

JOSHUA D. SHROUT

CURRICULUM VITAE

Education/Training

Post-doc	University of Washington/ University of Iowa—Microbiology (2003-2007)
Post-doc	University of Iowa—Civil and Environmental Engineering (2002-2003)
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)

Positions and Appointments

2021-pres	Professor—Department of Civil & Environmental Engineering and Earth Sciences, University of Notre Dame
2016-pres	Member—Warren Center for Drug Discovery, University of Notre Dame
2015	Guest Scientist—Department of Ecophysiology-Lotte Sørensen-Andersen Group, Max Planck Institute for Terrestrial Microbiology
2015-pres	Member—Institute for Precision Health (formerly Applied Diagnostics and Therapeutics), University of Notre Dame
2012-2021	Associate Professor—Department of Civil & Environmental Engineering and Earth Sciences, University of Notre Dame
2011-pres	Concurrent Appointment—Department of Biological Sciences, University of Notre Dame
2008-pres	Member—Eck Institute for Global Health, University of Notre Dame
2007-2012	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 <i>Pseudomonas aeruginosa</i>
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

- Indiana CTSI (Clinical Translational Sciences Institute) Young Investigator Basic Science Award, 2010-2012
- 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

Current Funded Extramural Research

- Principal Investigator (2019-2024)
R01AI113219: "Characterization of Biofilms by Correlated Mass Spectrometric and Raman Imaging"—NIH (co-PIs: Paul W. Bohn and Jonathan V. Sweedler) (\$2,520,924)
- Co-Principal Investigator (2019-2022)
1904192: "Determination of the Controls on Bacterial Cell Surface Sulfhydryl Binding Site Concentrations"—NSF Geobiology and Low Temperature Geochemistry (Jeremy B. Fein, Principal Investigator) (\$482,937; Shroud share: \$225,474)
- Co-Principal Investigator (2018-2022)
DE-SC0019312: "Meta-Optics Enabled Multifunctional Imaging"—DOE Office of Biological and Environmental Research (Paul W. Bohn, Principal Investigator) (\$1,431,652; Shroud share: \$291,097)

Prior Funded Extramural Research

- Principal Investigator (2020)
"Testing new decontamination methods of N95 masks to enable hospital reuse"—University of Notre Dame/Whirlpool Corporation/GHSP (\$12,000)
- Principal Investigator (2017-2018)
R13AI133973: "Midwest Microbial Pathogenesis Conference"—NIH (Multi-PI award with Patricia A. Champion, Principal Investigator) (\$8,500)
- Co-Principal Investigator (2016-2019)
1605177: "GOALI Predicting Biofilm Deformation and Detachment using In-Situ Micro-Rheology and Phase-Field Modeling"—NSF (Robert Nerenberg, Principal Investigator) (\$329,889; Shroud share: \$7,566)
- Co-Principal Investigator (2016-2017)
1565753: "Direct Measurement and Modeling of the Importance of Bacterial Adsorption of Cd in Natural Samples"—NSF (Jeremy B. Fein, Principal Investigator) (\$156,323; Shroud share: \$60,278)

Principal Investigator (2016)
 "Testing for Bacterial Biofilm Attachment and Growth on MiRus alloy"—MiRus Spine and Orthopaedics (\$8,000)

Principal Investigator (2014-2017)
 R21AI109417: "Glutamate-dependent behavior of *Pseudomonas aeruginosa*"—NIH (\$410,200)

Principal Investigator (2014-2019)
 R01AI113219: "Characterization of Biofilms by Correlated Mass Spectrometric and Raman Imaging"—NIH (co-PIs: Paul W. Bohn and Jonathan V. Sweedler) (\$2,201,659)

Principal Investigator (2013-2015)
 "Imaging gene expression patterns important to swarming of *Pseudomonas aeruginosa*"—Indiana CTSI (Clinical Translational Sciences Institute; NIH UL1 TR000006) (\$9,600)

Co-Principal Investigator (2012-2016)
 R01GM095959: "Combined multiscale modeling and experimental study of bacterial swarming"—NIH (Mark S. Alber, Principal Investigator) (\$1,149,272; Shroud share: \$287,318)

Co-Principal Investigator (2011-2015)
 DE SC-0006642: "In Situ Correlated Molecular Imaging of Chemically Communicating Microbial Communities"—DOE Office of Biological and Environmental Research (Paul W. Bohn, Principal Investigator) (\$1,370,000; Shroud share: \$370,198)

Co-Principal Investigator (2011-2015)
 R01GM100470: "Study of the interplay of motility mechanisms during swarming of *Myxococcus xanthus*"—NIH (Mark S. Alber, Principal Investigator) (\$800,285; Shroud share: \$200,071)

Principal Investigator (2010-2012)
 "Discerning Coordinated Surface Motility of *Pseudomonas aeruginosa*"—Indiana CTSI (Clinical Translational Sciences Institute; NIH UL1RR025761) (\$180,820)

Principal Investigator (2008-2009)
 W912HZ-08-1-0002: "Identification of Structural and Genetic Factors Critical to the Production of Microbial Biopolymers with Desirable Properties"—U.S. Army Engineer Research and Development Center (ERDC) (\$75,000)

Co-Principal Investigator/Post-Doctoral Scholar (2002-2003)
 DAAA09-02-C-0071: "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) (\$243,561)

Peer-Reviewed Publications (ORCID: 0000-0001-9509-2187)

Romero-Severson, J., T. Moran, D.G. Shrader, S. Pandey-Joshi, C.L. Thomas, E.C. Palmer, J.D. Shroud, M. Pfrender, S. Lee (2021) A seed-endophytic *Bacillus safensis* strain with antimicrobial activity has genes for novel bacteriocin-like antimicrobial peptides. *Front. Microbiol.*

Cao, T., A.A. Weaver, S. Baek, J. Jia, J.D. Shroud, P.W. Bohn (2021) Depth Distributions of Signaling Molecules in *Pseudomonas aeruginosa* Biofilms Mapped by Confocal Raman Microscopy. *J. Chem. Phys.* 154(20): 204201.

