination. *Environ. Sci. Technol.* 40 (8): 2601-2607.
49. Ginder-Vogel, M, C. Criddle, and S. Fendorf, 2006. Thermodynamic constraints on biogenic UO<sub>2</sub> oxidation by Fe(III)-(hydr)oxides. *Environ. Sci. Technol.* 40(11): 3544-3550.

50. Wu, W., J. Carley, M. Fienen, T. Mehlhorn, K. Lowe, J. Nyman, J. Luo, M. E. Gentile, R. Rajan, D. Wagner, R. F. Hickey, B. Gu, D. Watson, O. A. Cirpka, P. K. Kitanidis, P. M. Jardine, and C. S. Criddle. 2006. Pilot-scale bioremediation of uranium in a highly contaminated aquifer I: conditioning of a treatment zone. *Environ. Sci. Technol.* 40 (12): 3978-3985.
51. Wu, W., J. Carley, T. Gentry, M. A. Ginder-Vogel, M. Fienen, T. Mehlhorn, H. Yan, S. Carroll, J. Nyman, J. Luo, M. E. Gentile, M. W. Fields, R. F. Hickey, D. Watson, O. A. Cirpka, S. Fendorf, J. Zhou, P. Kitanidis, P. M. Jardine, and C. S. Criddle. 2006. Pilot-scale bioremediation of uranium in a highly contaminated aquifer II: evidence of U(VI) reduction and geochemical control of U(VI) bioavailability. *Environ. Sci. Technol.* 40 (12): 3986-3995.\*
52. Gentile, M., T. Yan, S.M. Tiquia, M.W. Fields, J. Nyman, J. Zhou, and C.S. Criddle. 2006. Stability in a denitrifying fluidized bed reactor. *Microbial Ecology* 52 (2): 311-321.
53. Park, H.-D., G. F. Wells\*, H. Bae, C. S. Criddle, and C. A. Francis. 2006. Occurrence of ammonia oxidizing archaea in wastewater treatment plant bioreactors. *Applied Environ. Microbiology* 72(8): 5643-5647.\* co-first author.
54. Tang, C. Y., Q. S. Fu, A. P. Robertson, C. S. Criddle, and J. O. Leckie. 2006. Use of reverse osmosis membranes to remove perfluorooctane sulfonate (PFOS) from semiconductor wastewater. *Environ. Sci. Technol.* 40(23): 7343 – 7349.
55. Gentile, M. E., C. M. Jessup, J. L. Nyman, and C. S. Criddle, 2007. Correlation of functional instability and community dynamics in denitrifying dispersed growth reactors. *Applied Environ. Microbiol.* 73(3): 680-690.
56. Crosby, L. D. and C. S. Criddle. 2007. Gene capture and random amplification for quantitative recovery of homologous genes. *Molecular & Cellular Probes* 21(2):140-147.
57. Nyman, J., M. Gentile, and C. S. Criddle, 2007. Sulfate requirement for growth of U(VI)-reducing organisms in an ethanol-fed enrichment. *Bioremediation Journal* 1:21-32.
58. Tang, C. Y., Q. S. Fu, C. S. Criddle, and J. O. Leckie, 2007. Effect of flux (transmembrane pressure) and membrane properties on fouling and rejection of reverse osmosis and nanofiltration membranes treating perfluorooctane sulfonate containing wastewater. *Environ. Sci. Technol.* 41(6):2008-2014.
59. Luo, J., Wu, W.-M., Carley, J., Ruan, C., Gu, B., Jardines, P.M., Criddle, C.S., and P.K. Kitanidis, 2007. Hydraulic performance analysis of a multiple injection-extraction well system. *J. Hydrol.* 336:294-302.

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\* \* ACS “most cited paper” for 2006, based on data from Thomson Web of Science.

60. Luo, J., Weber, F.-A., O. A. Cirpka, W.-M. Wu, J. L. Nyman, J. Carley, P. M. Jardine, C. S. Criddle, and P. K. Kitanidis. 2007. Modeling in-situ uranium (VI) bioreduction by sulfate-reducing bacteria. *J. Contam. Hydrol.* 92:129-148.

61. He, Z., T. J. Gentry, C. W. Schadt, L. Wu, J. Liebich, S. C. Chong, Z. Huang, W. Wu, B. Gu, P. Jardine, C. Criddle, and J. Zhou. 2007. GeoChip: A comprehensive microarray for investigating biogeochemical, ecological, and environmental processes. *The ISME Journal* 1:67-77.

62. Wu, W., J. Carley, J. Luo, M. A. Ginder-Vogel, E. Cardenas, M. B. Leigh, C. Hwang, S. D. Kelly, C. Ruan, L. Wu, J. Van Nostrand, T. Gentry, K. Lowe, T. Mehlhorn, S. Carroll, W. Lou, W. Fields, B. Gu, D. Watson, K. M. Kemner, T. Marsh, J. Tiedje, J. Zhou, S. Fendorf, P. K. Kitanidis, P. M. Jardine, and C. S. Criddle. 2007. In-situ bioreduction of uranium (VI) to submicromolar levels and reoxidation by dissolved oxygen. *Environ. Sci. Technol.* 41: 5716-5723.

Work summarized in References 50, 51, and 62 was highlighted in the January, 2008, issue of US EPA "Technology News and Trends":

<http://www.cluin.org/products/newsltrs/tnandt/view.cfm?issue=0108.cfm#3>

63. Nyman, J., H.-I. Wu, M. Gentile, and C. S. Criddle, 2007. Inhibition of a U(VI)- and sulfate-reducing consortia by U(VI). *Environ. Sci. Technol.* 41: 6528-6533.

64. Luo, W., W.-M. Wu, T. Yan, C. S. Criddle, P. M. Jardine, J. Zhou, and B. Gu. 2007. Influence of bicarbonate, sulfate, and electron donors on biological reduction of uranium and microbial community composition. *Applied Microbiol. and Biotech.* 77(3): 713-721.

65. Amos, B. K., Y. Sung, K. E. Fletcher, T. J. Gentry, W.-M. Wu, C. S. Criddle, J. Zhou, and F. E. Löffler. 2007. Detection and quantification of *Geobacter lovleyi* strain SZ: implications for bioremediation at tetrachloroethene- (PCE-) and uranium-impacted sites. *Applied Environ. Microbiol.* 73(21): 6898-6904.

66. Gentile, M. E., J. L. Nyman, and C. S. Criddle. 2007. Correlation of patterns of denitrification instability in replicated bioreactor communities with shifts in the relative abundance and known denitrification patterns of specific populations. *The ISME Journal* 1: 714-728.

67. Boonchayaanant, B., P. Kitanidis, and C. Criddle. 2008. Growth and cometabolic reduction kinetics of a uranium- and sulfate-reducing *Desulfovibrio/Clostridia* mixed culture: temperature effects. *Biotech. and Bioengr.* 99(5): 1107-1119.

68. Kelly, S.D., K.M. Kemner, J. Carley, C. S. Criddle, D. Phillips, P.M. Jardine, T.L. Marsh, D. Watson, and W.-M. Wu, 2008. Speciation of uranium within sediments before and after in situ bioreduction. *Environ. Sci. Technol.* 42(5):1558-1564.

69. Rhoads, K. R., E. M.-L. Janssen, R. Luthy, and C. S. Criddle. 2008. Aerobic biotransformation and fate of ethyl perfluorooctane sulfonamide ethanol (N-EtFOSE) in activated sludge. *Environ. Sci. Technol.* 42(8):2873-2878.
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153. Wu et al., 2019 \*. Global diversity and biogeography of bacterial communities in wastewater treatment plants. *Nature Microbiology* 4, 1183–1195. doi:10.1038/s41564-019-0426-5 \* Complete authorship: Wu\*, L., D. Ning\*, B. Zhang\*, Y. Li, P. Zhang, X. Shan, Q. Zhang, M. R. Brown, Z. Li, J. D. Van Nostrand, F. Ling, N. Xiao, Y. Zhang, J. Vierheilig, G. F. Wells, Y. Yang, Y. Deng, Q. Tu, A. Wang, D. Acevedo, M. Agullo-Barcelo, G. L. Andersen, J. C. de Araujo, K. F. Boehnke, P. Bond, C. B. Bott, P. Bovio, R. K. Brewster, F. Bux, A. Cabezas, L. Cabrol, S. Chen, C. Etchebehere, A. Ford, D. Frigon, J. S. Griffin, A. Z. Gu, M. Habagil, L. Hale, S. D. Hardeman, M. Harmon, H. Horn, Z. Hu, S. Jauffur, D. R. Johnson, A. Keucken, S. Kumari, C. D. Leal, L. A. Lebrun, J. Lee, M. Lee, Z. M. P. Lee, M. Li, X. Li, Y. Liu, R. G. Luthy, L. C. Mendonça-Hagler, F. G. R. de Menezes, A. J. Meyers, A. Mohebbi, A. Noyola, A. Oehmen, A. Palmer, P. Parameswaran, J. Park, D. Patsch, V. Reginatto, F. L. de los Reyes, S. Rossetti, J. Sanabria, J. Sidhu, W. T. Sloan, K. Smith, O. V. de Sousa, K. Stephens, R. Tian, N. B. Tooker, D. De los Cobos Vasconcelos, S. Wakelin, B. Wang, J. E. Weaver, S. West, P. Wilmes, S.-G. Woo, J.-H. Wu, L. Wu, C. Xi, M. Xu, T. Yan, M. Yang, M. Young, H. Yue, Q. Zhang, W. Zhang, Y. Zhang, H. Zhou, T. Zhang, Z. He, J. Keller, P. H. Nielsen, P. J. J. Alvarez, C. S. Criddle, M. Wagner, J. M. Tiedje, Q. He, T. P. Curtis, D. A. Stahl, L. Alvarez-Cohen, B. E. Rittmann, X. Wen, and J. Zhou (\*Equal contribution)
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159. Brandon, A.M., S. H. El Abbadi, Y.-M. Cho, M. Ibekwe, W.-M. Wu, and C. S. Criddle. 2019. Fate of hexabromocyclododecane (HBCD), a common flame retardant, in polystyrene-degrading mealworms: elevated HBCD Levels in egested polymer but no bioaccumulation. *Environmental Science and Technology* 54(1): 364-371.
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164. McCarty, P. L., C. S. Criddle, and T. M. Vogel., 2020. Retrospective on microbial reductive dehalogenation. *Environmental Science: Processes & Impacts* 22:512-517. DOI:10.1039/c9em00575g.
165. Dubrawski, K. L., W. Wang, J. Xu, and C. S. Criddle, 2020. Harnessing salinity gradient energy in coastal stormwater runoff to reduce pathogen loading. *Environmental Science: Water Research & Technology*. DOI:10.1039/C9EW01137D.
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using dual stressors and timed alkali additions. **In review**

