JOSHUA D. SHROUT
CURRICULUM VITAE

Education

Ph.D.	University of Iowa—Civil and Environmental Engineering (2002)
M.S.	Marquette University—Civil and Environmental Engineering (1998)
B.S.	Northwestern University—Environmental Engineering (1994)

Professional Experience

2007- Assistant Professor—Department of Civil Engineering and Geological Sciences
University of Notre Dame

2003-2007 Senior Fellow/Post-Doctoral Fellow—Department of Microbiology
University of Washington/University of Iowa; Matthew R. Parsek, research advisor. Research: Biofilm development and cell-cell signaling of *Pseudomonas aeruginosa*

2002-2003 Post-Doctoral Scholar—Department of Civil and Environmental Engineering
University of Iowa; Jerald L. Schnoor and Pedro J. Alvarez, research advisors. Research: Application of molecular techniques to investigate bioremediation of perchlorate and RDX.

1998-2002 Graduate Research Assistant—Civil and Environmental Engineering
University of Iowa; Gene F. Parkin, research advisor. Research: Degradation of perchlorate by mixed- and pure-culture bacteria.

1998 Environmental Engineer, Summer Internship
Applied Technologies, Inc., Brookfield, Wisconsin. Projects: Design of Biological Treatment Systems for Industrial Wastewaters.

1996-1998 Graduate Research Assistant
Marquette University; Daniel H. Zitomer, research advisor. Research: Biological Treatment of High-Strength Industrial Wastewaters.

1995-1996 Environmental Engineer
ENSA Environmental, Inc., Northbrook, Illinois. Projects: Underground Storage Tank Removal Oversight, Asbestos Inspection, and Air Quality Monitoring.

Fellowships and Awards

NIH-Training Grant on Mechanisms of Parasitism Post-Doctoral NRSA Fellow, University of Iowa, 2004-2006

NSF-Research Training Grant in Gene Expression and Bioremediation Fellow, University of Iowa, 1998-2002

University of Iowa Graduate Student Senate Travel Grant, May 2002

Professional Certification

Engineer in Training—State of Illinois, 1994

Professional Licenses

International Fire Code Institute UST Decomissioner—State of Illinois, 1996-1998
Visible Emissions Observer—State of Wisconsin, 1995-1996
Asbestos Inspector—State of Kentucky, 1996
Asbestos Inspector—State of Wisconsin, 1995-1996
Hazardous Waste Operations and Emergency Response, 1995-1997

Funded Research

Post-Doctoral Scholar (2003-2007)
"Cell-To-Cell Signaling in Bacterial Biofilms"—National Institute of Health (NIH) (David L.Chopp, Northwestern University, Principal Investigator)

Co-Principal Investigator/Post-Doctoral Scholar (2002-2003)
"Treatability and Demonstration Project for Phytoremediation and Rhizodegradation of Perchlorate in Groundwater at the Longhorn Army Ammunition Plant, Karnack, Texas"—U.S. Army Operations Command (Jerald L. Schnoor, Principal Investigator)

Post-Doctoral Scholar (2002-2003)
"Fe(0)-Based Bioremediation of RDX-Contaminated Groundwater"—Strategic Environmental Research and Development Program (SERDP) (Pedro J. Alvarez, Principal Investigator)

Graduate Research Assistant (2000-2002)
"Phytoremediation and Bioremediation of Perchlorate in Groundwater at the Longhorn Army Ammunition Plant, Karnack, Texas"—U.S. Army Industrial Operations Command (Jerald L. Schnoor and Gene F. Parkin, Principal Investigators)

Professional Services

Reviewer—*Environmental Science and Technology*
Reviewer—*Applied Microbiology and Biotechnology*
Reviewer—*Biodegradation*
Reviewer—*Water Research*
Reviewer—*Journal of Hazardous Materials*
Reviewer—*Journal of Chemical Technology and Biotechnology*
Proposal Reviewer—U.S. Army Research Office
Proposal Reviewer—NIWR-USGS National Competitive Grants Program
External Advisor—Iowa City High School Science Club (2005)

Professional Societies

American Society of Microbiology (since 2002)
Water Environment Federation (since 1999)

Publications

Shrout, J.D., D.L. Chopp, C.L. Just, M. Hentzer, M. Givskov, and M.R. Parsek. (2006) "The impact of quorum sensing and swarming motility on *Pseudomonas aeruginosa* biofilm formation is nutritionally conditional." *Mol. Microbiol.* 62(5): 1264-1277.

Shrout, J.D. and G.F. Parkin. (2006) "Influence of Electron Donor, Oxygen, and Redox Potential on Bacterial Perchlorate Degradation." *Water Res.* 40(6): 1191-1199.

Shrout, J.D., G.C. Struckhoff, G.F. Parkin and J.L. Schnoor. (2006) "Stimulation and Molecular Characterization of Bacterial Perchlorate Rhizodegradation by Plant-Produced Electron Donors". *Environ. Sci. Technol.* 40(1): 310 -317.

Sherburne, L.A., J.D. Shrout, and P.J. Alvarez. (2005) "Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) Degradation by *Acetobacterium paludosum.*" *Biodegradation* 16(6): 539-547.