- Weaver, A.A., D. Bolster, C.S. Madukoma, A.E. Mattingly, N. Morales-Soto, and J.D. Shrout (2021) Transient surface hydration impacts biogeography and intercellular interactions of non-motile bacteria. *Appl. Environ. Microbiol.* 87(8) e03067-20.
- Jia, J.; J. Ellis, T. Cao, K. Fu, N. Morales-Soto, J.D. Shrout, J.V. Sweedler, P.W. Bohn (2021) Biopolymer Patterning-Directed Secretion in Mucoïd and Non-Mucoïd Strains of *Pseudomonas aeruginosa* Revealed by Multimodal Chemical Imaging *ACS Infect. Dis.* 7(3):598-607.
- Do, H., S.R. Kwon, S. Baek, C.S. Madukoma, M.K. Smiley MK, L.E. Dietrich, J.D. Shrout, P.W. Bohn (2021) Redox cycling-based detection of phenazine metabolites secreted from *Pseudomonas aeruginosa* in nanopore electrode arrays. *Analyst* 146(4):1346-1354.
- Cao, T., J.V. Sweedler, P.W. Bohn, J.D. Shrout (2020) Spatiotemporal Distribution of *Pseudomonas aeruginosa* Alkyl Quinolones Under Metabolic and Competitive Stress. *mSphere* 5(4):e00426-20. (cover image)
- Dik, D.A. C. Kim, C.S. Madukoma, J.F. Fisher, J.D. Shrout, S. Mobashery. (2020) Fluorescence Assessment of the AmpR-Signaling Network of *Pseudomonas aeruginosa* to Exposure to β -Lactam Antibiotics, *ACS Chem. Biol.* 15(5): 1184-1194.
- Hopf J., M. Waters, V. Kalwajtyš, K.E. Carothers, R.K. Roeder, J.D. Shrout, S.W. Lee, P.D. Nallathamby. (2019) Phage-mimicking antibacterial core-shell nanoparticles. *Nanoscale Adv.* 1(12): 4812-4826.
- Weaver, A.A., N. Hasan, M. Klaassen, H. Karathia, R.R. Colwell, and J.D. Shrout (2019) Prosthetic Joint Infections Present Diverse and Unique Microbial Communities Using Combined Whole Genome Shotgun Sequencing and Culturing Methods *J. Med. Microbiol.* 68(10):1507-1516.
- Madukoma C.S., P. Liang, A. Dimkovikj, J. Chen, S.W. Lee, D.Z. Chen DZ, J.D. Shrout. (2019) Single cells exhibit differing behavioral phases during early stages of *Pseudomonas aeruginosa* swarming. *Bacteriol.* 201(19): e00184-19.
- Do, H., S. Kwon, K. Fu, N. Morales-Soto, J.D. Shrout, P.W. Bohn (2019) Electrochemical Surface Enhanced Raman Spectroscopy of Pyocyanin Secreted by *Pseudomonas aeruginosa* Communities. *Langmuir* 35(21): 7043-7049.
- Dik, D.A., C.S. Madukoma, S. Tomoshige, C. Kim, E. Lastochkin, B. Boggess, J.F. Fisher, J.D. Shrout, S. Mobashery (2019) Slr, MltD and MltG of *Pseudomonas aeruginosa* as Targets of Bulgecin A in Potentiation of β -Lactam Antibiotics. *ACS Chem. Biol.* 14(2): 296-303.
- Johnson C.R., J. Hopf, J.D. Shrout, J.B. Fein (2019) Testing the component additivity approach to surface complexation modeling using a novel cadmium-specific fluorescent probe technique. *J. Colloid Interface Sci.* 534:683-691.
- Morales-Soto, N., T. Cao, N.F. Baig, K.M. Kramer, P.W. Bohn, and J.D. Shrout (2018) Surface growing communities of *Pseudomonas aeruginosa* exhibit distinct alkyl quinolone signatures. *Microbiol. Insights* 11:1178636118817738.
- Tomoshige, S., D.A. Dik, M. Akabane-Nakata, C.S. Madukoma, J.F. Fisher, J.D. Shrout, S. Mobashery (2018) Total syntheses of bulgecins A, B and C and bactericidal potentiation of the β -lactam antibiotics. *ACS Infect. Dis.* 4(6):860-867. (Selected as ACS Editors' Choice)
- Dunham, S.J.B., J.F. Ellis, N. Baig, N. Morales-Soto, T. Cao, J.D. Shrout, P.W. Bohn, J.V. Sweedler (2018) Quantitative SIMS Imaging of Agar-Based Microbial Communities. *Anal. Chem.* 90(9): 5654-5663.

Morales-Soto, N., S.J.B. Dunham, N.F. Baig, J.F. Ellis, C.S. Madukoma, P.W. Bohn, J.V. Sweedler, and J.D. Shrout (2018) Antibiotic exposure induces spatially-dependent variations in alkyl quinolone signaling during *Pseudomonas aeruginosa* swarming. *J. Biol. Chem.* 293(24):9544-9552 (Selected as Editor's Pick article in top 2%)

Johnson, C.R., J.D. Shrout, J.B. Fein (2018) Visualization and Quantification of Cd Sorption to Bacteria Using Confocal Laser Scanning Microscopy and Cd-specific Fluorescent Probes. *Chem. Geol.* 483: 21-30.

Mattingly, A.E., A.A. Weaver, A. Dimkovikj, and J.D. Shrout (2018) Assessing Travel Conditions: Environmental and Host Influences On Bacterial Surface Motility. *J. Bacteriol.* 200(11): e00014-18.

Mattingly, A.E., N.G. Kamatkar, N. Morales-Soto, B.R. Borlee, and J.D. Shrout (2018) Multiple environmental factors influence the importance of the phosphodiesterase DipA upon *Pseudomonas aeruginosa* swarming. *Appl. Environ. Microbiol.* 84(7):e02847-17

Amiri, B., C. Harvey, A. Buchmann, S. Christley, J.D. Shrout, I.S. Aranson, and M. Alber (2017) Reversals and collisions optimize protein exchange in bacterial swarms. *Phys. Rev. E* 95(3): 032408.

Polisetti, S., N.F. Baig, N. Morales-Soto, J.D. Shrout, and P.W. Bohn (2017) Spatial Mapping of Pyocyanin in *Pseudomonas aeruginosa* Bacterial Communities by Surface Enhanced Raman Scattering. *Appl. Spectrosc.* 71(2):215-223.

Dunham, S.J.B. T.J. Comi, K. Ko, B. Li, N.F. Baig, N. Morales-Soto, J.D. Shrout, P.W. Bohn, and J.V. Sweedler (2016) Metal-assisted polyatomic SIMS and LDI for enhanced small molecule imaging of bacterial biofilms. *Biointerphases* 11(2):02A325.

Baig, N.F., S.J.B. Dunham, N. Morales-Soto, J.D. Shrout, J.V. Sweedler, P.W. Bohn (2015) Multimodal chemical imaging of molecular messengers in emerging *Pseudomonas aeruginosa* bacterial communities. *Analyst* 140(19): 6544 – 6552.

Shrout, J.D. (2015) A fantastic voyage for sliding bacteria. *Trends Microbiol.* 23(5):244-246.

Morales-Soto, N., M.E. Anyan, A.E. Mattingly, C.S. Madukoma, C.W. Harvey, M. Alber, E. Déziel, D.B. Kearns, and J.D. Shrout (2015) Preparation, Imaging, and Quantification of Bacterial Surface Motility Assays. *J. Vis. Exp.* 98: e52338.

Anyan, M.E., A. Amiri, C.W. Harvey, G. Tierra, N. Morales-Soto, C.M. Driscoll, M.S. Alber, and J.D. Shrout (2014) Type IV Pili Interactions Promote Intercellular Association and Moderate Swarming of *Pseudomonas aeruginosa*. *Proc. Natl. Acad. Sci. U.S.A.* 111(50): 18013–18018.

Lanni E.J., R.N. Masyuko, C.M. Driscoll, S.J. Dunham, J.D. Shrout, P.W. Bohn, J.V. Sweedler (2014) Correlated imaging with C60-SIMS and confocal Raman microscopy: visualization of cell-scale molecular distributions in bacterial biofilms. *Anal. Chem.* 86(21): 10885-10891.

Harvey, C.W., C.S. Madukoma, S. Mahserejian, M.S. Alber, J.D. Shrout (2014) Cell division resets polarity and motility for the bacterium *Myxococcus xanthus*. *J. Bacteriol.* 196(22): 3853-3861.

Lanni EJ, R.N. Masyuko, C.M. Driscoll, J.T. Aerts, J.D. Shrout, P.W. Bohn, J.V. Sweedler (2014) MALDI-guided SIMS: Multiscale Imaging of Metabolites in Bacterial Biofilms. *Anal Chem.* 86(18): 9139-9145.

Masyuko R.N., E.J. Lanni, C.M. Driscoll, J.D. Shrout, J.V. Sweedler, P.W. Bohn (2014) Spatial organization of *Pseudomonas aeruginosa* biofilms probed by combined matrix-assisted laser desorption ionization mass spectrometry and confocal Raman microscopy. *Analyst.* 139(22): 5700-5708.

