

Gerben John Zylstra

Rutgers, The State University of New Jersey
School of Environmental and Biological Sciences
Department of Biochemistry and Microbiology
Foran Hall, 59 Dudley Road, New Brunswick, NJ 08901-8520
Office: (848) 932-6298 Email: zylstra@sebs.rutgers.edu

Appointments:

- 2025-Pres. Associate Dean of Graduate Education, School of Environmental & Biological Sciences, Rutgers University
- 2011-25 Director, Microbial Biology Graduate Program, Rutgers University
- 2010-Pres. Distinguished Professor, Department of Biochemistry and Microbiology, Rutgers University
- 2003-08 Director, Biotechnology Center for Agriculture and the Environment, Rutgers U.
- 2001-03 Acting Director, Biotechnology Center for Agriculture and the Environment
- 2001-10 Professor of Biochemistry and Microbiology, Biotechnology Center for Agriculture and the Environment, Rutgers University
- 1996-01 Associate Professor of Biochemistry and Microbiology, Biotechnology Center for Agriculture and the Environment, Rutgers University
- 1995-10 Director, School of Environmental and Biological Sciences Biotech Core Facility, Rutgers University
- 1990-96 Assistant Professor of Biochemistry and Microbiology, Biotechnology Center for Agriculture and the Environment, Rutgers University
- 1990-10 Resident Member, Biotechnology Center for Agriculture and the Environment, Rutgers University
- 1988-90 Postdoctoral Research Associate, Department of Microbiology, University of Iowa, Iowa City (Advisor: D. T. Gibson)
- 1987-88 Postdoctoral Research Associate, Department of Microbiology, University of Texas at Austin (Advisor: D. T. Gibson)

Education:

- 1981-87 Ph.D., Cellular and Molecular Biology, The University of Michigan Medical School, Ann Arbor (Advisor: R. H. Olsen)
- 1977-81 B.S., Biology, Calvin College, Grand Rapids, MI

Publications:

- Phan J, Klein D, Nanda V, Zylstra G, Yee N. 2025. Genetic identification of the selenate reductase in *Enterobacter cloacae* SLD1a-1. Appl Environ Microbiol e0179625. doi:10.1128/aem.01796-25.
- Ivanovski I, Eleya S, Zylstra GJ. 2025. Analysis of benzoate 1,2-dioxygenase identifies shared electron transfer components with DxnA1A2 in *Rhizorhabdus wittichii* RW1. J Basic Microbiol e70061. DOI: 10.1002/jobm.70061.
- Al-Shiti AY, Faisal RM, Salih TS, Zylstra GJ. 2025. Draft genome sequence of the naphthalene-degrading bacterium *Rhodococcus pyridinivorans* RA1 isolated from an

- industrial soil sample in Mosul, Iraq. *Microbiol Resour Announc* 14:e0061124. DOI: 10.1128/mra.00611-24.
- Mohammed NJ, Zylstra GJ, Mutter TY. 2025. Green synthesis of hyaluronic acid coated cadmium sulfide nanoparticles with enhanced antibacterial activity. *Discover Materials* 5:225. doi:10.1007/s43939-025-00417-1.
- Qian Y, Yu H, He Q, Fan D, Zylstra GJ, Wang H, Huang X. 2025. A novel trifunctional hydrolase cleaving C-O, C-N, and C-C bonds and its widespread distribution in Proteobacteria and Actinobacteria. *J Hazard Mater* 495:139002. doi:10.1016/j.jhazmat.2025.139002.
- Qian Y, Lai L, Cheng M, Fang H, Fan D, Zylstra GJ, Huang X. 2024. Identification, characterization, and distribution of novel amidase gene *aphA* in sphingomonads conferring resistance to amphenicol antibiotics. *Appl Environ Microbiol* e0151224. doi:10.1128/aem.01512-24.
- Islam DT, Williams MR, Teppen BJ, Johnston CT, Li H, Boyd SA, Zylstra GJ, Fennell DE, Cupples AM, Hashsham SA. 2024. Comprehensive model for predicting toxic equivalents (TEQ) reduction due to dechlorination of polychlorinated dibenzo-p-dioxin and dibenzofurans (PCDD/F congeners). *J Hazard Mater*. 480:135749. doi:10.1016/j.jhazmat.2024.135749.
- Ivanovski I, Zylstra GJ. 2023. Genetic and functional characterization of a salicylate 1-monooxygenase located on an integrative and conjugative element (ICE) in *Pseudomonas stutzeri* AJR13. *J Microbiol*. 61:1025-1032. doi:10.1007/s12275-023-00093-x.
- Al-Fahdawi AM, Mutter TY, Zylstra GJ. 2023. Genotypic identification of hypervirulent *Klebsiella pneumoniae* in Anbar, Iraq. *Malays J Microbiol*. 19:527-534. doi:10.21161/mjm.230269.
- Al-Fahdawi AM, Zylstra GJ, Mutter TY. 2023. Molecular and phenotypic detection of siderophore production by hypervirulent *Klebsiella pneumoniae*. *Journal of University of Anbar for Pure Science (JUAPS)*. 17:26-35. doi:10.37652/juaps.2023.141818.1100.
- Mutter TY, Zylstra GJ, Huang X. 2023. Biotransformation of dioxins by assembling RW1 upper pathway gene cassettes in *Escherichia coli*. *Biodiversitas*. 24:3648-3656. doi:10.13057/biodiv/d240701.
- Qian Y, Cheng M, Lai L, Zhou J, Zylstra GJ, Huang X. 2023. ChlOR, a GMC family oxidoreductase that evolved independently from the actinomycete, confers resistance to amphenicol antibiotics. *Environ Microbiol* doi:10.1111/1462-2920.16493.
- Cheng M, Qian Y, Xing Z, Zylstra GJ, Huang X. 2021. The low-nanomolar 4-nitrobenzoate-responsive repressor PnbX negatively regulates the actinomycete-derived 4-nitrobenzoate-degrading *pnb* locus. *Environ Microbiol* doi:10.1111/1462-2920.15787.
- Mutter TY, Zylstra GJ. 2021. Differential roles of three different upper pathway *meta* ring cleavage product hydrolases in the degradation of dibenzo-*p*-dioxin and dibenzofuran by *Sphingomonas wittichii* RW1. *Appl Environ Microbiol* 87:e01067-21. doi:10.1128/aem.01067-21.
- Mutter TY, Zylstra GJ. 2021. Separate upper pathway ring cleavage dioxygenases are required for growth of *Sphingomonas wittichii* strain RW1 on dibenzofuran and dibenzo-*p*-dioxin. *Appl Environ Microbiol* 87:e02464-20. doi:10.1128/aem.02464-20.