168. Brandon, A. M., A. Garcia, W.-M. Wu, and C. S. Criddle. 2020. Enhanced bioavailability and microbial degradation of polystyrene in an enrichment derived from the gut microbiome of *Tenebrio molitor* (mealworm larvae). **In review**

169. Dubrawski, K., S. Woo, W. Chen, X. Xie, Y. Cui, and C. S. Criddle, 2020. Hard-wired bioanode for a fast-growth and high-power-density microbial battery stack. **In review**

170. Wang, Z., Y. Yao, N. Steiner, H.-H. Cheng, Y. Wu, S.-G. Woo, and C. S. Criddle, 2020. Simultaneous autotrophic/heterotrophic nitrification of anaerobic digester centrate and effects of commonly added polyacrylamide-based coagulants. *Environmental Science: Water Research & Technology*. **In review**

### **Refereed Conference Proceedings and Book Chapters**

1. Dybas, M., G. Tatara, W. Knoll, T. Mayotte, and C. S. Criddle, 1995. Niche adjustment for bioaugmentation with *Pseudomonas* sp. strain KC. In: *Bioaugmentation for Site Remediation*. pp. 77-84. Ed: R. E. Hincbee, J. Frederickson, and B. C. Alleman, *Bioremediation series 3(3)*, Battelle Press, Columbus, Ohio.

2. Tatara, G., M. Dybas, and C. S. Criddle, 1995. Biofactor-mediated transformation of carbon tetrachloride by diverse cell types. In: *Bioremediation of Chlorinated Solvents*. pp. 69-76. Ed: R. E. Hincbee, A. Leeson, and L. Semprini, *Bioremediation series 3(4)*, Battelle Press, Columbus, Ohio.

3. Witt, M. E., M. J. Dybas, R. Heine, S. Nair, C. S. Criddle, and D. C. Wiggert, 1995. Bioaugmentation and transformation of carbon tetrachloride in a model aquifer. In: *Bioaugmentation for Site Remediation*. pp. 221-228. Ed: R. E. Hincbee, J. Frederickson, and B. C. Alleman, *Bioremediation series 3(3)*, Battelle Press, Columbus, Ohio.

4. Sepulveda-Torres, L., M. J. Dybas, and C. S. Criddle, 1997. Solid phase biodegradation of carbon tetrachloride by *Pseudomonas stutzeri* strain KC. In: *In-Situ and On-Site Bioremediation*. pp. 33-37. Ed: B. C. Alleman and A. Leeson, *Bioremediation series 4(3)*, Battelle Press, Columbus, Ohio.

5. Dybas, M. J., S. Bezborodnikov, T. Voice, D. C. Wiggert, S. Davies, J. Tiedje, C. S. Criddle, O. Kawka, and M. Barcelona, 1997. Evaluation of bioaugmentation to remediate an aquifer contaminated with carbon tetrachloride. In: *In-Situ and On-Site Bioremediation*. pp. 507-512. Ed: B. C. Alleman and A. Leeson, *Bioremediation series 4(4)*, Battelle Press, Columbus, Ohio.

6. Witt, M.E., D. C. Wiggert, M. J. Dybas, K. Colleen Kelly, and C. S. Criddle. 1997. Bioaugmentation and numerical simulation of carbon tetrachloride transformation in groundwater. In: *In-Situ and On-Site Bioremediation*. pp. 575-580. Ed: B. C. Alleman and

A. Leeson, Bioremediation series 4 (4), Battelle Press, Columbus, Ohio.

7. Andersland, O. B., C. S. Criddle, R. B. Wallace, and D. C. Wiggert, 1998. Ground water remediation/frozen soil reactor gates. In *Cold Regions Impact on Civil Works*, pp. 212-223. Ed: D. E. Newcomb, ASCE Ninth International Conference on Cold Regions Engineering, Duluth, MN, September 27-30, 1998.

8. Tiedje, J., S. Hashsham, S. Dollhopf, F. Dazzo, R. Hickey, and C. Criddle. 2001. Stability, persistence, and resilience in anaerobic reactors: a community unveiled. In: *Advances in Water and Wastewater Treatment Technology*. pp. 13-20. Ed: Matsuo, Hanakai, Takizawa, Satoh. Elsevier, Amsterdam.

9. Hashsham, S. A., T. L. Marsh, S. L. Dollhopf, A. S. Fernandez, F. B. Dazzo, R. F. Hickey, C. S. Criddle, and J. M. Tiedje, 2001. Relating function and community structure of complex microbial systems using neural networks. In: *Advances in Water and Wastewater Treatment Technology*. pp. 67-77. Ed: Matsuo, Hanakai, Takizawa, Satoh. Elsevier, Amsterdam.

10. Williams, S. M., M. J. Dybas, and C. S. Criddle. 2005. Assessing the potential for biological Cr(VI) reduction in an aquifer contaminated with mixed wastes. *Cr(VI) Handbook*. J. Guertin, J. A. Jacobs, and C. P. Avakian (ed). CRC Press, p. 348-356.

11. McCarty, P. L. and C.S. Criddle, 2013. Chemical and biological processes: the need for mixing. Chapter 2 in: *Delivery and Mixing in the Subsurface: Process and Design Principles for In Situ Remediation*. Editors: P. K. Kitanidis and P. L. McCarty. SERDP and ESTCP Remediation Technology Monograph Series. Series Editor: C. Herb Ward, Springer Science + Business Media, New York, p. 7-52.

12. Criddle, C. S., M. J. Dybas, G. M. Tataru, L. B. Warnick, G. Vidal-Gavilan, A. P. Robertson, and T. A. Lewis, 2013. Bioaugmentation with *Pseudomonas stutzeri* KC for Remediation of Carbon Tetrachloride. Chapter 9 in: Bioaugmentation for Remediation. Editors: H. F. Stroo, A. Leeson, and C. H. Ward. SERDP and ESTCP Remediation Technology Monograph Series. Series Editor: C. Herb Ward, Springer Science + Business Media, New York, p. 257-285.

### **Conference Proceedings, Book Chapters, and Books - Not Refereed**

1. Criddle, C. S., L. M. Alvarez, and P. L. McCarty, 1991. Microbial Processes in Porous Media, In *Transport Processes in Porous Media*, Ed: J. Bear and Y. Corapcioglu, NATO Advanced Studies Institute Series E: Applied Sciences - Vol. 202, Kluwer Academic Publishing Co., Dordrecht, The Netherlands, pp. 641-691.

2. Zhao, X., K. Doh, C. S. Criddle, and T. C. Voice, 1994. Effects of sorption on the extent of mineralization of benzene, toluene, and xylene during transient step loading of biological fluidized bed reactors, *Proceedings of the 49th Annual Purdue University Industrial Waste Conference*.

3. Jain, M. and C. S. Criddle, 1995. Metabolism and cometabolism of halogenated C-1 and C-2 hydrocarbons. In Biotransformations: Microbial Degradation of Health-Risk Compounds. Ed: V. P. Singh, Progress in Industrial Microbiology Vol. 32. Elsevier Science Publishers, Amsterdam, pp. 65-102.

4. Criddle, C.S., 2001. Microbial community dynamics in anaerobic digestion. Proceedings of the 9<sup>th</sup> World Congress on Anaerobic Digestion 2001. September 2-6, 2001, Antwerpen, Belgium.

5. Nyman, J., S. Middleton, and C. S. Criddle, 2005. Bioengineering for the in-situ remediation of metals. Chapter 19 in Environmental Catalysis. Ed: Vicki Grassian. Taylor and Francis, CRC Press, p. 493-520.

6. Gonick, L. and C. Criddle, 2005. The Cartoon Guide to Chemistry. Harper Collins, New York, NY, 250 pages. Over 146,000 copies sold.

### **Magazine Opinion Pieces**

Criddle, C. S. and R. G. Bergman, 2010. "Green Chemistry is Good for Business" Commentary in Forbes magazine, published on-line (8/18/2010): <http://www.forbes.com/2010/08/17/green-chemistry-business-environment-opinions-contributors-craig-criddle-robert-bergman.html>

### **Conference Presentations and Invited Lectures**

"Reductive dehalogenation of halogenated aliphatic compounds by electrolysis". Platform presentation at the National Conference of the American Water Works Association, Los Angeles, California, June 19, 1989.

"Microbial processes in porous media". Invited lecture at the NATO Advanced Studies Institute on "Transport Processes in Porous Media", Pullman, Washington, July 9-17, 1989.

"Bioreactors for water purification". Lecture and demonstration at the High School Teachers Workshop, Sponsored by the Center for Microbial Ecology. July 12, 1990. Kellogg Biological Station, Hickory Corners, Michigan.

"Fate of halogenated aliphatic compounds in anaerobic environments". 3M Company Environmental Research Laboratories, February 15, 1991. St. Paul, Minnesota.

"Use of electrolysis for environmental control". Dow Chemical Company. March 11, 1991. Midland, Michigan.