- Luong, P.M., B.D. Shogan, A. Zaborin, N. Belogortseva, J.D. Shrout, O. Zaborina, and J.C. Alverdy (2014) Emergence of the P2 phenotype in *P. aeruginosa* PAO1 strains involves various mutations in *mexT* or *mexF*. *J. Bacteriol.* 196(2): 504-513.
- Dehner C., N. Morales-Soto, R.K. Behera, J. Shrout, E.C. Theil, P.A. Maurice, J.L. Dubois (2013) Ferritin and ferrihydrite nanoparticles as iron sources for *Pseudomonas aeruginosa*. *J. Biol. Inorg. Chem.* 18(3):371-381.
- Du, H., Z. Xu, M. Anyan, O. Kim, W.M. Leevy, J.D. Shrout, and M. Alber (2012) High Density Waves of the Bacterium *Pseudomonas aeruginosa* in Propagating Swarms Result in Efficient Colonization of Surfaces. *Biophys. J.* 103(3):601-609.
- Shrout, J.D. and R. Nerenberg (2012) Monitoring Bacterial Twitter: Does Quorum Sensing Determine the Behavior of Water and Wastewater Treatment Biofilms? *Environ. Sci. Technol.* 46(4) 1995-2005.
- Staudt, A.K, L.G. Wolfe, and J.D. Shrout (2012) Variations in exopolysaccharide production by *Rhizobium tropici*. *Arch. Microbiol.* 194(3): 197-206.
- Morris, J.D., J.L. Hewitt, L.G. Wolfe, N.G. Kamatkar, S.M. Chapman, J.M. Diener, A.J. Courtney, W.M. Leevy, and J.D. Shrout (2011) Imaging and Analysis of *Pseudomonas aeruginosa* Swarming and Rhamnolipid Production. *Appl. Environ. Microbiol.* 77(23): 8310-8317.
- Kamatkar, N.G., M.J. Sarna, and J.D. Shrout (2011) Population dynamics during swarming of *Pseudomonas aeruginosa*. *Commun. Integr. Biol.* 4(6): 689-691.
- Kamatkar, N.G. and J.D. Shrout. (2011) Surface hardness impairment of quorum sensing and swarming for *Pseudomonas aeruginosa*. *PLoS One.* 6(6): e20888.
- Du, H. J., Z.L. Xu, J.D. Shrout, and M. Alber. (2011) Multiscale modeling of *Pseudomonas aeruginosa* swarming. *Math. Models Meth. Appl. Sci.* 21: 939-954.
- Shrout, J.D., T. Tolker-Nielsen, M. Givskov, and M.R. Parsek. (2011) The contribution of cell-cell signaling and motility to bacterial biofilm formation. *MRS Bull.* 36(5): 367-373.
- Conrad, J. C., M.L. Gibiansky, F. Jin, V. D. Gordon, D.A. Motto, M.A. Mathewson, W.G. Stopka, D. C. Zelasko, J.D. Shrout, and G.C. Wong. (2011) Flagella and Pili-Mediated Near-Surface Single-Cell Motility Mechanisms in *P. aeruginosa*. *Biophys. J.* 100(7): 1608-1616.
- Gibiansky, M.L., J.C. Conrad, F. Jin, V.D. Gordon, D.A. Motto, M.A. Mathewson, W.G. Stopka, D.C. Zelasko, J.D. Shrout, and G.C.L. Wong. (2010) Bacteria Use Type IV Pili to Walk Upright and Detach from Surfaces. *Science* 330(6001): 197.
- Smalyukh, I. I., J. Butler, J.D. Shrout, M.R. Parsek and G.C.L. Wong. (2008). Elasticity-mediated nematiclike bacterial organization in model extracellular DNA matrix. *Phys. Rev. E* 78(3): 30701-30704.
- Starner, T. D., J.D. Shrout, M.R. Parsek, P.C. Appelbaum and G. Kim. (2008) Subinhibitory Concentrations of Azithromycin Decrease Nontypeable *Haemophilus influenzae* Biofilm Formation and Diminish Established Biofilms. *Antimicrob. Agents Chemother.* 52(1): 137-45.
- 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.
- 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.

Editorial Contributions

- Champion, P.A. and J.D. Shrout (2018) The 24th Annual Midwest Microbial Pathogenesis Meeting. *J. Bacteriol.* 200(11): e00095-18.
- Shrout, J.D. (2013) The Buzz in Chronic Wound Treatment. *Sci. Transl. Med.* 5(174): 174ec36.
- Shrout, J.D. (2013) Giving Lipid a Shot. *Sci. Transl. Med.* 5(170): 170ec20.
- Shrout, J.D. (2013) Solving Pathogen Sudoku. *Sci. Transl. Med.* 5(166): 166ec2.
- Shrout, J.D. (2012) Ear Power: Batteries Now Included. *Sci. Transl. Med.* 4(162): 162ec215.
- Shrout, J.D. (2012) Fungal Pathogens: Getting to “C-u”. *Sci. Transl. Med.* 4(158): 158ec196.
- Shrout, J.D. (2012) Strained Communication. *Sci. Transl. Med.* 4(154): 154ec178.
- Shrout, J.D. (2012) Seeing Double to Recognize TB. *Sci. Transl. Med.* 4(150): 150ec158.
- Shrout, J.D. (2012) Getting Vaccines and Antibiotics “To Go”. *Sci. Transl. Med.* 4(146): 146ec141.
- Shrout, J.D. (2012) Appreciating Staph Support. *Sci. Transl. Med.* 4(142): 142ec121.
- Shrout, J.D. (2012) Seeing an Earful. *Sci. Transl. Med.* 4(138): 138ec104.
- Shrout, J.D. (2012) Coming Unglued: The Potential to Break Apart Biofilms. *Sci. Transl. Med.* 4(134): 134ec85.
- Shrout, J.D. (2012) The Calming Effect of *Escherichia coli*. *Sci. Transl. Med.* 4(130): 130ec66.
- Shrout, J.D. (2012) The Gall of Some Bacteria: Strange Behavior by *Salmonella*. *Sci. Transl. Med.* 4(126): 126ec49.

Patents

Shrout, J.D., A. Timperman, S.W. Lee, and P.W. Bohn. Tunable Attribute Precision Screening Platform (TAPS). Patent Pending: PCT/US17/43912.

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

“An engineer turned microbiologist: Why I love to research bacteria, and some things I have learned...” Bethel University. (virtual visit) October 30, 2020, Mishawaka, IN, U.S.A.

“The complexity of behavior exhibited by bacteria moving from here to there” Wayne State University. (virtual visit) September 14, 2020, Detroit, MI, U.S.A.

“The Complexity of Behavior Exhibited by Bacteria Just Hanging Out in Their Own Backyard” 7th Annual Advanced Diagnostics & Therapeutics (AD&T) Symposium: Extreme Diagnostics, March 6, 2020, Notre Dame, IN, U.S.A.

“Coordinated responses to environmental signals by *Pseudomonas aeruginosa* swarm communities” 25th Midwest Microbial Pathogenesis Meeting, September 28-30, 2018, Iowa City, IA, U.S.A.

“Coordinated responses and signaling patterns of *Pseudomonas aeruginosa* swarm communities” Michigan State University. October 3, 2017, East Lansing, MI, U.S.A.

“Coordinated responses and signaling patterns of *Pseudomonas aeruginosa* swarm communities” McMaster University. August 29, 2017, Hamilton, Ontario, CANADA.

“Are we there yet? Surface exploration behavior of *Pseudomonas aeruginosa*” The Ohio State University. June 14, 2016, Columbus, OH, U.S.A.