- Almnehlawi HS, Dean RK, Capozzi SL, Rodenburg LA, Zylstra GJ, Fennell DE. 2021. *Agromyces* and *Arthrobacter* isolates from surficial sediments of the Passaic River degrade dibenzofuran, dibenzo-*p*-dioxin and 2-monochlorodibenzo-*p*-dioxin. *Bioremediat J.* doi:10.1080/10889868.2021.18920271-25.
- Pieczenik, G., T. Qi, and G. J. Zylstra. 2020. A strategy for rapidly making a vaccine and treatment for the disease caused by the Wuhan-Corona Virus (WCV). *Med Case Rep Rev* 3. DOI: 10.15761/MCRR.1000140
- Chai, B., T. Tsoi, J. B. Sallach, C. Liu, J. Landgraf, M. Bezdek, G. Zylstra, H. Li, C. T. Johnston, B. J. Teppen, J. R. Cole, S. A. Boyd and J. M. Tiedje. 2020. Bioavailability of clay-adsorbed dioxin to *Sphingomonas wittichii* RW1 and its associated genome-wide shifts in gene expression. *Sci Total Environ* 712: 135525.
- Kim D., K. Y. Choi, M. Yoo, G. J. Zylstra, and E. Kim. 2018. Biotechnological potential of *Rhodococcus* biodegradative pathways. *J Microbiol Biotechnol* 28:1037-1051.
- Stedtfeld, R. D., T. M. Stedtfeld, H. Waseem, M. Fitschen-Brown, X. Guo, B. Chai, M. R. Williams, T. Shook, A. Logan, A. Graham, J. C. Chae, W. J. Sul, J. VanHouten, J. R. Cole, G. J. Zylstra, J. M. Tiedje, B. L. Upham, and S. A. Hashsham. 2017. Isothermal assay targeting class 1 integrase gene for environmental surveillance of antibiotic resistance markers. *J Environ Manage* 198:213-220.
- Ahn, E., K. Y. Choi, B. S. Kang, G. J. Zylstra, D. Kim, and E. Kim. 2017. Salicylate degradation by a cold-adapted *Pseudomonas* sp. *Ann Microbiol* 67:417-424.
- Chai, B., T. V. Tsoi, S. Iwai, C. Liu, J. A. Fish, C. Gu, T. A. Johnson, G. Zylstra, B. J. Teppen, H. Li, S. A. Hashsham, S. A. Boyd, J. R. Cole, and J. M. Tiedje. 2016. *Sphingomonas wittichii* strain RW1 genome-wide gene expression shifts in response to dioxins and clay. *PLoS One* 11:e0157008.
- Ambrose, K. V., Z. Tian, Y. Wang, J. Smith, G. Zylstra, B. Wang, and F. C. Belanger. 2015. Functional characterization of salicylate hydroxylase from the fungal endophyte *Epichloe festucae*. *Nature Sci Rep* 5:10939.
- Masuda, H., Y. Shiwa, H. Yoshikawa, and G. J. Zylstra. 2014. Draft genome sequence of the versatile alkane-degrading bacterium *Aquabacterium* sp. strain NJ1. *Genome Announcements* 2:e01271-14.
- Theisen, J., G. J. Zylstra, and N. Yee. 2013. Genetic evidence for a molybdopterin-containing tellurate reductase. *Appl. Env. Microbiol.* 79:3171-3175.
- Masuda, H., K. McClay, R. J. Steffan, and G. J. Zylstra. 2012. Biodegradation of tetrahydrofuran and 1,4-dioxane by soluble diiron monooxygenase in *Pseudonocardia* sp. strain ENV478. *J. Mol. Microbiol. Biotechnol.* 22:312-316.
- Chang, H. K., G. J. Zylstra, and J.-C. Chae. 2012. Genome sequence of *n*-alkane degrading *Hydrocarboniphaga effusa* strain AP103T (ATCC BAA-332T). *J. Bacteriol.* 194:5120.
- Yoo, M., D. Kim, K. Y. Choi, J.-C. Chae, G. J. Zylstra, and E. Kim. 2012. Draft genome sequence and comparative analysis of the superb aromatic hydrocarbon degrader *Rhodococcus* sp. strain DK17. *J. Bacteriol.* 194:4440.
- Masuda, H., K. McClay, R. J. Steffan, and G. J. Zylstra. 2012. Characterization of three propane-inducible oxygenases in *Mycobacterium* sp. strain ENV421. *Lett. Appl. Microbiol.* 55:175-81.
- Callaghan, A. V., B. E. L. Morris, I. A. C. Pereira, M. J. McInerney, R. N. Austin, J. T. Groves, J.