"Selection and design of technologies for environmental control: an expert system approach", March 28, 1991. Symposium of the Great Lakes and Mid-Atlantic Hazardous Substance Research Center. University of Michigan, Ann Arbor, Michigan.



"Bioreactors for water purification". Invited lecture and demonstration at the High School Teachers Workshop, Sponsored by the Center for Microbial Ecology. July 11, 1991. Kellogg Biological Station, Hickory Corners, Michigan.

"Bacterial transformations of halocarbons". Invited lecture at the Workshop on "Aqueous Loss Processes for Halocarbons", organized by the Alternative Fluorocarbon Environmental Acceptability Study, July 16, 1991. Washington, D.C.

"Biodegradation of halogenated aliphatic hydrocarbons". Invited lecture at the 1991 Annual Meeting of the Society for Industrial Microbiology. August 6, 1991. Philadelphia, Pennsylvania.

"Parallel pathways in the anaerobic transformation of halogenated aliphatic compounds". Invited lecture at the symposium "Fundamental approaches to anaerobic dehalogenation of aliphatic compounds", sponsored by the Department of Civil Engineering at the University of Illinois at Urbana-Champaign and the Construction Engineering Research Laboratory, U.S. Army Corps of Engineers. November 7, 1991. Urbana, Illinois.

"Understanding cometabolism", Invited lecture in the Internal Seminar series at the Center for Microbial Ecology, Michigan State University, East Lansing, Michigan, May 12, 1992.

"Environmental biotechnology". Invited lecture and demonstration at the High School Teachers Workshop, Sponsored by the Center for Microbial Ecology. July 16, 1992. Kellogg Biological Station, Hickory Corners, Michigan.

"Microbial transformation of chlorinated and fluorinated hydrocarbons", lecture for 3M Company Environmental Research Laboratories, December 4, 1992. St. Paul, Minnesota.

"Reductive dehalogenation of halogenated aliphatic compounds by electrolysis", lecture for Dow Chemical Company, December 15, 1992. Midland, Michigan.

"Cometabolism of fluorinated compounds". 3M Company Environmental Research Laboratories, December 9, 1993. St. Paul, Minnesota.

"Potential for biodegradation of trifluoroacetic acid". Workshop on the Environmental Fate of Trifluoroacetic Acid, AFEAS, March 3-4, 1994. Miami, Florida.

"Use of alkaline niche adjustment to enable colonization and remediation of carbon tetrachloride-contaminated aquifer materials by *Pseudomonas* sp. strain KC". Poster presentation at the American Society for Microbiology 94th general meeting, May 26, 1994. Las Vegas, Nevada.

"Novel strategies for bioaugmentation". Lecture for the Division of Environmental Engineering, Utah State University, July 14, 1994. Logan, Utah.

"Novel strategies for bioaugmentation". Invited lecture at the DuPont Biotechnology Seminar Series, September 7, 1994. Glasgow, Delaware.

"Environmental fate of atmospheric degradation products of CFC replacement compounds". Invited lecture at an open forum: "Climate change and Ozone Depletion: Scientific Reality and Relevance to 3M". Sponsored by the 3M Specialty Chemicals Division and 3M Environmental Technology and Services, January 5, 1995. St. Paul, Minnesota.

"Niche adjustment for bioaugmentation with *Pseudomonas* sp. strain KC", Platform presentation, The Third International Symposium on In Situ and On-Site Bioreclamation, April 24-27, 1995. San Diego, California.

"Bioaugmentation with *Pseudomonas* sp. strain KC for carbon tetrachloride remediation". Invited lecture for the Canada National Research Council, June 16, 1995, Montreal, Canada.

"Evidence for biotransformation of trifluoroacetic acid". 3M Environmental Technology and Services, July 6-7, 1995. St. Paul, Minnesota.

"Bioaugmentation strategies with *Pseudomonas stutzeri* KC". Invited lecture at the Five Centers Conference: "From the Flask to the Field", July 23-26, 1995, Glendon Beach, Oregon.

"Role of electron transfer in the transformation of carbon tetrachloride by *Pseudomonas stutzeri* KC" (co-author: G. Tatara). Poster presentation at the Five Centers Conference: "From the Flask to the Field", July 23-26, 1995, Glendon Beach, Oregon.

"Engineered microbial communities". Invited presentation at the "Workshop on Community Diversity". Center for Microbial Ecology, Michigan State University, East Lansing, Michigan, November 10, 1995.

"Bioaugmentation with *Pseudomonas stutzeri* KC to remediate an aquifer contaminated with carbon tetrachloride". Invited lecture for the Department of Chemical Engineering, Washington State University, Pullman, Washington, March 25, 1996.

"Site remediation using permeable reaction curtains and funnel-and-gate systems". Invited lecture for the Michigan Department of Environmental Quality, Michigan State University, East Lansing, Michigan, May 14, 1996.

"Opportunities and challenges of bioaugmentation: field and laboratory experience with *Pseudomonas stutzeri* KC". Invited lecture for the Research Symposium "Remediation of Solvents in Subsurface Environments" Northwest Center for Occupational Health and Safety, University of Washington, Seattle, Washington, September 11, 1996.

"Bioaugmentation to remediate carbon tetrachloride contamination: field and laboratory

experience with *Pseudomonas stutzeri* KC". Seminar for the Department of Chemical Engineering, Michigan State University, East Lansing, Michigan, September 17, 1996.

"Serendipity and bioaugmentation: the strange true story of *Pseudomonas stutzeri* KC". Seminar for the Department of Civil Engineering, Stanford University, Stanford, California, February 14, 1997.

"Bioaugmentation for carbon tetrachloride remediation: field and laboratory experiences with *Pseudomonas stutzeri* KC" Poster presentation at the Superfund Basic Research Program: A Decade of Improving Health Through Multi-Disciplinary Research. Chapel Hill, North Carolina, February 23, 1997.

"El papel de la diversidad microbiana en la funcion y estabilidad de reactores biologicos". Invited lecture (in Spanish) at the 14to Simposio Microbiología Industrial, Recinto Universitario de Mayaguez, University of Puerto Rico - Mayaguez, March 21, 1997.

"Bioaugmentation and serendipity: carbon tetrachloride remediation with *Pseudomonas stutzeri* KC". Seminar for the Department of Environmental Science and the Department of Chemical Engineering, University of Virginia, Charlottesville, Virginia, June 11, 1997.

"El papel de la biodiversidad en la funcion de reactores biologicos". Invited lecture at the United Nations Latin American Biotechnology Program, VIII Curso Avanzado sobre Procesos Biotecnologicos, Biotecnologia Ambiental sponsored by El Instituto de Biotecnologia de la Universidad Autonoma de Mexico (UNAM) and El Centro de Investigacion en Biotecnologia de la Universidad Autonoma del Estado de Morelos, Cuernavaca, Morelos, Mexico, July 7, 1997.

"Acontecimientos fortuitos y la bioaumentacion: experiencias con *Pseudomonas stutzeri* KC". Invited lecture at the United Nations Latin American Biotechnology Program, VIII Curso Avanzado sobre Procesos Biotecnologicos, Biotecnologia Ambiental sponsored by El Instituto de Biotecnologia de la Universidad Autonoma de Mexico (UNAM) and El Centro de Investigacion en Biotecnologia de la Universidad Autonoma del Estado de Morelos, Cuernavaca, Morelos, Mexico, July 9, 1997.

"The impending revolution in environmental biotechnology: shining a light into the black box". Seminar for the Department of Civil and Environmental Engineering, Stanford University, Stanford, California, October 23, 1997.

"Use of sequencing batch reactors for cometabolic transformations" , Conference on Bioremediation for Industry. Society for Industrial Microbiology, University of Notre Dame, South Bend, Indiana, March 10, 1998.

"Full-scale remediation of an aquifer by bioaugmentation", Seminar for the Department of Civil and Environmental Engineering, Stanford University, October 2, 1998.

"Full-scale remediation of carbon tetrachloride using bioaugmentation, intermittent

substrate addition, and closely spaced wells”, invited poster presentation. American Geophysical Union Conference, San Francisco, California, December 11, 1998. Also presented at the Western Region Hazardous Substance Research Center annual meeting in Corvallis, Oregon on July 28, 1999.

“Serendipity and bioaugmentation: the strange story of *Pseudomonas stutzeri* KC”. Invited lecture for the Lawrence Berkeley National Laboratories, Berkeley, California, January 12, 1999.

“The Schoolcraft Project: full-scale remediation of carbon tetrachloride using bioaugmentation” Invited lecture in the Environmental Biotechnology series, Rutgers University, New Brunswick, New Jersey, March 12, 1999.

“Full-scale remediation of carbon tetrachloride using bioaugmentation”, Platform presentation, The Fifth Battelle International Symposium on In Situ and On-Site Bioreclamation, April 19-23, 1999. San Diego, California.

“Full-scale remediation of carbon tetrachloride by bioaugmentation with *Pseudomonas* sp strain KC”, Poster presentation at Pseudomonas 199: Biotechnology and Pathogenesis, American Society of Microbiology, Maui, Hawaii, Sept 1-5, 1999.

“The Schoolcraft Project: full-scale remediation of carbon tetrachloride using bioaugmentation”, Invited lecture in the Distinguished Lecture Series of the Department of Chemical Engineering and Applied Chemistry, University of Toronto, Toronto, Canada, November 24, 1999.

“The Schoolcraft Project: full-scale remediation of carbon tetrachloride using bioaugmentation” Oak Ridge National Laboratory, Oak Ridge, TN, January 13, 2000.

“The Schoolcraft Project: full-scale remediation of carbon tetrachloride using bioaugmentation”, Invited lecture for the Dept. of Chemical and Environmental Engineering, Yale University, Hartford, Connecticut, Feb 9, 2000.

“Design and performance of a low-cost biocurtain for full-scale remediation of carbon tetrachloride and nitrate”. Invited lecture for the Dept. of Microbiology, Molecular Biology, and Biochemistry at the University of Idaho, Moscow, ID, March 23, 2000.