“Population-dependent roles of type IV pili exhibited during *Pseudomonas aeruginosa* surface motility” University of Copenhagen. June 29, 2015, Copenhagen, DENMARK.

“Population-dependent roles of type IV pili exhibited during *Pseudomonas aeruginosa* surface motility” Biozentrum-University of Basel. June 3, 2015, Basel, SWITZERLAND.

“Population-dependent roles of type IV pili exhibited during *Pseudomonas aeruginosa* surface motility” Max Planck Institute for Terrestrial Microbiology and the Phillips University Collaborative Research Center (SFB) 987. April 13, 2015, Marburg, GERMANY.

“Population-dependent roles of type IV pili exhibited during surface motility for the bacterium *Pseudomonas aeruginosa*” University of Binghamton. October 10, 2014, Binghamton, NY, U.S.A.

“Population-dependent roles of type IV pili exhibited during surface motility for the bacterium *Pseudomonas aeruginosa*” Genetics, Cellular and Molecular Sciences Training Grant Symposium-Indiana University. June 5, 2014, Bloomington, IN, U.S.A. (Student invited speaker)

“Surface motility and group behavior of *Pseudomonas aeruginosa* and *Myxococcus xanthus*” The Chicago Cytoskeleton Meeting. September 27, 2013, Chicago, IL, U.S.A.

"The bacterium *Pseudomonas aeruginosa* generates high density waves to optimally swarm over surfaces" Workshop on the Physics of Bacterial Communities—jointly held by the Notre Dame Interdisciplinary Center for the Study of Biocomplexity and Argonne National Laboratory. June 11, 2012, Chicago, IL, U.S.A.

"Discerning Surface Motility of *Pseudomonas aeruginosa*" University of California-San Francisco. October 18, 2011, San Francisco, CA, U.S.A.

"Discerning Surface Motility Behavior of *Pseudomonas aeruginosa*" University of Michigan. September 8, 2011, Ann Arbor, MI, U.S.A.

"Discerning Surface Motility of *Pseudomonas aeruginosa*" Indiana University-Bloomington. October 12, 2010, Bloomington, IN, U.S.A.

"Discerning Coordinated Surface Motility of *Pseudomonas aeruginosa*" Indiana University School of Medicine. August 16, 2010, Indianapolis, IN, U.S.A.

"Understanding a different kind of stimulus package—the contribution of environment, cell-cell signaling, and motility on bacterial biofilm development" Columbia University. January 22, 2010, New York, NY, U.S.A.

"Understanding how bacteria coordinate as communities—the contribution of environmental sensing, cell-cell signaling, and motility on developing biofilms" Carnegie Mellon University. September 11, 2009, Pittsburgh, PA, U.S.A.

"Importance and control of swarm motility by *Pseudomonas aeruginosa*." University of Illinois—Urbana/Champaign. November 12, 2008, Urbana, IL, U.S.A.

"Do these bacteria know what they're doing?—Surface and community sensing during biofilm development." Northwestern University. November 7, 2008, Evanston, IL, U.S.A.

"Do these bacteria know what they're doing?—Surface and community sensing during biofilm development." Southern Great Lakes Industrial Microbiology Meeting. October 25, 2008, Chicago, IL, U.S.A.

"The contribution of AHL quorum sensing to *Pseudomonas aeruginosa* biofilm formation, surface interaction, and swarm motility." University of Wisconsin-Milwaukee. April 4, 2008, Milwaukee, WI, U.S.A.

"Do these bacteria know what they're doing?—Surface and community sensing during biofilm development." Marquette University. April 3, 2008, Milwaukee, WI, U.S.A.

"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, ID, U.S.A.

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

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

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

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

Abstracts and other Publications

Madukoma, C.S. and J.D. ShROUT “Type IV Pili-mediated motility of *Pseudomonas aeruginosa*” Bacterial Locomotion and Signal Transduction (BLAST) XVI, January 17-22, 2021 (held virtually).

Nallathamby, P., J. Hopf, M. Waters, V. Kalwajtyś, J. ShROUT, S. Lee, F. Fields “Phage-Mimicking, Broad-Spectrum Antibacterial Nanoparticles” 11th World Biomaterials Congress 2020 (held virtually).

Weaver, A.A., M. Klaassen, N. Hasan, R.R. Colwell, and J.D. ShROUT “Prosthetic Joint Infections Present Diverse Microbial Communities, Unique from Healthy Human Microbiomes” 26th Midwest Microbial Pathogenesis Meeting, September 20-22, 2019, Toledo, OH, U.S.A.

Madukoma, C.S., N. Morales Soto, A.E. Mattingly, S.W. Lee, and J.D. ShROUT “Surface motility, clustering, and rapid transitional behavior of *Pseudomonas aeruginosa*” 26th Midwest Microbial Pathogenesis Meeting, September 20-22, 2019, Toledo, OH, U.S.A.

Cao, T., J. Jia, H. Do, N. Morales-Soto, J. Ellis, J. Sweedler, J. ShROUT, P. Bohn “Multiscale spatiotemporal signaling in microbial communities” Abstracts of Papers of the American Chemical Society, vol. 257, ACS Spring 2019 National Meeting, March 31-April 4, 2019, Orlando, FL, U.S.A.

Ellis, J.F., J. Jia, N. Morales-Soto, E. Neumann, J. ShROUT, P. Bohn, and J. Sweedler “Chemical Imaging of Bacteria Biofilms Cultivated on Mucin-modified Patterns” Pittcon 2019, March 17-21, 2019, Philadelphia, PA, U.S.A.

Cao, T., N. Morales-Soto, J. Jia, H. Do, N.F. Baig, S.J.B. Dunham, J. Ellis, J.V. Sweedler, J.D. ShROUT, P.W. Bohn “Spatiotemporal dynamics of molecular messaging in bacterial co-cultures studied by multimodal chemical imaging” SPIE Diagnosis and Treatment of Infections and Inflammatory Diseases II, February 2-7, 2019, San Francisco, CA, U.S.A.

Madukoma, C.S., N. Morales-Soto, S.W. Lee, and J.D. ShROUT “Snapping: A Long Range, Type IV Pili-dependent, Group Motility of *Pseudomonas aeruginosa*” Bacterial Locomotion and Signal Transduction (BLAST) XV, January 20-25, 2019, New Orleans, LA, U.S.A.

Morales-Soto, N., S.J.B. Dunham, N.F. Baig, J.F. Ellis, C.S. Madukoma, P.W. Bohn, J.V. Sweedler, and J.D. ShROUT “Spatially-dependent quinolone signaling responses to antibiotics during *Pseudomonas aeruginosa* swarming” The 2018 Molecular Genetics of Bacteria and Phages Meeting, August 6-10, 2018, Madison, WI, U.S.A.

Cao, T., N. Morales-Soto, K.M. Kramer, N.F. Baig, J.D. ShROUT and P.W. Bohn “*In Situ* Chemical Characterization of the Motile to Sessile Transition of *Pseudomonas aeruginosa* Communities” 73rd International Symposium on Molecular Spectroscopy, June 18-22, 2018, Champaign-Urbana, IL, U.S.A.

Choe, K., S.J.B. Dunham, S. Lozano, J.F. Ellis, N.F. Baig, T. Cao, N. Morales-Soto, J.D. ShROUT, P.W. Bohn, and J.V. Sweedler “Identification and characterization of *Pseudomonas aeruginosa* metabolites produced during intraspecific interactions” 66th Conference on Mass Spectrometry and Allied Topics, June 3-7, 2018, San Diego, CA, U.S.A.