- J. Kukor, J. M. Suflita, L. Y. Young, G. J. Zylstra, and B. Wawrik. 2012. The genome sequence of *Desulfatibacillum alkenivorans* AK-01: a blueprint for anaerobic alkane oxidation. *Env. Microbiol.* 14:101-13.
- Kim, D., M. Yoo, K. Y. Choi, B. S. Kang, T. K. Kim, S. G. Hong, G. J. Zylstra, and E. Kim. 2011. Differential degradation of bicyclics with aromatic and alicyclic rings by *Rhodococcus* sp. strain DK17. *Appl. Environ. Microbiol.* 77:8280-8287.
- Yoo, M., D. Kim, G. J. Zylstra, B. S. Kang, and E. Kim. 2011. Biphenyl hydroxylation enhanced by an engineered *o*-xylene dioxygenase from *Rhodococcus* sp. strain DK17. *Res. Microbiol.* 162:724-728.
- Atlas, R. M., D. J. Grimes, T. C. Hazen, J. Spain, J. M. Suflita, A. Reid, S. Maloy, C. E. Cerniglia, G. M. King, N. E. Kinner, J. E. Kostka, K. Lee, F. Loeffler, R. C. Prince, P. Sobczyk, R. J. Steffan, A. P. Teske, B. Van Mooy, A. D. Venosa, L. P. Wackett, C. H. Ward, L. Young, and G. J. Zylstra. 2011. *Microbes & Oil Spills FAQ*. American Academy of Microbiology & American Society for Microbiology, Washington, D.C.
- Wawrik, B., T. Doolotkeldieva, D. Kutliev, L. Kerkhof, G. J. Zylstra, and J. J. Kukor. 2011. Bioprospecting uncultured microbial biodiversity, p. 21-40. *In*: B. E. Ponman and J. S. Miller (eds.), *Realizing Nature's Potential: Proceedings of the William L. Brown Symposium Honoring Dr. Gordon Cragg*. Missouri Botanical Garden Press, St. Louis, MO.
- Kim, D., K. Y. Choi, M. Yoo, J. N. Choi, C. H. Lee, G. J. Zylstra, B. S. Kang, and E. Kim. 2010. Benzylic and aryl hydroxylations of *m*-xylene by *o*-xylene dioxygenase from *Rhodococcus* sp. strain DK17. *Appl. Microbiol. Biotech.* 86:1841-1847.
- Kim, D., C. H. Lee, J. N. Choi, K. Y. Choi, G. J. Zylstra, and E. Kim. 2010. Aromatic hydroxylation of indan by the *o*-xylene-degrading *Rhodococcus* sp. strain DK17. *Appl. Environ. Microbiol.* 76:375-377.
- Ni Chadhain, S. and G. J. Zylstra. 2010. Functional Gene Diversity, Biogeography, and Dynamics, p. 2413-2422. *In* K. N. Timmis (ed.), *Handbook of Hydrocarbon and Lipid Microbiology*. Springer Verlag GmbH, Heidelberg.
- Chang, H.-K. and G. J. Zylstra. 2010. Xanthomonads, p. 1805-1811. *In* K. N. Timmis (ed.), *Handbook of Hydrocarbon and Lipid Microbiology*. Springer Verlag GmbH, Heidelberg.
- Chang, H.-K., J. J. Dennis, and G. J. Zylstra. 2009. Involvement of two transport systems and a specific porin in the uptake of phthalate by *Burkholderia* spp. *J. Bacteriol.* 191:4671-4673.
- Sul, W. J., J. Park, J. F. Quensen III, J. L. M. Rodrigues, L. Seliger, T. V. Tsoi, G. J. Zylstra, and J. M. Tiedje. 2009. DNA-stable isotope probing integrated with metagenomics: retrieval of biphenyl dioxygenase genes from PCB-contaminated river sediment. *Appl. Environ. Microbiol.* 75:5501-5506.
- Ahn, Y.-B., J.-C. Chae, G. J. Zylstra, and M. M. Hagglom. 2009. Degradation of phenol via phenylphosphate and carboxylation to 4-hydroxybenzoate by a newly isolated strain of the sulfate-reducing bacterium *Desulfobacterium anilini*. *Appl. Environ. Microbiol.* 75:4248-4253.
- Schuler, L., Y. Jouanneau, S. M. Ni Chadhain, C. Meyer, M. Pouli, G. J. Zylstra, P. Hols, S. N. Agathos. 2009. Characterization of a ring-hydroxylating dioxygenase from phenanthrene-degrading *Sphingomonas* sp. strain LH128 able to oxidize benz[a]anthracene. *Appl. Microbiol. Biotechnol.* 83:465-475.