“Full-scale biocurtain for efficient long-term removal of carbon tetrachloride”, Platform presentation, Battelle Second International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, California, May 24, 2000.

“Below-ground bioreactors for water purification”, Invited lecture for the Department of Civil and Structural Engineering, Nanyang Technological University, Singapore, June 26, 2000.

“Linking teaching and research along the tenure track (while balancing professional and

private life): strategic planning -- what to do and what to avoid”, invited lecture at the NSF New Century Scholars workshop, Stanford, CA, August 3, 2000..

“Chemical and organism delivery for full-scale bioremediation”, Invited lecture for the Gordon Conference on Modeling Fluid Flow in Permeable Media, Proctor Academy, Andover, New Hampshire., August 9, 2000.

“Serendipity and bioaugmentation: the strange true story of *Pseudomonas stutzeri* KC”. Keynote invited lecture for the Goldschmidt Conference, Oxford, England, September 6, 2000.

“Even more serendipity: the increasingly strange story of *Pseudomonas stutzeri* KC”. Invited lecture for the the UC Berkeley Microbial Biology Seminar Series, Berkeley, CA, September 13, 2000.

“Microbial community dynamics in anaerobic digestion.” Anaerobic Digestion Conference talk, Antwerpen, Belgium, Aug 2001.

“Serendipity and bioaugmentation: the strange yet true story of *Pseudomonas stutzeri* KC”. Invited lecture for the Environmental Engineering graduate program at the University of Illinois at Urbana-Champaign, Champaign, IL, September 28, 2001.

“Full-scale bioremediation: unexpected solutions”, Invited lecture at the U.S. Geological Survey, Menlo Park, CA, February 22 2002.

“Full-scale bioremediation: unexpected solutions”, Invited lecture at the Center for Environmental and Water Resources Engineering , University of California at Davis, Davis, CA, April 1 2002

“Full-scale bioremediation: unexpected solutions”, Invited lecture at the Center for Biofilm Engineering, Montana State University, Bozeman, MO, July 24, 2002

“Bioremediation of Atomic Bomb Wastes”, Invited lecture at the University of California Santa Cruz, Environmental Toxicology Program, April 13, 2004.

“Bioremediation of Atomic Bomb Wastes: Adventures in the Near Source Zone”, Invited lecture at the University of Notre Dame. Dec 4, 2003.

Forum speaker at the Planet-X Symposium on Energy and Water, Stanford University, Stanford, CA. July 29, 2004.

Eight lectures and a seminar presented as part of a course entitled “Fate and Remediation of Hazardous Chemicals”. Tsinghua University, Beijing, China, September 6-10, 2004.

“How molecular ecology is about to revolutionize environmental biotechnology”. Seminar at Nanyang Technological University, Singapore, Sept 15, 2004.

“Membrane bioreactor systems for sustainable water reuse from municipal wastewater”, NSF WaterCAMWS Symposium. Atlanta, GA. April 14, 2005.

“Water reuse through biotechnology as a new source of drinking water.” NSF WaterCAMPWS Symposium. Atlanta, GA. April 14, 2005 (with E. Morgenroth).

“Bioremediation of Atomic Bomb Wastes,” Invited lecture at the California Institute of Technology, Environmental Science Program, May 18, 2005.

“Overcoming obstacles to water reuse in the 21st century”. Singapore-Stanford Clean Water Program Symposium. Singapore. June 2, 2005.

Eight lectures and a seminar presented as part of a course entitled “Fate and Remediation of Hazardous Chemicals”. Tsinghua University, Beijing, China, September 5-9, 2005.

Bioremediation of atomic bomb wastes”, Invited lecture at POSTECH, Pohang, South Korea. Department of Civil and Environmental Engineering, Sept 14, 2005.

“Bioremediation of atomic bomb wastes”, Invited lecture in Seoul National University series, Department of Civil and Environmental Engineering, Sept 16, 2005.

“Bioremediation of atomic bomb wastes”, Invited lecture in the Distinguished Seminar series, University of California Riverside, Department of Chemical and Environmental Engineering, Dec 9, 2005.

“Organizing and managing centers and large-scale collaborative research activities”, Invited lecture at the Regional Research Partnership Assessment Workshop, EPSCOR Centers Development Initiative, University of Nevada, Las Vegas, January 13, 2006.

“The Coming Revolution in Environmental Biotechnology”, Invited lecture at the Department of Civil and Environmental Engineering, University of South Florida. April 11, 2006.

“Bioremediation of atomic bomb wastes”, Invited lecture in the Environmental Research Interdisciplinary Colloquium, University of South Florida Department of Civil and Environmental Engineering, April 12, 2006.

“Bioremediation of atomic bomb wastes”, Invited lecture. Georgia Institute of Technology, Department of Chemical and Environmental Engineering, April 14, 2006.

Eight lectures and a seminar presented as part of a course entitled “Fate and Remediation of Hazardous Chemicals”. Tsinghua University, Beijing, China, September, 2006.

Establishment of the Global Bioreactor Network, Nov 29-Dec 1, 2006. Singapore.

“The coming revolution in environmental biotechnology” Invited lecture. University of California Berkeley, Department of Chemical and Environmental Engineering, January 26, 2007.

“Bioremediation of atomic bomb wastes: developing a strategy for long-term immobilization of uranium under field conditions.” Invited lecture. University of California Santa Barbara, Bren School of Environmental Science and Management, February 6, 2007.

“Bioremediation of atomic bomb wastes: developing a strategy for long-term immobilization of uranium under field conditions.” Invited lecture. University of Michigan, Ann Arbor, March 27, 2007.

“Environmental Biotechnology in the Coming Green Economy: Cycles, Networks and Products”. Invited lecture. U. Toronto, Dept of Chemical Engineering, Toronto, Canada, Sept 17, 2007.

“Bioremediation of atomic bomb wastes.” Federal Remediation Technologies Roundtable Meeting, Arlington, VA, 15 November 2007. US EPA. Invited lecture. Arlington, VA. Nov 15, 2007. [http://www.frtr.gov/pdf/meetings/nov07/summary\\_nov07\\_FRTR.pdf](http://www.frtr.gov/pdf/meetings/nov07/summary_nov07_FRTR.pdf)

“Environmental Biotechnology in the Coming Green Economy: Cycles, Networks and Products”. Invited lecture. Chevron, Richmond, CA. December 11, 2007.

“Appropriate technology for the developing world: wastewater”, Invited talk. Water and the Developing World, conference sponsored by the Stanford Association for International Development and Engineers for a Sustainable World. Stanford University, April 12, 2008.

“Ecology-based industry: cycles, networks, and products for the coming green economy”. Invited lecture. Industrial Technology Research Institute. Hsinchu, Taiwan. August 11, 2008.

“Ecology-based biotechnology: cycles, networks, and products for the coming green economy”. Invited keynote address at the Fourth International Symposium for Environmental Biotechnology. National Cheng Kung University, Tainan, Taiwan. organized by the Sustainable Environmental Research Center and the Department of Environmental Engineering. National Cheng Kung University. August 13, 2008.

“Ecology-based biotechnology: cycles, networks, and products for the coming green economy”. Invited presentation. International Society for Microbial Ecology. Cairns, Australia. August 21, 2008.

“From Technology to Business: Future Ecology-Based Industry”. Invited presentation. Sustainable Development & Global Competitiveness: Development Research Center program with the Stanford Center for Professional Development, September 27, 2008.

“Ecology-based biotechnology: cycles, networks, and products for the coming green economy”. Invited lecture. Green Chemistry lecture series, US Berkeley, October 15, 2008.

“Bioreactors in the new green economy: cycles, networks, and products”. Invited lecture. California EPA, Sacramento, CA, November 8, 2008.

“Water: potential for new products and services”. Invited lecture and panel member. Global Technology Symposium, Stanford, CA, March 26, 2009.

“Fluorocarbons and the limits of biodegradation”. Invited presentation. Micropol and Ecohazard 2009. 6<sup>th</sup> IWA/GRA Specialized Conference on Assessment and Control of Micropollutants/Hazardous Substances in Water. Sponsored by the International Water Association (IWA) and the Groundwater Resources Association (GRA) of California. San Francisco, CA. June 9, 2009.

“Bioreactors in the green economy”. Invited lecture. NASA Singularity University, Mountain View, CA, July 28, 2009.

“Recovering resources from wastewater” Invited Internet presentation to the WIA IT Committee. October 20, 2009.

“Bioreactors and the green economy: Cycles, Networks, and Products” Invited lecture. Meeting of the Bay Area Clean Water Agencies, San Leandro, CA, Jan 28, 2010.

“Wastewater as a Resource” Invited presentation. Woods Institute for the Environment. Water Salon. March 16, 2010.

“Bioreactors and the green economy” Invited presentation. Lockheed Martin. Palo Alto, CA. April 8, 2010.

“Bioplastics from Biogas”. Presentation at a National Academy of Sciences Meeting on “Chemistry for Improved Plastics Recycling”, Washington DC, April 29, 2010.

“Wastewater as a Resource” Invited presentation. Conference on Smart Green Cities: New Policies, New Industries, New Practices" Stanford Program on Regions of Innovation and Entrepreneurship. May 10, 2010. Invited speaker.

“Scale and Scale Up”. Wood’s institute Uncommon Dialog: Waste and Wastewater: Focus on the Bay”. Quadras Conference Center. Organizer and Speaker, May 21, 2010.

“Water Panel”. Imagine H2O. Panel member, June 2, 2010.

“Resource Recovery from Wastewater”. Presentation to the Santa Clara Valley Water District. June 15, 2010. Invited speaker.



“Recovery of Wastewater Resources Across Scale”. WhollyH2O September Forum: “Establishing Water Use Baselines and Balances: Auditing and Benchmarking Across Sectors”. San Francisco, CA. September 13, 2010. Invited speaker.