Brady, C., D. Chen, A. Dimkovikj, J. Shuttleworth, J. ShROUT and A. Timperman “Development of a microfluidic tunable attribute precision screening (TAPS) antimicrobial system for characterization of

bacterial stress” 255th American Chemical Society National Meeting And Exposition, March 18-22, 2018, New Orleans, LA, U.S.A.

Dunham, S.J.B., N. Morales-Soto, N.F. Baig, J.F. Ellis, P.W. Bohn, J.D. Shrout, and J.V. Sweedler “C₆₀-SIMS imaging of *Pseudomonas aeruginosa*’s biochemical response to aminoglycoside antibiotics” 21st International Conference on Secondary Ion Mass Spectrometry, September 10-15, 2017, Krakow, POLAND.

Dunham, S.J.B., K. Choe, N.F. Baig, J.F. Ellis, N. Morales-Soto, J.D. Shrout, P.W. Bohn, and J.V. Sweedler “Chemotypical differentiation in *Pseudomonas aeruginosa* microbial communities revealed through C₆₀-SIMS imaging” 21st International Conference on Secondary Ion Mass Spectrometry, September 10-15, 2017, Krakow, POLAND.

Ellis, J.F., S.J.B Dunham, S.J.B., N.F. Baig, N. Morales-Soto, J.D. Shrout, P.W. Bohn, and J.V. Sweedler “Evaluation and Mitigation of Ion Suppression in Biomolecular Secondary Ion Mass Spectrometry Imaging” 21st International Conference on Secondary Ion Mass Spectrometry, September 10-15, 2017, Krakow, POLAND.

Morales-Soto, N., S.J.B. Dunham, N.F. Baig, J.F. Ellis, C.S. Madukoma, P.W. Bohn, J.V. Sweedler, and J.D. Shrout “Antibiotic stress induces spatially-dependent variations in 2-alkyl- 4(1H)-quinolone production in *Pseudomonas aeruginosa* swarming communities” 24th Midwest Microbial Pathogenesis Meeting, August 25-27, 2017, Notre Dame, IN, U.S.A.

Morales-Soto, N., K.M. Kramer, J.H. Myers, and J.D. Shrout “Media composition results in reversal of the mucoid non-motile phenotype of the *Pseudomonas aeruginosa* clinical strain FRD1” 24th Midwest Microbial Pathogenesis Meeting, August 25-27, 2017, Notre Dame, IN, U.S.A.

Weaver, A.A., M. Klaassen, N. Hasan, R.R. Colwell, and J.D. Shrout “Complex microbial communities relevant to Prosthetic Joint Infections” 24th Midwest Microbial Pathogenesis Meeting, August 25-27, 2017, Notre Dame, IN, U.S.A.

Mattingly, A.E., N. Kamatkar, and J.D. Shrout “Effects of carbon source variation and the phosphodiesterase *dipA* on flagella-mediated motility in *Pseudomonas aeruginosa*” 24th Midwest Microbial Pathogenesis Meeting, August 25-27, 2017, Notre Dame, IN, U.S.A.

Madukoma, C.S., A. Dimkovikj, J. Chen, P.Liang, D. Chen, and J.D. Shrout “Quantification of *Pseudomonas aeruginosa* Cell Behavior During Early Stages of Swarming” 24th Midwest Microbial Pathogenesis Meeting, August 25-27, 2017, Notre Dame, IN, U.S.A.

Dimkovikj, A., D. Chen, A. Lopez, C. Brady, J. Shuttleworth, A. Timperman, and J.D. Shrout “Examining the influence of the nutrient environment on antibiotic susceptibility of *Pseudomonas aeruginosa*” 24th Midwest Microbial Pathogenesis Meeting, August 25-27, 2017, Notre Dame, IN, U.S.A.

Hopf J., P.D. Nallathamby, J. Schiltz, A.A. Weaver, D. Balkin, and J.D. Shrout “Development of nanoparticle-based antimicrobial surfactants for orthopedic implants and surgical instruments” 24th Midwest Microbial Pathogenesis Meeting, August 25-27, 2017, Notre Dame, IN, U.S.A.

Morales-Soto, N., S.J.B. Dunham, N.F. Baig, J.F. Ellis, C.S. Madukoma, P.W. Bohn, J.V. Sweedler, and J.D. Shrout “Multimodal physiochemical characterization of *Pseudomonas aeruginosa* PQS responses in swarming communities” The 2017 Molecular Genetics of Bacteria and Phages Meeting, August 6-11, 2013, Madison, WI, U.S.A.

Dunham, S.J.B., J.F. Ellis, N.F. Baig, N. Morales-Soto, J.D. Shrout, P.W. Bohn, and J.V. Sweedler “Quantitative chemical imaging of chemically communicating microbial communities using cluster-secondary ion mass spectrometry” 65th Conference on Mass Spectrometry and Allied Topics, June 4-8, 2017, Indianapolis, IN, U.S.A.

Weaver, A.A., M. Klaassen, N. Hasan, R.R. Colwell, and J.D. Shrout “Microbial Populations and the Interactions that Shape Prosthetic Joint Infections Association for Clinical and Translational Science (ACTS) 2017, April 19-21, 2017, Washington, DC, U.S.A.

Mattingly, A.E. and J.D. Shrout “Effects of Carbon Source Variation and the Phosphodiesterase DipA on Flagella-Mediated Motility In *Pseudomonas aeruginosa*” Bacterial Locomotion and Signal Transduction (BLAST) XIV, January 15-20, 2017, New Orleans, LA, U.S.A.

S.J.B. Dunham, J.F. Ellis, N. Morales-Soto, N.F. Baig, P.W. Bohn, J.D. Shrout, and J.V. Sweedler “Revealing the spatiochemical response of *Pseudomonas aeruginosa* to antibiotic treatment via secondary ion mass spectrometry imaging” 2016 Turkey Run Analytical Chemistry Conference, October 28-29, 2016, Marshall, IN, U.S.A.

Morales-Soto, N., S.J.B. Dunham, N.F. Baig, P.W. Bohn, J.V. Sweedler, and J.D. Shrout “Multimodal physiochemical characterization of *Pseudomonas aeruginosa* surface-attached communities” 23rd Midwest Microbial Pathogenesis Meeting, September 23-25, 2016, Urbana, IL, U.S.A.

Weaver, A., M. Klaassen, N. Hasan, R. Colwell, and J. Shrout “Microbial Interactions Associated With Prosthetic Joint Infections” Indiana Clinical and Translational Sciences Institute (CTSI) 8th Annual Meeting, September 23, 2016, Indianapolis, IN, U.S.A.

Baig, N.F., S.J.B. Dunham, S. Poliseti, N. Morales-Soto, J.V. Sweedler, J.D. Shrout, and P.W. Bohn “Molecular Imaging of Chemical Communicating Communities of the Opportunistic Human Pathogen *Pseudomonas aeruginosa*” SciX 2016: The 43rd Annual North American Meeting of the Federation of Analytical Chemistry and Spectroscopy Societies (FACSS), September 18-23, 2016, Minneapolis, MN, U.S.A.

Baig, N.F., S. Poliseti, S.J.B. Dunham, N. Morales-Soto, J.D. Shrout, J.V. Sweedler, and P.W. Bohn “Label-free Molecular Imaging of Bacterial Communities of the Opportunistic Pathogen *Pseudomonas aeruginosa*” SPIE Optics and Photonics, August 28- September 1, 2016, San Diego, CA, U.S.A.

S.J.B. Dunham, K. Ko, N.F. Baig, N. Morales-Soto, T.C. Comi, B. Li, J.F. Ellis, J.D. Shrout, P.W. Bohn, J.V. Sweedler “Integrating Mass Spectrometry Imaging with Multiple Microscopy Modalities for Enhanced Spatiochemical Characterization of Dynamic Microbial Communities” 64th Conference on Mass Spectrometry and Allied Topics, June 5-9, 2016, San Antonio, TX, U.S.A.