- Dushenkov, V., J. Akimaliev, K. Buriev, M. A. Lila, Y. Nuraliev, G. Pichkhadze, L. Struwe, J. F. White, G. J. Zylstra, I. Raskin. 2008. The role of the ICBG program in building new pharmaceutical capabilities in Central Asia. *In* Proceedings of the First Congress of Phytotherapist and Phytopharmacologists of Tajikistan. International Institute for the Study of Avicenna Heritage and Pharmacology, Dushanbe, Tajikistan.
- Yoo, M. S. U. Choi, K. Y. Choi, G. H. Yon, J. C. Chae, D. Kim, G. J. Zylstra, and E. Kim. 2008. Trisindoline synthesis and anticancer activity. *Biochem. Biophys. Res. Commun.* 376: 96-99.
- Chang, H.-K., and G. J. Zylstra. 2008. Examination and expansion of the substrate range of *m*-hydroxybenzoate hydroxylase. *Biochem. Biophys. Res. Commun.* 371:149-153.
- Kwon, N.R., J.-C. Chae, K. Y. Choi, M. Yoo, G. J. Zylstra, Y. M. Kim, B. S. Kang, and E. Kim. 2008. Identification of functionally important amino acids in a novel indigo-producing oxygenase from *Rhodococcus* sp. strain T104. *Appl. Microbiol. Biotechnol.* 79:417-422.
- Chae, J.-C., B. Song, G. J. Zylstra. 2008. Identification of genes coding for hydrolytic dehalogenation in the metagenome derived from a denitrifying 4-chlorobenzoate degrading consortium. *FEMS Microbiol. Lett.* 281:203-209.
- Schuler, L., S. M. Ní Chadhain, Y. Jouanneau, C. Meyer, G. J. Zylstra, P. Hols, S. N. Agathos. 2008. Characterization of a novel angular dioxygenase from fluorene-degrading *Sphingomonas* sp. strain LB126. *Appl. Environ. Microbiol.* 74:1050-1057.
- Callaghan, A. V., B. Wawrik, S. Ní Chadhain, L. Y. Young, and G. J. Zylstra. 2008. Anaerobic alkane-degrading strain AK-01 contains two alkylsuccinate synthase genes. *Biochem. Biophys. Res. Commun.* 366:142-148.
- Perry, L. L., and G. J. Zylstra. 2007. Cloning of a gene cluster involved in the catabolism of *p*-nitrophenol by *Arthrobacter* sp. strain JS443 and characterization of the *p*-nitrophenol monooxygenase. *J. Bacteriol.* 189:7563-7572.
- Ní Chadhain, S. M., E. M. Moritz, E. Kim, and G. J. Zylstra. 2007. Identification, cloning, and characterization of a multicomponent biphenyl dioxygenase from *Sphingomonas yanoikuyae* B1. *J. Ind. Microbiol. Biotechnol.* 34:605-613.
- Chae, J.-C., E. Kim, E. Bini, and G. J. Zylstra. 2007. Comparative analysis of the catechol 2,3-dioxygenase gene locus in thermoacidophilic archaeon *Sulfolobus solfataricus* strain 98/2. *Biochem. Biophys. Res. Commun.* 357:815-819.
- Choi, K. Y., D. Kim, J.-C. Chae, G. J. Zylstra, E. Kim. 2007. Requirement of duplicated operons for maximal metabolism of phthalate by *Rhodococcus* sp. strain DK17. *Biochem. Biophys. Res. Commun.* 357:766-771.
- Yano, H., C. E. Garruto, M. Sota, Y. Ohtsubo, Y. Nagata, G. J. Zylstra, P. A. Williams, and M. Tsuda. 2007. Complete sequence determination combined with analysis of transposition/site-specific recombination events to explain genetic organization of the IncP-7 TOL plasmid pWW53 and related mobile genetic elements. *J. Mol. Biol.* 25:11-26.
- Poulain, A. J., S. M. Ní Chadhain, P. A. Ariya, M. Amyot, E. Garcia, P. G. Campbell, G. J. Zylstra, and T. Barkay. 2007. Potential for mercury reduction by microbes in the high arctic. *Appl. Environ. Microbiol.* 73:2230-2238.
- Kim, D., J. S. Lee, K. Y. Choi, Y.-S. Kim, J. N. Choi, S.-K. Kim, J.-C. Chae, G. J. Zylstra, C. H. Lee, and E. Kim. 2007. Effect of substituent size on the regioselectivity of a novel *o*-xylene dioxygenase from *Rhodococcus* sp. strain DK17. *Enz. Microb. Tech.* 41:221-225.