Shrout, J.D., P. Larese-Casanova, M.M. Scherer and P.J. Alvarez. (2005) "Sustained and Complete Hexahydro-1,3,5-Trinitro-1,3,5-Triazine (RDX) Degradation in Zero-Valent Iron Simulated Barriers under Different Microbial Conditions". *Environ. Technol.* 26(10): 1115-1126.

Shrout, J.D., T. E. Scheetz, T. L. Casavant, and G. F. Parkin. (2005) "Isolation and Characterization of Autotrophic, Hydrogen-Utilizing, Perchlorate-Reducing Bacteria." *Appl. Microbiol. Biotechnol.* 67(2): 261-268.

Shrout, J.D., A.G.B. Williams, M.M. Scherer, and G.F. Parkin (2005) "Inhibition of Microbial Perchlorate Reduction by Zero-Valent Iron." *Biodegradation* 16(1): 23-32.

Shrout, J.D., M.L. Seppanen, G.F. Parkin, and J.L. Schnoor. (2003) "Utilization Of Plant-Produced Electron Donors For Bacterial Perchlorate Degradation." In Proceedings of *Air & Waste Management Association's 96th Annual Conference and Exhibition*. June 22-26, 2003. San Diego, California, U.S.A.

Shrout, J.D. (2002) *Characteristics and Electron Donor Requirements of Perchlorate Degradation by Mixed and Pure-Culture Bacteria*. Ph.D. Dissertation. The University of Iowa.

Shrout, J.D., and G.F. Parkin. (2000) "Inhibition Of Anaerobic Perchlorate Biotransformation By Fe(0)" In Proceedings of *2nd International Conference on Remediation of Chlorinated and Recalcitrant Compounds*. May 22-25, 2000. Monterey, CA, U.S.A. Battelle Press.

Zitomer, D.H. and J.D. Shrout. (2000) "High-Sulfate, High-Chemical Oxygen Demand Wastewater Treatment Using Aerated Methanogenic Fluidized Beds" *Wat. Environ. Res.* 1:90-97.

Zitomer, D.H. and J.D. Shrout. (1998) "Feasibility and Benefits of Methanogenesis Under Oxygen-Limited Conditions" *Waste Mgmt*. 18:107-116.

Shrout, J.D. (1998) *The Effects of Limited Aeration on Expanded Bed Biological Wastewater Treatment.* M.S. Thesis. Marquette University.

Zitomer, D.H. and J.D. Shrout. (1998) "Limited-Aeration of Methanogenic Systems for Treatment of Sulfate-Containing Wastewater" Proceedings of the *1998 ASCE National Conference on Environmental Engineering.* June 7-10, 1998. Chicago, IL, U.S.A.

Zitomer, D.H. and J.D. Shrout. (1997) "Kinetics of COD Biotransformation Under Methanogenic, Limited-Aeration Conditions" *Proceedings 70th Annual Water Environment Federation Conference.* October 18-22, 1997. Chicago, IL, U.S.A.

Book Chapters

Shrout, J.D. and M.R. Parsek (2006) "Quorum Sensing: Coordinating Group Behavior Through Intercellular Signals" in Molecular Paradigms of Infectious Disease: A Bacterial Perspective. C.A. Nickerson and M.J. Schurr., eds. Springer. New York. ISBN: 0-387-30917-9.

Invited Presentations

"The Contribution of Quorum Sensing to *Pseudomonas aeruginosa* Swarming and Biofilm Formation is Nutritionally Conditional." *88th Annual Meeting of the AAAS Pacific Division*. June 19, 2007, Boise, Idaho, U.S.A.

"Cell Signaling and Motility Affect Architecture of *Pseudomonas aeruginosa* Biofilms." Marquette University. November 18, 2004, Milwaukee, Wisconsin, U.S.A.

"Potential for *In Situ* Rhizodegradation of Perchlorate." Iowa Groundwater Association Annual Meeting. November 10, 2004, Coralville, Iowa, U.S.A.

"Inhibition of Bacterial Perchlorate Degradation by Zero-Valent Iron." Northwestern University. January 29, 2003, Evanston, Illinois, U.S.A.

"Characterization of Methanogenic, Perchlorate-Acclimated, Mixed Cultures." Swiss Federal Institute for Environmental Science and Technology (EAWAG), ETH, Switzerland. June 19, 2001, Dübendorf, Switzerland.

Abstracts

Shrout, J.D., J. Cardon, and M.R. Parsek. "The contribution of AHL quorum sensing to *Pseudomonas aeruginosa* surface interaction and swarm motility." *3rd ASM Conference on Cell-Cell Communication on Bacteria*. October 7-10, 2007, Austin, Texas, U.S.A.

Shrout, J.D. and M.R. Parsek. "The impact of quorum sensing and swarming motility on *Pseudomonas aeruginosa* biofilm formation is nutritionally conditional." *4th ASM Conference on Biofilms*. March 25-29, 2007, Quebec City, Quebec, CANADA.