Baig, N.F., S. Poliseti, N. Morales-Soto, S.J.B. Dunham, J.V. Sweedler, J.D. Shrout, and P.W. Bohn “Correlated Raman and Mass Spectrometric Chemical Imaging of Multiscale Spatiotemporal Signaling in Microbial Communities” Pittcon 2016, March 7 – 10, 2016, Atlanta, GA, U.S.A.

Morales-Soto, N., N.F. Baig, S.J.B. Dunham, S.J.B., P.W. Bohn, J.V. Sweedler, and J.D. Shrout “Correlated in-situ characterization of quorum sensing signals important to early stages of *Pseudomonas aeruginosa* biofilm development” 7th ASM Conference on Biofilms, October 24-29, 2015, Chicago, IL, U.S.A.

Anyan, M., A. Amiri, M. Alber, and J.D. Shrout “Influence of type IV pili passive action during *Pseudomonas aeruginosa* swarm motility”. 7th ASM Conference on Biofilms, October 24-29, 2015, Chicago, IL, U.S.A.

Weaver, A.A. and J.D. Shrouf "The Effects of Interspecies Competition on *Pseudomonas aeruginosa* Swarming Behavior". 7th ASM Conference on Biofilms, October 24-29, 2015, Chicago, IL, U.S.A.

Mattingly, A., N. Kamatkar, and J.D. Shrouf "Ability of tricarboxylic acid cycle precursors and intermediates to promote rhamnolipid-independent swarm motility of *Pseudomonas aeruginosa*". 7th ASM Conference on Biofilms, October 24-29, 2015, Chicago, IL, U.S.A.

Morales-Soto, N., N.F. Baig, S.J.B. Dunham, S.J.B., P.W. Bohn, J.V. Sweedler, and J.D. Shrouf "In-situ metabolite and biological characterization of *Pseudomonas aeruginosa* swarming in response to environmental stimuli" ASM Conference on Pseudomonas, September 8-12, 2015, Washington, D.C., U.S.A.

Weaver, A.A. and J.D. Shrouf "Impact of *Staphylococcus aureus* and *Pseudomonas aeruginosa* interactions on *Pseudomonas aeruginosa* swarming" ASM Conference on Pseudomonas, September 8-12, 2015, Washington, D.C., U.S.A.

Weaver, A.A. and J.D. Shrouf "The Effects of Interspecies Competition on *Pseudomonas aeruginosa* Swarming Behavior" 22nd Midwest Microbial Pathogenesis Meeting, August 28-30, 2015, Indianapolis, IN, U.S.A.

Mattingly, A. and J. Shrouf "Ability of tricarboxylic acid cycle precursors and intermediates to promote rhamnolipid-independent swarm motility of *Pseudomonas aeruginosa*" The 2015 Molecular Genetics of Bacteria and Phages Meeting, August 4-8, 2015, Madison, WI, U.S.A.

Anyan, M., A. Amiri, M. Alber, and J. Shrouf "Population-dependent action of type IV pili utilized during *Pseudomonas aeruginosa* swarm motility" The 2015 Molecular Genetics of Bacteria and Phages Meeting, August 4-8, 2015, Madison, WI, U.S.A.

Harvey, C.W., C.S. Madukoma, S. Mahserejian, F. Pancaldi, M. Alber, J.D. Shrouf "Polarity and motility is reset during *Myxococcus xanthus* cell division" 42nd International Conference of the Biology of the Myxobacteria, July 12-15, 2015, Estes Park, CO, U.S.A.

Dunham, S.J.B., N.F. Baig, N. Morales-Soto, E.J. Lanni, J.D. Shrouf, P.W. Bohn, J.V. Sweedler "Monitoring Chemical Communication and Chemotypical Differentiation in *Pseudomonas aeruginosa* Microbial Communities Using Confocal Raman Microscopy and Secondary Ion Mass Spectrometry" 63rd ASMS Conference on Mass Spectrometry & Allied Topics, May 31 - June 4, 2015, St. Louis, MO, U.S.A.

Mahserejian, S., F. Pancaldi, J. Chen, C. Madukoma, J. Shrouf, and M. Alber "Connecting Polarity, Reversal, and Division in *M. xanthus*" 2015 Annual Conference of the Great Lakes Section of the Society for Industrial and Applied Mathematics, May 2, 2015, Grand Rapids, MI, U.S.A.

Dunham, S.J.B., E.J. Lanni, N.F. Baig, R.N. Masyuko, C.M. Driscoll, J.D. Shrouf, P.W. Bohn, J.V. Sweedler "Combining Secondary Ion Mass Spectrometry, Matrix Assisted Laser Desorption Ionization Mass Spectrometry, and Electron Microscopy for Characterization of Biofilms with Enhanced Spatio-chemical Information" Pittcon 2015, March 8 - 12, 2015, New Orleans, LA, U.S.A.

Anyan, M.E. and J.D. Shrouf "Increased Tolerance to Heavy Metals Exhibited by Swarming Bacteria" American Geophysical Union Fall Meeting, December 15-19, 2014, San Francisco, CA, U.S.A.

Baig, N.F., S.J.B. Dunham, N. Morales-Soto, J.D. Shrouf, J.V. Sweedler, and P.W. Bohn "Label Free Molecular Imaging of Clinically Relevant, Chemically Communicating Bacterial Communities" Turkey Run 2014 Analytical Chemistry Conference, November 14-15, 2014, Marshall, IN, U.S.A.

Lee, S., J. Romero-Severson, S. Pandeyjoshi, C. Thomas, J. Shrout, M. Pfrender “Beneficial Bacteria are Packaged Inside Viable Orthodox Seeds” 5th ASM Conference on Beneficial Microbes, September 27-30, 2014, Washington, D.C., U.S.A.

Mattingly, A.E., N. Morales-Soto, M.E. Anyan, M. Alber, E. Déziel, D.B. Kearns, and J.D. Shrout “Preparation, and imaging, and analysis of community-level properties of from bacterial swarm plate assays” 21st Midwest Microbial Pathogenesis Meeting, September 12-14, 2014, Chicago, IL, U.S.A.

Philo, S.E., N. Morales-Soto, C. Driscoll, and J.D. Shrout “Classification of divalent cation effects on motility patterns of the bacterium *Pseudomonas aeruginosa*” 21st Midwest Microbial Pathogenesis Meeting, September 12-14, 2014, Chicago, IL, U.S.A.

Masyuko, R.N., E.J. Lanni, C.M. Driscoll, N.F. Baig, S.J. Melton, J.D. Shrout, J.V. Sweedler, J. Morrell-Falvey, M.J. Doktycz and P.W. Bohn “Molecular Imaging of Bacterial Biofilms by Confocal Raman Microscopy” 246th National Meeting of the American Chemical Society, Sept 29-Oct 4, 2013, Milwaukee, WI, U.S.A.

Masyuko, R.N., C.M. Driscoll, E.J. Lanni, J.D. Shrout, J.V. Sweedler and P.W. Bohn “Correlated mass spectrometric and Raman imaging of chemically communicating microbial communities” SciX, Sept 8-12, 2013, Indianapolis, IN, U.S.A.

Harvey, C., J. Shrout, C. Madukoma, S. Mahserejian, D. Kaiser, and M. Alber “*Myxococcus xanthus* pauses surface motility for cell division and assigns polarity”. The 2013 Molecular Genetics of Bacteria and Phages Meeting, August 6-10, 2013, Madison, WI, U.S.A.