“Environmental Strategies for Public and Industry Health” Presentation to Chinese Mayors. Guanghua Leadership Institute. SDGC and CISCO”. Stanford, CA, September 14, 2010. Invited speaker.

“Cycles, Networks, and Products: Recovering Value from Waste and Wastewater “, “Sustainable Silicon Valley EcoCloud presentation. CISCO systems. Sunnyvale, CA. October 8, 2010.

“Biogas to Bioplastic (and Back Again)”, 5<sup>th</sup> Annual Biopolymers Symposium 2010, Denver, CO, October 12, 2010. Invited speaker and panel member.

“Cycles, Networks, and Products: Recovering Value from Waste and Wastewater “, Presentation to the Center for Integrated Facility Engineering (CIFE) Advisory Board, October 14, 2010. Invited speaker.

"Integrated Water Systems: Wastewater as a Resource". Invited presenter and panel moderator for the WEST (Water, Energy and Smart Technology) Conference, sponsored by Sustainable Silicon Valley and the Woods Institute for the Environment. December 8, 2010.

“The State of Research”, Invited keynote address. The Global Water Crisis: Challenges and Opportunities in Clean Energy, SD Forums and Australia, Sunnyvale, CA. January 25, 2011.

“How can we recover resources from wastewater?” Invited presenter at the Pretreatment, Pollution Prevention and Stormwater Training Conference of the California Water Environment Association). Feb. 28, 2011.

“Next Generation Wastewater Treatment”. Blue Tech Valley Water Conference, Fresno, CA. This conference was sponsored by the Water Innovations Alliance in partnership with the Central Valley Business Incubator and the Claude Laval Water & Energy Technology Incubator. Invited speaker and panel member, May 4, 2011.

“Creating sustainable economic cycles through local resource recovery”. Invited presentation at the CIFE Summer Program. Stanford, CA, June 15, 2011

“Next Generation Wastewater Treatment”. Presentation to the City of Palo Alto Wastewater Treatment Personnel and Carollo Engineers. Stanford, CA, July 31, 2011.

“Energy and Resource Recovery from Waste and Wastewater”, Invited presentation at Yonsei University Seoul, South Korea, August 25, 2011.

“Energy and Resource Recovery from Waste and Wastewater”, Invited presentation at the Third International Symposium on Energy Production and Greenhouse Gas Reduction from Waste. Inha University, Incheon, South Korea, August 26, 2011.

“Energy and Resource Recovery from Waste and Wastewater”, Invited presentation at Hong Kong University, Hong Kong, August 30, 2011.

“Energy and Resource Recovery from Waste and Wastewater”, Invited presentation at Dalian University of Technology, Dalian, China, Sept 2, 2011

“Creating Sustainable Economic Cycles through Local Resource Recovery”, Invited presentation for the Palo Alto Rotary Club, Palo Alto, CA, Sept 23, 2011.

“Creating Sustainable Economic Cycles through Local Resource Recovery”, Invited presentation for the UC Berkeley Environmental Engineering seminar series, Oct 15, 2011.

“Creating Sustainable Economic Cycles through Local Resource Recovery”, Invited presentation for the Advanced Materials for Energy and Environment Stanford Energy and Environment Affiliates Program Fall 2011 Conference, Nov 2, 2011.

“Field- and Laboratory-Scale Evaluation of Uranium Sequestration: The Role of Sulfur and Iron Species“. Invited presentation at the American Geophysical Union. San Francisco, CA, Dec 6, 2011.

"Resource Recovery from Waste and Wastewater". The United Nations Association Film Festival (UNAFF) Screening of "Waste=Food". Invited presentation for the Stanford Institute for Creativity and the Arts. Feb 23, 2012.

“Creating an Integrated Water-Energy Infrastructure”, Invited presentation for the Center for Integrated Facility Engineering (CIFE), Google, Stanford University, Stanford, CA. May 9, 2012.

“Creando Ciclos Económicos y Sostenibles a Través de Recuperación de Recursos Locales”. Argentina y Ambiente 2012. Invited presentation for the 1er Congreso Internacional de Ciencia y Tecnología Ambiental. 1er Congreso Nacional de la Sociedad Argentina de Ciencia y Tecnología Ambiental. Mar del Plata, Argentina. May 29, 2012.

“Emerging opportunities for resource recovery from organic waste streams”. Presentation to the East Bay Municipal Utilities District, Oakland, CA. June 11, 2012.

“Microbial Community Structure and Function” Session Chair for the 2012 Gordon Conference “Environmental Sciences: Water”, Holderness, NH, June 27, 2012.

“Integrated Wastewater Resource Recovery Across Scale”. Presentation to the San Francisco Public Utilities Commission, July 31, 2012.

“Nitrogen Removal & Energy Recovery”. Presentation to Bay Area Wastewater Agencies. Delta Diablo Sanitation District, Antioch. Aug 2, 2012.

“Groundwater and Soil Bioremediation: Scale and Scale-up”. Presentation to the LH Corporation, Daejeon & Sejong City, South Korea, August 21, 2012.

“Urban Water Infrastructure Innovation in the United States” (invited keynote), 2012 Conference of the Korea Society of Environmental Engineers, Changwon, South Korea, August 23, 2012.

“Water and Energy”, 2012. Invited presentation for the “Energy@Stanford & SLAC Conference”, Precourt Institute, Stanford, CA, September 12, 2012.

“Harnessing Microorganisms for Sustainable Resource Recovery: Water, Energy, Materials”, Invited presentation for “Lectures at the Leading Edge”, Department of Chemical Engineering and Applied Chemistry, University of Toronto, Toronto, Canada, Sept 26, 2012.

“Clean Water, Energy, and Biomaterials from Wastewater“, Invited presentation for Stanford Water in the West Uncommon Dialogue: (Re)Aligning California Climate Change Policy and Innovation in the Water Sector. February 11, 2013.

“Recovering Clean Water, Renewable Energy, Safe Biomaterials”, Invited presentation for NVIDIA at CIFE, Stanford University, February 11, 2013.

“Microbial Biotechnology for Sustainable Resource Recovery: Water, Energy, Materials” Invited presentation at North Dakota State University for the Environmental and Conservation Sciences, Fargo, North Dakota. Earth Day, April 21, 2013.

“Sustainable Cycles for Recovery of Water, Energy and Materials”, Invited presentation, Eawag, Zurich Switzerland. May 3, 2013.

“The Water Sector”, Invited moderator and presenter at the Global Investment Forum Investor Roundtable: The Frontier of Infrastructure Investing: New Technologies & New Markets. Global Projects Center. Schwab Center, Stanford University. May 11, 2013.

“Water Resiliency”, Invited speaker for “Smart Eco-City Solutions for Waste and Water Resiliency” US-China Green Energy Challenge. Orrick, Herrington & Sutcliffe LLP, Menlo Park, CA. June 6, 2013.

External Expert Workshop leader. Veolia’s International Workshop on Urban Wastewater Systems and Services in 2013. Brussels, Belgium. July 4-5, 2013.

"Sustainable cycles for water, energy, and materials". Coca Cola Company. Atlanta, GA. Aug 20, 2013.

“Creating Sustainable Cycles for Water, Energy, Materials”, Invited speaker. International Conference on Sustainability and Environmental Protection, California EPA, Burlingame, CA. Oct 12, 2013.

“Microbial Biotechnology for Sustainable Resource Recovery”. Invited keynote at the Institute of Biological Engineering Annual Conference, Lexington, KY, Mar 7, 2014.

“The microbial battery: a new microbial electrochemical system for efficient energy recovery”. Harbin, China. IWA International Workshop on Resource Recovery from Wastewater/Bio-solids. July 13-16, 2014.

“Recovered resource potential: temporal and spatial variability” Science Summit on Urban Water International Workshop on Resource Recovery from Wastewater/Bio-solids Harbin, China, July 15, 2014.

“Energy-neutral removal of organics, nitrogen, and salt from domestic wastewater: emerging technologies could do it, but can they cross the "Valley of Death?" Shanghai Jiao Tong University. Shanghai, China. Nov.8-9, 2014, “EU-CHINA Workshop on Resource Recovery from Biomass and Green Technology In Waste/wastewater Treatment“ Organizers: Charles Bank, U. Southhampton, UK, and Zhengjia Zhang, Shanghai Jiao Tong University.

“Nutrient Treatment as a part of Urban Wastewater Resource Recovery Facilities in 25 years”. Invited keynote. July 27, 2015. Water Environment Federation Nutrient Symposium, San Jose, CA.

"Drought-driven Wastewater Treatment and Reuse: What will be the Operational Challenges and Opportunities", Invited lecture, Sep 9, 2015, California Water Environment Association, Sacramento, CA.

“Energy-Positive Wastewater treatment: can it be done? (...and how clean can the water be?) Invited lecture, Stanford Summer Graduate Institute, Energy@Stanford&SLAC. Precourt Institute, Sep 9, 2015, Stanford, CA.

“Energy Positive Wastewater Treatment and Resource Recovery”, Invited lecture, Presentation to the General Accounting Office, Sep 10, 2015, Stanford, CA.

Invited lecture, P. L. McCarty (preparer), C. S. Criddle (deliverer). WEFTEC 2015: Technical Session 407: Emerging Concepts for Capturing Wastewater’s Resources. September 29, 2015, Chicago, IL.

“Wastewater Energy and Biosolids Reduction Through Efficient Anaerobic Membrane Technology – A New Approach for Temperate Regions” P. L. McCarty (preparer), C. S. Criddle (deliverer). WEFTEC 2015: Technical Session 407: Emerging Concepts for Capturing Wastewater’s Resources. September 29, 2015, Chicago, IL.

“Maximizing Revenue from Biogas”. Invited lecture, WEFTEC 2015: Technical Session 407: Emerging Concepts for Capturing Wastewater’s Resources. September 29, 2015, Chicago, IL.