- Wawrik, B., D. Kutliev, U. A. Abdivasievna, J. J. Kukor, G. J. Zylstra, and L. J. Kerkhof. 2007. Biogeography of Actinomycete communities and Type II polyketide synthase genes in soils collected in New Jersey and Central Asia. *Appl. Environ. Microbiol.* 73:2982-2989.
- Rhine, E. D., S. M. Ní Chadhain, G. J. Zylstra, and L. Y. Young. 2007. The arsenite oxidase genes (*aroAB*) in novel chemoautotrophic arsenite oxidizers. *Biochem. Biophys. Res. Commun.* 354:662-667.
- Choi, K. Y., G. J. Zylstra, and E. Kim. 2007. Benzoate catabolite repression of the phthalate degradation pathway in *Rhodococcus* sp. strain DK17. *J. Bact.* 73:1370-1374.
- Yu, C. L., W. Liu, D. J. Ferraro, E. N. Brown, J. V. Parales, S. Ramaswamy, G. J. Zylstra, D.T. Gibson and R.E. Parales. 2007. Purification, characterization, and crystallization of the components of a biphenyl dioxygenase system from *Sphingobium yanoikuyae* B1. *J. Ind. Microbiol. Biotechnol.* 34:311-324.
- Rozhkova-Novosad, E. A., J.-C. Chae, G. J. Zylstra, E. M. Bertrand, M. Alexander-Ozinskas, D. Deng, L. A. Moe, J. B. van Beilen, M. Danahy, J. T. Groves, and R. N. Austin. 2007. Profiling mechanisms of alkane hydroxylase activity in vivo using the diagnostic substrate norcarane. *Chemical Biology* 14:165-172.
- Bae, H. W., D. Kim, K. Y. Choi, N. R. Kwon, J.-C. Chae, G. J. Zylstra, S.-C. Koh, C.-H. Lee, and E. Kim. 2007. Functional identification of *p*-cumate operons in the terpene-degrading *Rhodococcus* sp. strain T104. *FEMS Microbiol. Lett.* 266:55-59.
- Ní Chadhain, S. M., B. Wawrik, T. Doolotkeldieva, L. J. Kerkhof, J. J. Kukor, and G. J. Zylstra. 2007. High mountain soil as a source of genetic biodiversity, p. 267-271. *In Proceedings of the International Conference "Ecological Characteristics of Biodiversity."* Academy of Sciences of the Republic of Tajikistan, Dushanbe.
- Doolotkeldieva, T., B. Wawrik, G. J. Zylstra, L. J. Kerkhof, and J. J. Kukor. 2007. Biodiversity of soil prokaryotes as sources of new antibiotic compounds, p. 291-296. *In Proceedings of the International Conference "Ecological Characteristics of Biodiversity."* Academy of Sciences of the Republic of Tajikistan, Dushanbe.
- Kukor, J. J., B. Wawrik, and G. J. Zylstra. 2007. Metabolism of Aromatic Compounds, p. 586-595. *In C. A. Reddy, T. J. Beveridge, J. A. Breznak, G. A. Marzluf, T. M. Schmidt, and L. R. Snyder (eds), Methods for General and Molecular Microbiology.* American Society for Microbiology Press, Washington, D.C.
- Chae, J.-C., and G. J. Zylstra. 2006. 4-Chlorobenzoate uptake in *Comamonas* sp. strain DJ-12 is mediated by a tripartite ATP-independent periplasmic (TRAP) transporter. *J. Bact.* 188:8407-8412.
- Ní Chadhain, S. M., J. K. Schaefer, S. Crane, G. J. Zylstra, and T. Barkay. 2006. Analysis of mercuric reductase (*merA*) gene diversity in an anaerobic mercury-contaminated sediment enrichment. *Environ. Microbiol.* 8:1746-1752.
- Vainberg, S., K. McClay, H. Masuda, D. Root, C. Condee, G. J. Zylstra, and R. J. Steffan. 2006. Biodegradation of ether pollutants by *Pseudonocardia* sp. strain ENV478. *Appl. Environ. Microbiol.* 72:5218-5224
- Ní Chadhain, S. M., R. S. Norman, K. Pesce, J. J. Kukor, and G. J. Zylstra. 2006. Microbial dioxygenase gene population shifts during polycyclic aromatic hydrocarbon biodegradation. *Appl. Environ. Microbiol.* 72:4078-4087.
- Chae, J.-C., C.-K. Kim, and G. J. Zylstra. 2005. Characterization of two small cryptic

- plasmids from *Pseudomonas* sp. strain S-47. *Biochem. Biophys. Res. Commun.* 338:1600-1606.
- Choi, K. Y., D. Kim, W. J. Sul, J.-C. Chae, G. J. Zylstra, Y. M. Kim, E. Kim. 2005. Molecular and biochemical analysis of phthalate and terephthalate degradation by *Rhodococcus* sp. strain DK17. *FEMS Microbiol. Lett.* 252:207-213.
- Wawrik, B., L. Kerkhof, J. J. Kukor, and G. J. Zylstra. 2005. Effect of different carbon sources on community composition of bacterial enrichments from soil. *Appl. Environ. Microbiol.* 71:6776-6783.
- Jang, J. Y., D. Kim, H. W. Bae, K. Y. Choi, J.-C. Chae, G. J. Zylstra, Y. M. Kim, and E. Kim. 2005. Isolation and characterization of a *Rhodococcus* species strain able to grow on *ortho*- and *para*-xylene. *J. Microbiol.* 43: 325-330.
- Zylstra, G. J., and J. J. Kukor. 2005. What is environmental biotechnology? *Curr. Opin. Biotechnol.* 16:243-245.
- Zylstra, G. J., and J. J. Kukor (eds.). 2005. *Current Opinion in Biotechnology* special issue on Environmental Biotechnology. (Volume 16, Number 3, June issue)
- Kim, D., J.-C. Chae, G. J. Zylstra, H.-Y. Sohn, G.-S. Kwon, and E. Kim. 2005. Identification of two-component regulatory genes involved in *o*-xylene degradation by *Rhodococcus* sp. strain DK17. *J. Microbiol.* 43:49-53.
- Wawrik, B., L. Kerkhof, G. J. Zylstra, and J. J. Kukor. 2005. Identification of unique type II polyketide synthase genes in soil. *Appl. Env. Microbiol.* 71:2232-2238.
- Cho, O., K. Y. Choi, G. J. Zylstra, Y.-S. Kim, S.-K. Kim, J. H. Lee, H.-Y. Sohn, G.-S. Kwon, Y. M. Kim, and E. Kim. 2005. Catabolic role of a three-component salicylate oxygenase from *Sphingomonas yanoikuyae* B1 in polycyclic aromatic hydrocarbon degradation. *Biochem. Biophys. Res. Commun.* 18:656-662.
- Kim, D., J.-C. Chae, J. Y. Jang, G. J. Zylstra, Y. M. Kim, B. S. Kang, and E. Kim. 2005. Functional characterization and molecular modeling of methylcatechol 2,3-dioxygenase from *o*-xylene-degrading *Rhodococcus* sp. strain DK17. *Biochem. Biophys. Res. Commun.* 326:880-886.
- Caballero, A., A. Esteve-Núñez, G. J. Zylstra, and J. L. Ramos. 2005. Assimilation of nitrogen from nitrite and trinitrotoluene in *Pseudomonas putida* JLR11. *J. Bacteriol.* 187:396-399.
- Kim, D., J.-C. Chae, G. J. Zylstra, Y.-S. Kim, S.-K. Kim, M. H. Nam, Y. M. Kim, and E. Kim. 2004. Identification of a novel dioxygenase involved in metabolism of *o*-xylene, toluene, and ethylbenzene by *Rhodococcus* sp. strain DK17. *Appl. Environ. Microbiol.* 70:7086-7092.
- Dennis, J. J., and G. J. Zylstra. 2004. Complete sequence and genetic organization of pDTG1, the 83 kilobase naphthalene degradation plasmid from *Pseudomonas putida* strain NCIB 9816-4. *J. Mol. Biol.* 341:753-768.
- Williams, P. A., R. M. Jones, and G. J. Zylstra. 2004. Genomics of Catabolic Plasmids, p. 165-196. *In* J. L. Ramos (ed.), *Pseudomonas* Volume 1: Genomics, Lifestyle, and Molecular Architecture. Kluwer Academic / Plenum Publishers, New York.
- Palleroni, N. J., A. M. Port, H.-K. Chang, and G. J. Zylstra. 2004. *Hydrocarboniphaga effusa* gen. nov., sp. nov., a novel member of the gamma-Proteobacteria active in alkane and aromatic hydrocarbon degradation. *Int. J. Syst. Evol. Microbiol.* 54:1203-1207.