Driscoll, C, N. Morales-Soto, and J. Shrout “The influence of calcium on *Pseudomonas aeruginosa* surface motility” The 2013 Molecular Genetics of Bacteria and Phages Meeting, August 6-10, 2013, Madison, WI, U.S.A.

Anyan, M.E., N. Morales-Soto, C. Harvey, M. Alber, J. D. Shrout “Cell-Cell Interactions and Dynamics during Swarming of *Pseudomonas aeruginosa*” American Society of Microbiology 113th General Meeting. May 18-21, 2013, Denver, CO, U.S.A.

N. Morales-Soto, N.G. Kamatkar, M. Sarna, J.L. DuBois, and J. Shrout “Iron Control of the Rhamnolipid-Independent Swarming Phenotype in *Pseudomonas aeruginosa*” American Society of Microbiology 113th General Meeting. May 18-21, 2013, Denver, CO, U.S.A.

Sarna, M.J. and J.D. Shrout “Identification of Surface-dependent Regulators of Swarm Motility in *Pseudomonas aeruginosa*” American Society of Microbiology 113th General Meeting. May 18-21, 2013, Denver, CO, U.S.A.

Anyan, M., H. Du, O. Kim, Z. Xu, M. Alber, and J. Shrout “Bacterial transitions: optimization of biological and physical factors by *Pseudomonas aeruginosa* during swarming” Bacterial Locomotion and Signal Transduction (BLAST) XII Meeting, January 20-25, 2013, Tucson, AZ, U.S.A.

Lanni, E.J., R. Masyuko, C. Driscoll, P. Bohn, J. Shrout and J.V. Sweedler “Chemical profiling and imaging of bacterial colonies and biofilms with laser desorption ionization (LDI) and secondary ion mass spectrometry (SIMS)” 2012 Turkey Run Analytical Chemistry Conference, November 2-3, 2012, Marshall, IN, U.S.A.

Dehner, C., N. Morales-Soto, R. Behera, E.C. Theil, J. Shrout, P.A. Maurice, J.L. DuBois. “Ferritin and ferrihydrite nanoparticles as iron sources for *Pseudomonas aeruginosa*” 19th Midwest Microbial Pathogenesis Meeting, September 7-9, 2012, Milwaukee, WI, U.S.A.

Harvey, C.W., C. Madukoma, I.S. Aronson, D. Kaiser, M.S. Alber, and J.D. ShROUT "Cell Division in *Myxococcus xanthus* requires stalling of gliding motility" 39th International Conference on the Biology of Myxobacteria, July 29-August 1, 2012, Chicago, IL, U.S.A.

Masyuko, R., P.W. Bohn, C. Driscoll, J. ShROUT, and J.V. Sweedler. "In Situ Correlated Molecular Imaging of Chemically Communicating Microbial Communities" US Department of Energy Genomic Science Meeting, February 26-29, 2012, Bethesda, MD, U.S.A.

Du, H., Z. Xu, M. Anyan, O. Kim, W.M. Leevy, J.D. ShROUT, J.D., and M. Alber. "Pseudomonas Aeruginosa Cells Alter Environment to Efficiently Colonize Surfaces using Fluid Dynamics" ASME 2012 Summer Bioengineering Conference, June 20-23, 2012, Farajdo, PUERTO RICO.

Kamatkar, N.G., M.J. Sarna, and J.D. ShROUT. "Limiting *Pseudomonas aeruginosa* swarming by Surface Impairment of AHL Quorum Sensing" ASM Conference on Cell-Cell Communication in Bacteria, November 6-9, 2011, Miami, FL, U.S.A.

ShROUT, J.D. "Surface Characteristics Influence Quorum Sensing and Swarming of *Pseudomonas aeruginosa*" The 2011 Molecular Genetics of Bacteria and Phages Meeting, August 2-7, 2011, Madison, WI, U.S.A.

Gibiansky, M.L., J.C. Conrad, D.A. Motto, G.C.L. Wong, and J.D. ShROUT. "Discerning surface motility patterns important to biofilm formation" EUROBIOPILMS 2011 - Second European Congress on Microbial Biofilms, July 6-8, 2011, Copenhagen, DENMARK.

Wolfe, L.G., A.K. Staudt, and J.D. ShROUT "Yield and Characterization of ex planta EPS Produced by *Rhizobium tropici*" American Society of Microbiology 110th General Meeting. May 23-27, 2010, San Diego, CA, U.S.A.

Motto, D.A., M. L. Gibiansky, J. C. Conrad, V. D. Gordon, M. A. Mathewson, G. C. Wong and J.D. ShROUT "Carbon source affects multiple surface motility aspects of *Pseudomonas aeruginosa*" 5th ASM Conference on Biofilms. November 15-19, 2009, Cancun, MEXICO.

Gordon, V.D., J.D. ShROUT, I. Smalyukh, J. Butler, K.M. Colvin, G. Spalding, M.R. Parsek, G.C.L. Wong "Laser trapping directly probes inter-bacterial interactions and provides a platform for systematic study of spatiotemporal dependencies of quorum sensing and motility" 5th ASM Conference on Biofilms. November 15-19, 2009, Cancun, MEXICO.

Conrad, J.C., F. Jin, V. D. Gordon, M. L. Gibiansky, D. A. Motto, M. A. Mathewson, W. G. Stopka, D. C. Zelasko, J. D. ShROUT, G. C. Wong "High-throughput biometric analysis of *Pseudomonas aeruginosa* flagella-based surface motility" 5th ASM Conference on Biofilms. November 15-19, 2009, Cancun, MEXICO.

M. L. Gibiansky, Conrad, J.C., F. Jin, V. D. Gordon, F. Jin, D. A. Motto, M. A. Mathewson, W. G. Stopka, D. C. Zelasko, J. D. ShROUT, G. C. Wong "High-throughput biometrics for bacterial motility" 5th ASM Conference on Biofilms. November 15-19, 2009, Cancun, MEXICO.

ShROUT, J.D. "Surface factors influence swarm motility of *Pseudomonas aeruginosa*" American Chemistry Society Surface and Colloids Meeting. June 14-19, 2009, New York, NY, U.S.A.

Staudt, A.K., L.G. Wolfe, and J.D. ShROUT "Identification of Environmental and Structural Factors Critical to the Production of Exopolysaccharides by *Rhizobium tropici*" American Society of Microbiology 109th General Meeting. May 17-21, 2009, Philadelphia, PA, U.S.A.

Motto, D.A., N. G. Kamatkar, J. L. Hewitt, M. R. Parsek, and J. D. Shrout "Surface factors influence swarm motility of *Pseudomonas aeruginosa*" American Society of Microbiology 109th General Meeting. May 17-21, 2009, Philadelphia, PA, U.S.A.

Aruguete, D.M., J.S. Guest, J.D. Shrout, N.G. Love, and M.F. Hochella, Jr. "Bacterial Physiology and Viability in the Presence of Quantum Dot Nanoparticles: Towards an Environmental Perspective." American Geophysical Society Fall Meeting. December 10-14, 2007, San Francisco, CA, U.S.A.

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, TX, 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." American Society of Microbiology 105th General Meeting. June 5-9, 2005, Atlanta, GA, 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, CA, 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, CA, U.S.A.

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., B. Oh, G. F. Parkin, and P. J. Alvarez "Enhanced RDX Degradation by Dissimilatory Iron-Reducing Bacteria in Flow-Through Fe(0) Columns." American 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, IA, 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.

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

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.

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, IA, 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 Research Center. May 24-26, 1999, St. Louis, MO, U.S.A.

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.