“The Codiga Resource Recovery Center: Accelerated Adoption of Promising Technology Through Pilot-Scale Testing”, Invited lecture, WEFTEC 2015: Technical Session 407: Emerging Concepts for Capturing Wastewater’s Resources September 29, 2015, Chicago, IL.

“Water Resource Recovery Facilities of the future: What might they look like?” Presentation to the East Bay Leadership Council, September 20, 2016.

“Update on the Codiga Resource Recovery Center”. BACWA Executive Board. Feb 17, 2017, Oakland, CA

“Revitalizing our Waste and Wastewater Systems: Turning Bad Things Good”, Invited lecture for the Stanford Club of the Central Coast, April 8, 2017, Morro Bay, CA.

“Revitalizing our waste and wastewater systems: turning bad things good”, Guest lecture for CEE 1 – Introduction to Environmental Systems Engineering. April 26, 2017, Stanford, CA.

“Revitalizing our waste and wastewater systems”, Presentation to The Nature Conservancy, Santa Clara Valley Water District, The Anthropocene Institute. May 25, 2017, Stanford, CA.

“Harvesting information from the urban waste stream”, Invited lecture for the Digital Cities Corporate Affiliates Program. Stanford Global Projects Center. June 1, 2017, Stanford, CA.

“Resource Recovery by the Bay”, Leadership of the San Francisco Public Utilities Commission, June 1, 2017, Stanford, CA.

“The William and Cloy Resource Recovery Center”, Woods Institute Advisory Committee Meeting, June 7, 2017, Stanford, CA.

“Revitalizing Waste and Wastewater Systems”, Merit Technologies and leadership from the City of Harbin, China. June 21, 2017. Stanford, CA.

“Making Water Sustainable”, Invited lecture for the Environmental and Water Studies Intensive Stanford Summer Session July 10, 2017, Stanford, CA.

“Making Resource Recovery Sustainable”, Presentation at Energy@Stanford&SLAC, Sept 12, 2017, Stanford, CA.

“Making Resource Recovery Sustainable”, Aarhus University visit to Silicon Valley Clean Water, October 25, 2017. Redwood City, CA.

“Making water reuse sustainable”, Presentation for Chinese-American student group, Nov 11, 2017, Stanford, CA.

Woods Water Panel, Arrillaga Alumni Assoc., Dec 5, 2017, Stanford, CA.

“Can water security be engineered?” Invited lecture at the Center for International Security and Cooperation Freeman Spogli Institute for International Studies. 22 January 2018, Stanford, CA.

“Information from wastewater for protection of public health”, Jan 26, 2018. Bill Lane Center for the American West, Uncommon Dialogue: Improving Health and Health Care in the Rural American West. Environmental Determinants of Rural Health, Stanford, CA.

“Smart infrastructure for water reuse”, Invited lecture for the Digital Cities Corporate Affiliates Program. Stanford Global Projects Center. Feb 26-27, 2018, Stanford, CA.

“Scale up of the Codiga Resource Recovery Center”, Invited presentation for the Woods Institute Community Retreat. March 21, 2018. Fioli, CA.

“Water 2100: Innovation now to create resilience then”. Luncheon speaker, California Water Environment Association, Students and Young Professionals Lunch Meeting, April 18, 2018. Sacramento, CA.

“The Future of Wastewater treatment: Integrating Innovation”, California Water Environment Association, April 18, 2018. Sacramento, CA.

“Silicon Valley Clean Water and Stanford: Creating a water innovation hub”, Presentation at SVCW, May 2, 2018, Redwood City, CA.

“Creating a Sustainable Circular Economy for Water”, guest lecture for CEE 144, May 16, 2018, Stanford, CA.

“Water 2100: Let’s Think About Our Children”. Saratoga High School “Engineering for a Greener World”, May 18, 2018, Saratoga, CA.

“Water 2100: Innovation now to create resilience then”. Invited presentation at the Technical University of Munich, June 28, 2018; participation in the thesis defense of Max Weisbach on June 29, 2018, Munich, Germany.

“Water 2100: Innovation now to create resilience then”. Invited presentation to the leadership of China Water Environment. August 13, 2018, Stanford, CA.

“Methane as a feedstock: microbial synthesis of high-strength aromatic polymers”. Presentation at the Natural Gas Initiative Affiliates Meeting, October 8, 2018.

“Economics & Science of Recycled Water: Strategies for Commercial Viability”, Presentation to the Santa Clara Valley Water District Water Commission, October 24, 2018.

“Novel approaches to water treatment”, 2018. Water Systems Symposium, October 12, 2018, Stanford CA.

“Production of high-strength aromatic biopolymers from methane”. Methane as a feedstock: microbial synthesis of high-strength aromatic polymers. Presentation at the the Natural Gas Initiative Affiliates Meeting, October 18, 2018.

“Production of high-strength aromatic biopolymers from methane”. Methane as a feedstock: microbial synthesis of high-strength aromatic polymers. Presentation at the Natural Gas Initiative Affiliates Meeting, October 9, 2019.

“Biotech 2100: Innovation now to create resilience then”. Invited presentation to the USU Department of Bioengineering, Utah State University. Dec 5, 2018, Logan, UT.

“Adaptation: Water & Wastewater Systems”, Panel discussion and talk for conference on “Strategies for Adapting to Sea Level Rise in the Bay Area—Technology, Governance and Communication“. Collaborative Governance for Climate Resilience. Sponsored by the Bill Lane Center for the American West. Dec 10, 2018, Stanford, CA.

“Environmental Engineering seminar, Plastics and bioplastics: can we turn the tide? Dec 2, 2019. Stanford, CA.

“Can microbial biotechnology turn the tide on plastics?” Bioengineering 450 Seminar Series, invited seminar, on-line presentation, May 22, 2020. Stanford, CA.

“Harnessing the circular economy for aquaculture”. Stanford Distinguished Careers Institute (DCI) Colloquium, on-line presentation, May 29, 2020, Stanford, CA.

## **Reports**

Adams, V. D. and C. S. Criddle, 1982. Sprinkler application of SO<sub>2</sub>-treated groundwater at the Sandarosa Farm, Snowville, Utah. Utah Water Research Laboratory. Report to International Environmental, Inc. Salt Lake City, Utah.

McCarty, P. L., T. Xinggang, and C. S. Criddle, 1986. Biochemical methane potential analysis for the Mountain View Controlled Landfill Project. Submitted to Emcon Associates, Pacific Gas and Electric Company, and the Gas Research Institute. Stanford, California.

Criddle, C. S., J. DeWitt, P. Gurian, D. Grbic-Galic, and P. L. McCarty, 1990. Anaerobic transformation of carbon tetrachloride as a sole substrate and in mixtures with

hexachloroethane and/or nitrate, by subsurface microorganisms. Stanford University Civil Engineering Technical Report No. 31. Submitted to Lawrence Livermore National Laboratory.

Criddle, C. S., 1990. Volatile emissions from the Muskegon POTW - Reports 1 and 2. Submitted to Warner, Norcross and Judd, Attorneys. Muskegon, Michigan. Both reports admitted as evidence in court proceedings.

Criddle, C. S. and M. Rajayya, 1991. Electrolytic reduction of trichloroacetate, trifluoroacetate, and perfluorooctanoate in water. Submitted to 3M Environmental Engineering and Pollution Control. August 9, 1991.

Criddle, C. S. and Y. A. Demirjian, 1992. Diagnostic Summary of the Bay View Water Reclamation Facility Design and Operation. Prepared for Natural Systems, Inc., Muskegon, Michigan. Submitted to the United States Environmental Protection Agency and the City of Toledo, Ohio, November 12, 1992.

Criddle, C. S., B. Key, and Y. A. Demirjian, 1993. Wastewater storage requirements for the municipality of Penn Hills, Pennsylvania. Prepared for Natural Systems, Inc., Muskegon, Michigan. May 9, 1993.

Criddle, C. S. 1994. Reassessment of Bay View Water Reclamation Facility Design and Operation. Prepared for Natural Systems, Inc., Muskegon, Michigan. June 14, 1994.

Criddle, C. S. and Y. A. Demirjian, 1994. Expert Witness Report Regarding the Bay View Water Reclamation Facility for U. S. v. City of Toledo, Ohio. Prepared for Natural Systems, Inc., Muskegon, Michigan. Submitted to the United States Department of Justice and the Environmental Protection Agency, September 6, 1994.

Chauhan, S., C. Criddle, and J. Tiedje, 1995. Potential for microbial transformation of trifluoroacetate. Final report to AFEAS, July 1, 1995.

Criddle C. S., M. Dybas, M. Witt, M. Szafranski, R. Heine, S. Davies, M. Sneathen, S. Mathuram, J. Tiedje, L. Forney, K. Smalla, S. Bezborodnikov, L. Sepulveda-Torres, R. Brown, T. Voice, D. Wiggert, X. Zhao, O. Kawka, M. Barcelona, and T. Mayotte. 1996. Evaluation of in-situ bioaugmentation to remediate an aquifer contaminated with carbon tetrachloride. Schoolcraft Field Bioaugmentation Experiment Phase II Final Report to the State of Michigan Department of Environmental Quality. Department of Civil & Environmental Engineering, Department of Microbiology, Center for Microbial Ecology, Michigan State University; Department of Civil Engineering, The University of Michigan; Golder Associates.

Criddle, C. S., S. Billington, and C. Frank, 2014. Renewable bioplastics and biocomposites from biogas methane and waste-derived feedstock: development of enabling technology, life cycle assessment, and analysis of costs. Final Report to Cal Recycle, Aug. 2014.  
<http://www.calrecycle.ca.gov/Publications/Documents/1502%5C20141502.pdf>



Wardrop, D., C. Bott, C. Criddle, R. Hale, J. McDevitt, M. Morse, C. Rochman. 2016. Technical Review of Microbeads/Microplastics in the Chesapeake Bay. STAC Publication Number 16-002, Edgewater, MD. 28 pp.