- Chang, H.-K., P. Mohseni, and G. J. Zylstra. 2003. Characterization and regulation of the genes for a novel anthranilate 1,2-dioxygenase from *Burkholderia cepacia* DBO1. *J. Bacteriol.* 185:5871-5881.
- Austin, R., K. Buzzi, E. Kim, G. J. Zylstra, and J. T. Groves. 2003. Xylene monooxygenase, a membrane-spanning non-heme diiron enzyme that hydroxylates hydrocarbons via a substrate radical intermediate. *J. Biological Inorganic Chem.* 8:733-740.
- Bae, M., W. J. Sul, S.-C. Koh, J. H. Lee, G. J. Zylstra, Y. M. Kim, and E. Kim. 2003. Implication of two glutathione S-transferases in the optimal metabolism of *m*-toluate by *Sphingomonas yanoikuyae* B1. *Antonie van Leeuwenhoek* 84:25-30.
- Kim, D., Y.-S. Kim, J. W. Jung, G. J. Zylstra, Y. M. Kim, S.-K. Kim, and E. Kim. 2003. Regioselective oxidation of xylene isomers by *Rhodococcus* sp. Strain DK17. *FEMS Microbiol. Lett.* 223:211-214.
- Park, W., C. O. Jeon, A. M. Hohnstock-Ashe, S. C. Winans, G. J. Zylstra, and E. L. Madsen. 2003. Identification and characterization of the conjugal transfer region of the pCg1 plasmid from naphthalene-degrading *Pseudomonas putida* Cg1. *Appl. Environ. Microbiol.* 69:3263-3271.
- Sullivan, R. F., M. A. Holtman, G. J. Zylstra, J. F. White, Jr., and D. Y. Kobayashi. 2003. Taxonomic positioning of two biological control agents for plant diseases as *Lysobacter enzymogenes* based on phylogenetic analysis of 16S rDNA, fatty acid composition and phenotypic characteristics. *J. Appl. Microbiol.* 94:1079-1086.
- Kang, H., S. Y. Hwang, Y. M. Kim, E. Kim, Y.-S. Kim, S.-K. Kim, S. W. Kim, C. E. Cerniglia, K. L. Shuttleworth, and G. J. Zylstra. 2003. Degradation of phenanthrene and naphthalene by a *Burkholderia* species strain. *Can. J. Microbiol.* 49:139-144.
- Duscha, L. A., C. J. Burns, R. J. Colton, K. J. Kearfott, R. J. Samuelson, R. J. Steffan, V. J. Tschinkel, M. E. Uhle, and G. J. Zylstra. 2002. Research opportunities for improving the management of the Department of Energy's transuranic and mixed waste. National Academy Press, Washington, D.C.
- Park, W., P. Padmanabhan, S. Padmanabhan, G. J. Zylstra, and E. L. Madsen. 2002. *nahR*, encoding a LysR-type transcriptional activator, is highly conserved among naphthalene degrading bacteria isolated from a coal tar waste contaminated site and in extracted DNA. *Microbiology* 148:2319-2329.
- Dennis, J. J., and G. J. Zylstra. 2002. Rapid nested deletion generation by differential restriction enzyme digestion. *Biotechniques* 33:310-315.
- Kim, D., Y.-S. Kim, S.-K. Kim, S. W. Kim, G. J. Zylstra, Y. M. Kim, and E. Kim. 2002. Monocyclic aromatic hydrocarbon degradation by *Rhodococcus* sp. strain DK17. *Appl. Environ. Microbiol.* 68:3270-3278.
- Hauser, H., and G. J. Zylstra. 2001. Mammals, plants, bacteria, and soil: common problems and solutions in gene expression and analysis. *Curr. Opin. Biotech.* 12:437-438.
- Hauser, H., and G. J. Zylstra (eds.). 2001. Current Opinion in Biotechnology special issue on Expression Vectors and Delivery Systems. (Volume 12, Number 5, October issue)
- Daane, L. L., I. Harjono, G. J. Zylstra, and M. M. Häggblom. 2001. Isolation and characterization of polycyclic aromatic hydrocarbon-degrading bacteria associated with the rhizosphere of salt marsh plants. *Appl. Environ. Microbiol.* 67:2683-2691.