Butler, J.C., J. D. Shrout, I. Smalyukh, J. Manual, G. Spalding, G. C. L. Wong, and M. R. Parsek. "Generating biofilms with optical tweezers: the influence of quorum sensing and motility upon Pseudomonas aeruginosa aggregate formation." *4th ASM Conference on Biofilms*. March 25-29, 2007, Quebec City, Quebec, CANADA.

Shrout, J.D., D.L. Chopp, and M.R. Parsek. "Quorum Sensing and Motility Affect Architecture of *Pseudomonas aeruginosa* Biofilms." A*merican Society of Microbiology 105th General Meeting*. June 5-9, 2005, Atlanta, Georgia, U.S.A.

Shrout, J.D., J.L. Schnoor, and G.F. Parkin. "Effect of Electron Donor Addition and Redox Conditions on Bacterial Perchlorate Degradation." *5th International Conference on Remediation of Chlorinated and Recalcitrant Compounds*. May 24-27, 2004, Monterey, California, U.S.A.

Shrout, J.D., P. Larese-Casanova, M.M. Scherer, and P.J. Alvarez. "Sustained RDX Degradation in Bioaugmented, Simulated, Fe(0) Permeable Reactive Barriers." *5th International Conference on Remediation of Chlorinated and Recalcitrant Compounds*. May 24-27, 2004, Monterey, California, U.S.A.

Shrout, J.D., M. L. Seppanen, G. F. Parkin, and J. L. Schnoor. "Utilization Of Plant-Produced Electron Donors For Bacterial Perchlorate Degradation." *Air & Waste Management Association's 96th Annual Conference and Exhibition*. June 22-26, 2003, San Diego, California, U.S.A.

Shrout, J.D., B. Oh, G. F. Parkin, and P. J. Alvarez "Enhanced RDX Degradation by Dissimilatory Iron-Reducing Bacteria in Flow-Through Fe(0) Columns." A*merican Society of Microbiology 103rd General Meeting*. May 18-22, 2003, Washington D.C., U.S.A.

Shrout, J.D. and G.F. Parkin. "Isolation of Hydrogen-Utilizing, Autotrophic, Perchlorate-Degrading Bacteria." *11th Biocatalysis and Bioprocessing Conference*. October 21-23, 2002, Iowa City, Iowa, U.S.A.

Shrout, J.D. and G.F. Parkin. "Isolation of Hydrogen-Utilizing, Autotrophic, Perchlorate-Degrading Bacteria." A*merican Society of Microbiology 102nd General Meeting*. May 19-23, 2002, Salt Lake City, Utah, U.S.A.

Shrout, J.D. and G.F. Parkin. "Electron Donor Requirements And Redox Conditions For Perchlorate Degradation." *3rd International Conference on Remediation of Chlorinated and Recalcitrant Compounds*. May 20-23, 2002, Monterey, California, U.S.A.

Shrout, J.D. and G.F. Parkin. "Electron Donor Requirements And Redox Conditions For Perchlorate Degradation."*10th Biocatalysis and Bioprocessing Conference*. October 22-24, 2001, Iowa City, Iowa, U.S.A.

Shrout, J.D. and G.F. Parkin. "Characterization of Methanogenic, Perchlorate-Acclimated, Mixed Cultures." *6th International Symposium on In Situ and On-Site Bioremediation*. June 4-7, 2001, San Diego, CA, U.S.A.

Shrout, J.D. and G.F. Parkin. "Inhibition Of Anaerobic Perchlorate Biotransformation By Fe(0)." *9th Biocatalysis and Bioprocessing Conference*. October 23-25, 2000, Iowa City, Iowa, U.S.A.

Shrout, J.D. and G.F. Parkin. "Inhibition Of Anaerobic Perchlorate Biotransformation By Fe(0)." *2nd International Conference on Remediation of Chlorinated and Recalcitrant Compounds*. May 22-25, 2000, Monterey, CA, U.S.A.

Mason, M.G., J.D. Shrout, and G.F. Parkin. "Enhanced Anaerobic Degradation of Tetrachloroethene and 1,1,1-Trichloroethane Using a Lactate Enriched Methanogenic Culture in the Presence of Zero-Valent Iron." *8th Biocatalysis and Bioprocessing Conference*. October 25-27, 1999, Iowa City, Iowa, U.S.A.

Mason, M.G., J.D. Shrout, and G.F. Parkin. "Enhanced Anaerobic Degradation of Tetrachloroethene and 1,1,1-Trichloroethane Using a Lactate Enriched Methanogenic Culture in the Presence of Zero-Valent Iron." *1999 Conference on Hazardous Waste Research—Great Plains/Rocky Mountain Hazardous Substance Recearch Center.* May 24-26, 1999, St. Louis, MO, U.S.A.

Continuing Education and Special Training

January 15, 1996—Chicago, IL "8-Hour Waste Operations and Emergency Response Training Refresher 29CFR1910.120" (Baxter Reilly).

February 6-8, 1995—Milwaukee, WI “Asbestos Inspector Training Course” (Milwaukee Asbestos Information Center).

January 10-13, 1995—Chicago, IL “40-Hour Waste Operations and Emergency Response Training 29CFR1910.120” (Baxter Reilly).