### **Patents issued**

1. U.S. Patent No. 5,602,036. Issued 2/11/97. Method and compositions for remediation. Craig S. Criddle, Gregory M. Tataro, and Michael J. Dybas
2. U.S. Patent No. 5,730,550. Issued 3/24/98. Method for placement of permeable remediation zones in-situ. Orlando Andersland, Craig S. Criddle, Roger Wallace, and David C. Wiggert
3. U.S. Patent No. 6,258,589B1. Issued 7/10/01. Method and compositions for providing a chemical to a microorganism. Michael J. Dybas, Craig S. Criddle, and Michael E. Witt
4. U.S. Patent 6,287,846. Issued 9/11/01. Method and compositions for providing a chemical to a microorganism. Michael J. Dybas, Craig S. Criddle, and Michael E. Witt.
5. U.S. Patent No. 6,331,300 B1. Issued 12/18/01. Method and compositions for providing a chemical to a microorganism. Michael J. Dybas, Craig S. Criddle, and Michael E. Witt.
6. U. S. Patent 6,613,558 B1. Issued 9/2/03. Method for conversion of a halogenated hydrocarbon using a Pseudomonas sp. M Michael J. Dybas, Craig S. Criddle, Gregory M. Tataro
7. U.S. Patent No. 6,645,756 B1. Issued 11/11/03. Method for remediation of an environment contaminated with carbon tetrachloride. Michael J. Dybas, Craig S. Criddle, Gregory M. Tataro.
8. U.S. Patent No. 7887893. Issued Feb 15, 2011. Bacterial poly(hydroxyalkanoate) polymer and natural fiber composites". Billington, S. L., C. S. Criddle, W. C. Frank, M. C. Morse, S. J. Christian, and A. J. Pieja.
9. U.S. Patent No. 8,030,021 B2. Issued Oct 4, 2011. "Use of selection pressures to enable microbial biosynthesis of polyhydroxyalkanoates from anaerobic degradation products." C. S. Criddle and A. J. Pieja. <http://www.google.com/patents/US8030021>
10. U.S. Patent No. 8932848. Issued Jan 13, 2015. Microbial production of nitrous oxide coupled with chemical reaction of gaseous nitrous oxide. B. J. Cantwell, C. S. Criddle, Y. D. Scherson, and G. F. Wells.
11. U.S. Patent No. 8932849. Issued Jan 13, 2015. Microbial production of nitrous oxide coupled with chemical reaction of gaseous nitrous oxide including phosphorus removal and nitrite reduction to nitrous oxide. Y. D. Scherson, B. J. Cantwell, and C. S. Criddle.

12. US Patent No 2013/0052681 A1. Issued: Feb. 28, 2013. Criddle, C. S., K. H. Rostkowski, and E. R. Sundstrom, Process for the selection of PHB-producing methanotrophic cultures.
13. U. S. Patent No.9,509,028. Issued: Nov 29. 2016. Microbial batteries with re-oxidizable solid-state electrodes for conversion of chemical potential energy into electrical energy. X. Xie, Y. Cui, C. S. Criddle, and M. Ye.
14. U. S. Patent 10,003,110 B2. Charge-free mixing entropy battery. Meng Ye, Yi Cui, Mauro Pasta, Xing Xie, Craig S. Criddle, Vaishnav V. Davey.
15. U. S. Patent No. 10,273,510. Issued: Apr 30, 2019. Emulsion-based fermentation for accelerated gas substrate mass transfer. S. Tang, C. Criddle, J. Myung, and M. Kim.
16. Averesch, Nils

### **Advisees and Supervised Research**

#### **MS students (MSU) and Engineer's Degree students (Stanford) and their theses or projects**

Qaiser Baig - MS in Environmental Engineering 1991, project title: "Biodegradation of selected crude oil contaminants under saline conditions." Current position: Project Manager (Environmental Consulting)

David Relyea - MS in Computer Science 1991 - Co-advisor on research with William F. Punch, Department of Computer Science, project title: "Selection and design of technologies for environmental control".

Linda Clowater Hilbert - MS in Environmental Engineering 1992, thesis title: "Factors affecting the transformation of trichloroethylene by methanotrophs". Current employment: Consumers Energy Manager of Renewable Energy.

Mahesh Rajayya - MS in Environmental Engineering 1992, thesis title: "Pathways of transformation in the electrolytic reduction of chlorinated aliphatic compounds". Current position: Senior Oracle Database Administrator.

Sanjay Syal - MS in Environmental Engineering 1992, thesis title: "Reductive dechlorination in a continuous flow electrolysis cell". Current position: Santa Clara Valley Water District, Senior Management Analyst.

Lori Schutz-Riley - MS in Environmental Engineering 1993, thesis title: "Knowledge acquisition from experts in conceptual design of environmental engineering systems".

Douglas Gatrell - MS in Environmental Engineering 1993, project title: "Physical and chemical properties of calcium magnesium acetate".

Chien Ping Hung - MS in Environmental Engineering 1993, thesis title: "Abiotic transformation of halogenated aliphatic compounds by iron powder".

Timothy Mayotte - MS in Environmental Engineering 1993, project title: "Evaluation of sorption and the potential for biotransformation of carbon tetrachloride by *Pseudomonas* sp. strain KC in contaminated aquifer material".

Fred Knoll - MS in Environmental Engineering 1994, thesis title: "Factors influencing the competitive advantage of *Pseudomonas* sp. strain KC for subsequent remediation of a carbon tetrachloride impacted aquifer".

Mukesh Jain - MS in Environmental Engineering 1994, project - published review article: "Metabolism and cometabolism of halogenated C-1 and C-2 hydrocarbons".

Michael Witt - MS in Environmental Engineering 1994, thesis title: "Assessment of bioaugmentation for carbon tetrachloride transformation in a model aquifer system".

Chris Harvey - MS in Environmental Engineering 1995, project title: "Operational strategies for sequencing batch reactors".

Michael Apgar - MS in Environmental Engineering 1995, thesis title: "Microcosm studies of acetone and benzene degradation at the West KL Landfill".

Ken Recker - MS in Environmental Engineering 1995, project title: "Effect of denitrification on wetting phase permeability in porous media".

Mark Sneathen - MS in Environmental Engineering 1996, thesis title: "Theoretical and experimental competitiveness of *Pseudomonas stutzeri* KC".

Jeff Chilson - MS in Environmental Engineering 1996, project title: "An improved computer model for sequencing batch reactors: simulating aerobic and anoxic reactor stages".

Kathleen Wight - MS in Environmental Engineering 1997, thesis title: "The role of biodegradation and sorption in determining the fate of nonionic surfactants in the environment".

Robert Solak - MS in Environmental Engineering 1998, thesis title: "Modeling of trichloroethylene cometabolism in a sequencing batch reactor"

Patrick Radabaugh - MS in Environmental Engineering 1998, thesis title: "Factors affecting the transport of *Pseudomonas stutzeri* KC".

Haekyung Kim - MS in Environmental Engineering 1998, thesis title: "The role of trace copper in the transformation of carbon tetrachloride by *Pseudomonas stutzeri* KC".

Lance Warnick - MS in Environmental Engineering 1998, thesis title: "Induced carbonate precipitation and cation exchange in sandy aquifer solids".

Allison Huang – Engineer's Degree in Environmental Engineering, 2001, thesis title: "Regulation of genes for carbon tetrachloride degradation in *Pseudomonas stutzeri* KC".

Jeannine Larabee – Engineer's Degree in Environmental Engineering, 2005, thesis title: "The characterization of genes and proteins involved in the biosynthesis and activity of PDTC by *Pseudomonas stutzeri* strain KC."

Andrew Pfluger – Engineer's Degree in Environmental Engineering, 2010, thesis title: "Growth of Type 1 and Type 2 methanotrophs in a fluidized bed reactor "

#### **Ph.D. students mentored and theses**

1. Chien-Chun Shih - PhD in Environmental Engineering 1995, thesis title: "Experimental and numerical evaluation of cometabolism in sequencing batch reactors". Current employment: Moh and Associate Consultants, Taiwan.

2. Gregory M. Tataro - PhD in Microbiology and Public Health 1996, thesis title: "Physiology of carbon tetrachloride transformation by *Pseudomonas stutzeri* KC". Current employment: Deputy Drain Commissioner, Livingston County, MI.

3. Blake Key - PhD in Environmental Engineering 1996, thesis title: "Biotransformation of nonvolatile organofluorine compounds". Current employment: Professor at Northwestern Michigan College, Traverse City, MI.

4. Wang-Kuan Chang - PhD in Environmental Engineering 1996, thesis title: "Kinetics characterization of cometabolizing communities and adaptation to nongrowth substrate". Current employment: Research Engineer, Union Chemical Laboratories, Industrial Technology Research Institute, Taiwan.

5. Michael Witt - PhD in Environmental Engineering 1998, thesis title: "Laboratory and numerical simulation of bioaugmentation strategies". Current employment: Dow Chemical Company, Midland, MI.

6. Lycely Sepulveda-Torres - PhD in Microbiology and Public Health 2000. Thesis title: "Characterization of genes involved in the degradation of carbon tetrachloride by *Pseudomonas stutzeri* KC". Professor, Universidad Central del Caribe.

7. Sarah Middleton - PhD in Environmental Engineering and Science, 2005. Thesis title: "Physiological and ecological interactions between chromate and nitrate in microbial model systems". Current employment: consultant.

8. Laurel Crosby - PhD in Environmental Engineering and Science, 2005. Thesis title:

"Molecular microbial community analysis: understanding and overcoming the limitations".  
Current employment: Senior Research Engineer, Stanford Genome Technology Center,  
Stanford University.

9. Margaret Gentile - PhD in Environmental Engineering and Science, 2006. Thesis title:  
"Community structure, community dynamics, and functional stability in denitrifying  
bioreactors." Current employment: Consultant, Arcadis.