- Austin, R. N., H.-K. Chang, G. J. Zylstra, and J. T. Groves. 2000. The non-heme diiron alkane monooxygenase of *Pseudomonas oleovorans* (AlkB) hydroxylates via a substrate radical intermediate. *J. Am. Chem. Soc.* 122:11747-11748.
- Song, J., J. Sung, Y. M. Kim, G. J. Zylstra, and E. Kim. 2000. Roles of the *meta*- and *ortho*-cleavage pathways for the efficient utilization of aromatic hydrocarbons by *Sphingomonas yanoikuyae* B1. *J. Microbiol.* 38:245-249.
- Chae, J.-C., Y. Kim, Y.-C. Kim, G. J. Zylstra, and C.-K. Kim. 2000. Genetic structure and functional implication of the *fcB* gene cluster for hydrolytic dechlorination of 4-chlorobenzoate from *Pseudomonas* sp. DJ-12. *Gene* 258:109-116.
- Zylstra, G. J., S.-W. Bang, L. M. Newman, and L. Perry. 2000. Microbial degradation of mononitrophenols and mononitrobenzoates, p. 145-160. *In* J. C. Spain (ed.), *Biodegradation of nitroaromatic compounds and explosives*. Lewis Publishers, Boca Raton, Florida.
- Bick, J. A., J. J. Dennis, G. J. Zylstra, J. Nowack, and T. Leustek. 2000. Identification of a new class of 5' adenylylsulfate APS reductase from sulfate assimilating bacteria. *J. Bacteriol.* 182: 135-142.
- Kim, E., and G. J. Zylstra. 1999. Functional analysis of genes involved in biphenyl, naphthalene, phenanthrene, and *m*-xylene degradation by *Sphingomonas yanoikuyae* B1. *J. Ind. Microbiol. Biotechnol.* 23:294-302.
- Chang, H.-K., and G. J. Zylstra. 1999. Characterization of the phthalate permease OphD from *Burkholderia cepacia* ATCC 17616. *J. Bacteriol.* 181:6197-6199.
- Chang, H.-K., and G. J. Zylstra. 1999. Role of quinolinate phosphoribosyl transferase in the degradation of phthalate by *Burkholderia cepacia* DBO1. *J. Bacteriol.* 181:3069-3075.
- Chang, H.-K., and G. J. Zylstra. 1998. Novel organization of the genes for phthalate degradation from *Burkholderia cepacia* DBO1. *J. Bacteriol.* 180:6529-6537
- Kieboom, J., J. Dennis, G. J. Zylstra, and J. A. M. de Bont. 1998. Active efflux of organic solvents in *Pseudomonas putida* S12 is induced by solvents. *J. Bacteriol.* 180:6769-6772
- Dennis, J. J., and G. J. Zylstra. 1998. Improved antibiotic resistance cassettes through restriction site elimination using *Pfu* DNA polymerase PCR. *BioTechniques* 25:772-776.
- Dennis, J. J., and G. J. Zylstra. 1998. Plasposons: modular self-cloning mini-transposon derivatives for the rapid genetic analysis of gram-negative bacterial genomes. *Appl. Environ. Microbiol.* 64:2710-2715.
- Kieboom, J., Dennis, J. J., de Bont, J. A. M. and Zylstra, G. J. 1998. Identification and molecular characterization of an efflux pump involved in *Pseudomonas putida* S12 solvent tolerance. *J. Biol. Chem.* 273:85-91.
- Zylstra, G. J., and E. Kim. 1997. Aromatic hydrocarbon degradation by *Sphingomonas yanoikuyae* B1. *J. Ind. Microbiol. Biotechnol.* 19:408-414.
- Goyal, A. K., and G. J. Zylstra. 1997. Genetics of naphthalene and phenanthrene degradation by *Comamonas testosteroni*. *J. Ind. Microbiol. Biotechnol.* 19:401-407.
- Kim, E., G. J. Zylstra, J. P. Freeman, T. M. Heinze, J. Deck, and C. E. Cerniglia. 1997. Evidence for the role of 2-hydroxychromene-2-carboxylate isomerase in the degradation of anthracene by *Sphingomonas yanoikuyae* B1. *FEMS Microbiol. Lett.* 153:479-484.
- Zylstra, G. J., E. Kim, A. Goyal. 1997. Comparative molecular analysis of genes for polycyclic aromatic hydrocarbon degradation. *Genetic Engineering* 19:257-269.