Professional Services

Editorial Board Member, *Journal of Bacteriology* (2020-2022)

Editorial Board Member, *Applied and Environmental Microbiology* (2013-2021)

Core Group/Session Moderator

—NSF Biofilm Mechanical Properties Workshop (organized by Robert Nerenberg and Paul Stoodley). April 22-23, 2018, Notre Dame, IN, USA

Co-Chair

—24th Annual Midwest Microbial Pathogenesis Conference (MMPC). August 25-27, 2017, Notre Dame, IN, USA

Editorial Board Member (Reviews), *Frontiers in Microbiology* (2015-2017)

Organizing Committee/ Session Moderator

—IWA-Microbial Ecology and Water Engineering (MEWE) conference 2013. July 7-10, 2013, Ann Arbor, MI, USA

Associate Scientific Advisor, *Science Translational Medicine* (2012-2013)

Scientific Committee member

—WEF/IWA Biofilm Reactor Technology Conference 2010 (Portland, OR, USA)

Session chair

—Biofilm Development Session at the 5th ASM Conference on Biofilms. November 15-19, 2009, Cancun, MEXICO.

ad hoc Reviewer

—*BMC Genomics* (2021)

—*Proceedings of the National Academy of Sciences USA* (2019-2020)

—*PLoS Pathogens* (2011, 2013, 2014, 2019, 2020)

—*PLOS Computational Biology* (2017, 2020)

—*Physical Biology* (2020)

—*ACS Infectious Disease* (2019)

—*Microbial Ecology* (2019)

—*Molecular Microbiology* (2018, 2019)

—*Journal of Medical Microbiology* (2019)

—*mBio* (2013, 2014, 2018)

—*Communications Biology* (2018)

—*International Society for Microbial Ecology Journal* (2010, 2015, 2018, 2019, 2020)

—*Journal of Bacteriology* (2009, 2012, 2014, 2016, 2018, 2019)

—*Environmental Science and Technology* (1998-2016, 2018-2021)

—*mSphere* (2017, 2020, 2021)

—*Microbiology* (2011, 2015-2017)

—*Frontiers in Microbiology* (2016-2019)

—*Cellular and Molecular Life Sciences* (2016-2017)

—*Biophysical Journal* (2016, 2018)

—*Journal of Proteome Research* (2016)

—*Environmental Microbiology Reports* (2016, 2019)

—*Science* (2015, 2016)

—*Science Advances* (2015, 2016, 2020)

—*PLoS One* (2015, 2021)

—*Journal of Molecular Biology* (2015)

—*FEMS Microbial Ecology* (2010, 2014, 2015)

—*Journal for the Royal Society Interface* (2014, 2020)

—*PeerJ* (2014)

—*Scientific Reports* (2013-2014, 2016-2017)

—*Environmental Microbiology* (2013, 2020)

—*Antonie van Leeuwenhoek* (2013)

—*Analytical Chemistry* (2013)

- Cell Reports* (2013)
- Applied and Environmental Microbiology* (2010-2012)
- Water Research* (2005, 2014)
- Bioresource technology* (2012)
- Journal of Applied Microbiology* (2009-2010)
- FEMS Microbiology Letters* (2010)
- Biotechnology and Bioengineering* (2010)
- Biofouling* (2009, 2013)
- Trends in Microbiology* (2008, 2009)
- Nature Protocols* (2008)
- Langmuir* (2008)
- Journal of Environmental Engineering* (2008)
- Applied Microbiology and Biotechnology* (2007)
- Applied Microbiology* (2007)
- Biodegradation* (2005)
- Journal of Hazardous Materials* (2005)
- Journal of Chemical Technology and Biotechnology* (2005)

Proposal Reviewer

- Office of Independent Research Fund Denmark (DFF) (2021)
- Indiana Traumatic Spinal Cord and Brain Injury Research Fund (ITSCBIRF) Panel (2021)
- Natural Sciences and Engineering Research Council of Canada (NSERC) (2020, 2021)
- Center for the Advancement of Science in Space/International Space Station (CASIS/ISS) U.S. National Laboratory (2018)
- Biotechnology and Biological Sciences Research Council (BBSRC) of the UK (2019)
- Israel Science Foundation (ISF) (2016-2017, 2019)
- Belgian Fund for Scientific Research (FNRS) (2012-2021)
- National Science Foundation (NSF) Mail Reviewer (2016-2017, 2019, 2021)
- U.S. Army Engineering Research Development Center (ERDC) (2010, 2012, 2019)
- Indiana CTSI Collaboration in Translational Research Review Panel (2018, 2020)
- European Research Council-Life Sciences (2018)
- Fonds de recherche du Québec – Nature et technologies (2018)
- United States - Israel Binational Science Foundation (BSF) (2017)
- National Science Center, Poland (NCN) (2014, 2018, 2020)
- National Aeronautics and Space Administration (NASA) (2013)
- U.S. Department of Defense-Defense Threat Reduction Agency (DTRA) (2011)
- Dutch Technology Foundation STW (2010)
- National Science Foundation (NSF) Panelist (2009)
- AAAS-KACST Grant Program (2008)
- U.S. Army Research Office (2006)
- NIWR-USGS National Competitive Grants Program (2005)

High School Science Fair Mentor (2012-2016)

External Advisor—Iowa City High School Science Club (2005)

Professional Societies

American Association for the Advancement of Science (since 2014)
American Society of Microbiology (since 2002)

University Service

President's Faculty Advisory Committee for Campus Reopening (during COVID pandemic) (2020-pres)
University of Notre Dame Committee on Intellectual Property (2014-2017, 2020-2023)
Eck Institute for Global Health Faculty Council (2015-2017)
University of Notre Dame College of Science Biophysics Committee (2014-2015)
University of Notre Dame Academic Council (2013-2014, 2015-2016)
University of Notre Dame Faculty Senate (2012-2016)

Research Advisees

Abigail Weaver, Ph.D. (Post-doc 2014-2020); Indiana CTSI Post-doctoral fellow (2016-2018)
Juliane Hopf, Ph.D. (Post-doc 2016-2018)
Nydia Morales Soto, Ph.D. (Post-doc 2011-2016)

Anne Mattingly, Ph.D. Civil & Env Engineering, 2018
Morgen Anyan, Ph.D. Civil & Env Engineering, 2015 (2014-2015 CEST Bayer Predoctoral Research Fellow)
Callan Driscoll, Ph.D. Civil & Env Engineering, 2015 (2019-2021 Eck Inst for Global Health Fellow)
Geliang (Jack) Song, Ph.D. Physics 2013 (co-advised with Bruce Bunker)

Aleksandar Dimkovikj, M.S. Civil and Environmental Engineering, 2019
Nachiket Kamatkar, M.S. Biotechnology, 2012
Jessica Hewitt, M.S. Biotechnology, 2010
Ann Staudt, M.S. Civil Engineering, 2009

Alejandra Osorlo, B.S. Science Pre-professional/Latino Studies, 2021
Matthew Gaborek, B.S. Biology/Theology, 2021
Kristin Kramer, B.S. Biology, 2019
Sarah Philo, B.S. Biology (Honors), 2016
Emily Palmer, B.S. Environmental Engineering 2014 (Honors Thesis; Claire Booth Luce Fellow)
Matthew Sarna, B.S. Biology, 2013 (Departmental Undergraduate Research Award)
Catherine Stecyk, B.S. Biology, 2010 (Fulbright Recipient)
Dominick Motto, B.S. Biology, 2010

Professional Certifications and 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
Engineer in Training—State of Illinois, 1994

Continuing Education and Special Training

FBI Academic Biosecurity Workshop (FBI-Notre Dame, IN) September 18, 2012.

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

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

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