10. Jennifer Nyman - PhD in Environmental Engineering and Science, 2006. "Community  
structure and kinetics of microbial uranium reduction for field-scale bioremediation".  
Current employment: Consultant, Arcadis.

11. Chuen Yung Philip Wong - PhD in Environmental Engineering and Science, 2008.  
"Fouling in an anoxic-aerobic membrane bioreactor: role of membrane properties and  
biological contributions". Current employment: Teaching Fellow, Nanyang Technological  
University, Singapore.

12. Kurt Rhoads - PhD in Environmental Engineering and Science, 2009.  
Biotransformation of perfluorinated organics. Current employment: Assistant Professor,  
Case Western University.

13. Benjaporn (Aim) Boonchayaanant Suwannasilp - PhD in Environmental Engineering  
and Science, 2009. Kinetics of U(VI) reduction by sulfate- and iron-reducing bacteria.  
Current employment: Assistant Professor, Chulalongkorn University, Thailand. Email:  
benjaporn.bo@chula.ac.th

14. Margaret-Catherine Morse (jointly advised with Sarah Billington) - PhD in Civil  
Engineering. 2009. Anaerobic biodegradation of biocomposites. Current employment:  
CEO Mango Materials.

15. Chok Hang (Joanne) Yeung- PhD in Environmental Engineering and Science, 2009.  
Inhibition of nitrification. Social Entrepreneur, Innovation in Green Technology

16. George Wells - (jointly advised with Chris Francis, Environmental Earth Systems  
Science) PhD in Environmental Engineering and Science, 2010. Nitrifying archaea in  
wastewater treatment plants. Current position: Assistant Professor, Northwestern  
University.

17. Allison Pieja - PhD in Environmental Engineering and Science, 2011. Methanotrophic  
production of polyhydroxybutyrate. Current position: Chief Scientific Officer, Mango  
Materials.

18. Katherine Rostkowski - PhD In Environmental Engineering And Science, 2012. "Understanding methanotrophic polyhydroxybutyrate (PHB) production across scale: Life cycle assessment, pure culture experimentation, and pathway/genome database development." Current position: partnerships Insights Team Lead at USAID.
19. Xin Du. PhD in Environmental Engineering and Science, 2012. "Uranium remediation using iron chemistry". Current position: mutual fund portfolio manager, Beijing, China. [du.xin@vip.163.com](mailto:du.xin@vip.163.com) Cell phone: 18610380880
20. Yaniv Scherson (jointly advised with Brian Cantwell, Aeronautics and Astronautics), PhD in Mechanical Engineering, 2012. Thesis title: "Energy recovery from waste nitrogen through N<sub>2</sub>O decomposition: the coupled aerobic-anoxic nitrous decomposition operation (CANDO)." Postdoctoral Research Associate, Civil and Environmental Engineering, Stanford University 2012-2014. Current position: Managing Director, Western US, Anaergia, Inc.
21. Eric Sundstrom. PhD in Environmental Engineering and Science, 2013. Thesis title: "Selection and optimization strategies for production of polyhydroxybutyrate in methanotrophic bacteria". Current position: Scientific Engineering Associate – Fermentation/Recovery, Lawrence Livermore National Laboratory, Advanced Biofuels Process Development Unit.
22. Xing Xie (jointly advised with Yi Cui, Materials Science). PhD in Environmental Engineering and Science, 2013. Thesis theme: Use of nanotechnology in microbial fuel cells and batteries. Current position: Assistant Professor, Georgia Institute of Technology.
23. Sebastien Tilmans, 2015 (jointly advised with Jenna Davis, CEE). Thesis: "Creating value from integrated organic waste management". Current position: Director of Operations, Codiga Resource Recovery Center.
24. Meng Ye, 2015. Thesis topic: "Energy recovery from the saltwater/freshwater gradient for treated wastewater discharged to saline environments". Current position:
25. Eun Jung Lee (jointly advised with David Freyberg, CEE). PhD in Environmental Engineering, 2016. Thesis topic: "Decision support systems for wastewater resource recovery across scale". Current position: Postdoctoral researcher, Stanford University.
26. Jaewook Myung, 2016. Thesis topic: "PHA recycling and production of tailored biopolymers". Current position: Assistant Professor, KAIST.
27. Cecily Ryan (jointly advised with Sarah Billington, CEE), 2017. Thesis topic: Sustainable engineering of biopolymer composites: end-of-life degradation mechanisms. Current position: Assistant Professor, Montana State University.
28. Sung-Geun Woo, 2017. Thesis topic: Microbial community structure of nitrous oxide-producing bioreactor communities. Current position: Postdoctoral researcher, Stanford

29. Nathan Strong, 2018. Thesis: “Quantifying *Ascaris*: changing the game in the battle against parasitic worms”. Current position: SRI start-up
30. Holly Sewell (jointly advised with Alfred Spormann, CEE), 2018. Thesis topic: “Exploring the genetic basis of dehalogenation”.
31. Veronica Brand. 2018. Thesis topic: “Use of molecular tools for forensic analysis of activated sludge process upsets”. Current position: Bioengineering Teaching Staff, Stanford University.
32. Zhiyue Wang, 2019. Thesis topic: Removal of nitrogen using CANDO. Current position: postdoctoral researcher, U. Minnesota.
33. Wakuna Gallega, 2019. Thesis topic: “Methane mixtures: effects on metabolism and production of PHAs”
34. Anja Brandon, 2020. Thesis topic: Plastic biodegradation in mealworms”.
35. Stephanie Bachas-Daunert, 2020 (jointly advised with David Relman, School of Medicine). Thesis topic: Biotransformation of arsenic by human gut microflora.
36. Sahar El-Abbadi, 2021. Thesis topic: “Methanotrophic PHA food supplement for shrimp aquaculture in Bangladesh”
37. Yinuo Yao, 2021. Thesis topic: Computational Fluid Dynamic Modeling Tools for Scale-up of Anaerobic Fluidized Bed Bioreactors.
38. Andrew Kim, 2022. Thesis topic: Nitrogen removal in anaerobic secondary treatment
39. Emir Mahmut Aksuyak, 2023. Thesis topic: Membrane aerated bioreactors for nitrogen removal.
40. Jorge Meraz, 2023. Thesis topic: Delivery of sparingly soluble gases in high-rate bioreactors.
41. Soo Yeol (Suzy) Kim, 2023. Thesis topic: Pathogen monitoring in domestic wastewater.
42. Latifah Hamzah, 2023. Thesis topic: Sanitation in low-Income settings: integrating social and technological elements.

Co-advisor with Prof. William Tarpeh, Chemical Engineering: Xiaohan (Anita) Shao, 2023. Thesis topic: Electrochemical methods for N and S recovery; Lorelay Mendoza.

Other Axess advisees: Jianxiao Xu, Wenjia Cai, Maeva Fincker, Kirin Furst, Yash Gaur,

Wiley Jennings, Anna Kogler, Amanda Piao, Anita Shao, Navina Venugopal

### **Post-Doctoral Scholars**

1. Michael Dybas - Feb 1, 1993 - Oct 31, 1994. Current employment: consultant, Dybas and Associates.
2. Sadhana Chauhan - Sept 1, 1993 - March 22, 1996 (with J. Tiedje). Current employment: Assistant Professor, University of Texas Medical Branch, Department of Microbiology & Immunology
3. Syed Hashsham - Nov 1, 1996 - Aug, 1998. (at MSU, with R. Hickey and J. Tiedje); Sept, 1998 - Aug., 1999 (at Stanford University). Current employment: Professor, Michigan State University.
4. Wang-kuan Chang - Jan 1 - June 15, 1996. Current employment: Union Chemical Laboratories, Industrial Technology Research Institute, Taiwan.
5. Blake Key - Jan 1 - June 31, 1996. Current Position: Professor, Northwestern Michigan College, Traverse City, MI.
6. Heleen DeWeever - March 1, 1997 - Feb 15, 1998 (with J. Tiedje).
7. Narayanan Rajendran - May 31, 1997-March 31, 1999.
8. Shiang Fu - May 2000 - January 2004. Current Position: Consulting Engineer, International Water Technologies Group.
9. Daniel Yeh - Jan, 2004-2006. Current position: Assistant Professor, Department of Civil and Environmental Engineering, University of South Florida.
10. Young Lee - Dec, 2004-2006. Current position: Research Engineer, Korea Institute of Science and Technology
11. Hee-Deung Park - June, 2005-June 2006. Current position: Assistant Professor, Korea University
12. Laurel Crosby - June 2005-June, 2007. Current position: Research Engineer, Stanford Genome Technology Center.
13. Lycely Sepulveda-Torres - Aug 2006 – Dec, 2007. Most recent position: faculty, Universidad Central del Caribe
14. Yaniv Scherson, Sept, 2012 – Oct, 2014. Western Regional manager. Anaergia.
15. Shan-Shan Yang, Nov, 2015-present Current position: Harbin University
16. Kristian Dubrawski, 2017-2019. Current position: Assistant Professor, University of Victoria
17. Eun Jung Lee, 2017-2019
18. Sung-Geun Woo, 2017-present
19. Chungheon Shin, 2018-present
20. Nils Aversch, 2019- present

### **Research Associates**

1. Mandy Ward, July, 2000 – 2002. retired
2. Wei-Min Wu, January, 2001 - present. Senior Research Engineer, Stanford University.
3. Shiang Fu, January 2004 - August, 2006. Consulting Engineer, International Water Technologies Group.



## **Staff**

1. Weimin Wu, Senior Research Engineer, Civil and Environmental Engineering, Stanford University, Director of International Collaborations, Codiga Resource Recovery Center. Retired 12/31/2019.
2. Sebastien Tilmans, Senior Research Engineer, Civil and Environmental Engineering; Executive Director, Codiga Resource Recovery Center, Stanford University. 2017-present