- Kim, E., Aversano, P. J., M. F. Romine, R. P. Schneider, and G. J. Zylstra. 1996. Homology between genes for aromatic hydrocarbon degradation in surface and deep-subsurface *Sphingomonas* strains. *Appl. Environ. Microbiol.* 62:1467-1470.
- Goyal, A. K., and G. J. Zylstra. 1996. Molecular cloning of novel genes for polycyclic aromatic hydrocarbon degradation from *Comamonas testosteroni* strain GZ39. *Appl. Environ. Microbiol.* 62:230-236.
- Wang, Y. Z., Y. Zhou, and G. J. Zylstra. 1995. Molecular analysis of isophthalate and terephthalate degradation by *Comamonas testosteroni* YZW-D. *Environ. Health Persp.* 103:9-12.
- Yabannavar, A., and G. J. Zylstra. 1995. Cloning and characterization of the genes for *p*-nitrobenzoate degradation from *Pseudomonas pickettii* strain YH105. *Appl. Environ. Microbiol.* 61:4284-4290.
- Kim, E. and G. J. Zylstra. 1995. Molecular and biochemical characterization of two *meta*-cleavage dioxygenases involved in biphenyl and *m*-xylene degradation by *Beijerinckia* sp. strain B1. *J. Bacteriol.* 177:3095-3103.
- Zylstra, G. J., X. P. Wang, E. Kim, and V. A. Didolkar. 1994. Cloning and analysis of the genes for polycyclic aromatic hydrocarbon degradation. *Ann. New York Acad. Sci.* 721:386-398.
- Zylstra, G. J. 1993. Molecular analysis of aromatic hydrocarbon degradation, p. 83-115. *In* S. J. Garte (ed.), *Molecular environmental biology*. Lewis Publishers, Inc., Boca Raton.
- Lajoie, C. A., G. J. Zylstra, M. DeFlaun, and P. F. Strom. 1993. Development of field application vectors for bioremediation of soils contaminated with polychlorinated biphenyls. *Appl. Environ. Microbiol.* 59:1735-1741.
- Ensley, B. D. and G. J. Zylstra. 1993. Principles and practices of biotreatment using altered microorganisms, p. 39-64. *In* M. Levin and M. Gealt (ed.), *Biotreatment of industrial and hazardous waste*. McGraw Hill, New York.
- Gibson, D. T., D. L. Cruden, J. D. Haddock, G. J. Zylstra, and J. M. Brand. 1993. Oxidation of polychlorinated biphenyls by *Pseudomonas* sp. strain LB400 and *Pseudomonas pseudoalcaligenes* strain KF707. *J. Bacteriol.* 175:4561-4564.
- Simon, M. J., T. D. Osslund, R. Saunders, B. D. Ensley, W.-C. Suen, D. L. Cruden, D. T. Gibson, G. J. Zylstra. 1993. Sequences of genes encoding naphthalene dioxygenase in *Pseudomonas putida* strains G7 and NCIB 9816-4. *Gene* 127:31-37.
- Brand, J. M., D. L. Cruden, G. J. Zylstra, and D. T. Gibson. 1992. Stereospecific hydroxylation of indan by *Escherichia coli* containing the cloned toluene dioxygenase genes from *Pseudomonas putida* F1. *Appl. Environ. Microbiol.* 58:3407-3409.
- Zylstra, G. J., X. P. Wang, and V. A. Didolkar. 1992. Manipulation of the genes for polycyclic aromatic hydrocarbon degradation, p. 68-71. *In* M. R. Ladisch and A. Bose (ed.), *Harnessing Biotechnology for the 21st Century*. Proceedings of the ninth international biotechnology symposium. American Chemical Society, Washington, D.C.
- Menn, F.-M., G. J. Zylstra, and D. T. Gibson. 1991. Nucleotide sequence of the *todF* gene encoding 2-hydroxy-6-oxo-2,4-heptadienoate hydrolase of *Pseudomonas putida* F1. *Gene* 104:91-94.
- Zylstra, G. J. and D. T. Gibson. 1991. Aromatic hydrocarbon degradation: a molecular approach, p. 183-203. *In* J. K. Setlow (ed.), *Genetic Engineering: Principles and Methods*,

- volume 13. Plenum Press, New York.
- Zylstra, G. J., S. M. Cuskey, and R. H. Olsen. 1991. Construction of plasmids for use in risk assessment research, p. 363-370. *In* M. A. Levin, R. J. Seidler, and M. Rogul (ed.), *Microbial Ecology: Principles, Methods, and Applications*. McGraw-Hill, Inc., New York.
- Zylstra, G. J., S. Chauhan, and D. T. Gibson. 1990. Degradation of chlorinated biphenyls by *Escherichia coli* containing cloned genes of the *Pseudomonas putida* F1 toluene catabolic pathway, p. 290-302. *In* Proceedings of the Sixteenth Annual Hazardous Waste Research Symposium: Remedial Action, Treatment, and Disposal of Hazardous Waste. (EPA/600/9-90/037).
- Gibson, D. T., G. J. Zylstra, and S. Chauhan. 1990. Biotransformations catalyzed by toluene dioxygenase from *Pseudomonas putida* F1, p. 121-132. *In* S. Silver, A. M. Chakrabarty, B. Iglewski, and S. Kaplan (ed.), *Pseudomonas: Biotransformations, Pathogenesis, and Evolving Biotechnology*. American Society for Microbiology, Washington, D.C.
- Zylstra, G. J., L. P. Wackett, and D. T. Gibson. 1989. Trichloroethylene degradation by *Escherichia coli* containing the cloned *Pseudomonas putida* F1 toluene dioxygenase genes. *Appl. Environ. Microbiol.* 55:3162-3166.
- Zylstra, G. J. and D. T. Gibson. 1989. Toluene degradation by *Pseudomonas putida* F1: nucleotide sequence of the *todC1C2BADE* genes and their expression in *Escherichia coli*. *J. Biol. Chem.* 264:14940-14946.
- Zylstra, G. J., R. H. Olsen, and D. P. Ballou. 1989. Genetic organization and sequence of the *Pseudomonas cepacia* genes for the alpha and beta subunits of protocatechuate 3,4-dioxygenase. *J. Bacteriol.* 171:5915-5921.
- Zylstra, G. J., R. H. Olsen, and D. P. Ballou. 1989. Cloning, expression, and regulation of the *Pseudomonas cepacia* protocatechuate 3,4-dioxygenase genes. *J. Bacteriol.* 171:5907-5914.
- Spain, J. C., G. J. Zylstra, C. K. Blake, and D. T. Gibson. 1989. Monohydroxylation of phenol and 2,5-dichlorophenol by toluene dioxygenase in *Pseudomonas putida* F1. *Appl. Environ. Microbiol.* 55:2648-2652.
- Zylstra, G. J., W. R. McCombie, D. T. Gibson, and B. A. Finette. 1988. Toluene degradation by *Pseudomonas putida*: genetic organization of the *tod* operon. *Appl. Environ. Microbiol.* 54:1498-1503.
- Zhang, Y. Z., G. J. Zylstra, R. H. Olsen, and C. A. Reddy. 1986. Identification of cDNA clones for ligninase from *Phanerochaete chrysosporium* using synthetic oligonucleotide probes. *Biochem. Biophys. Res. Commun.* 137:649-656.
- McCombie, W. R., J. B. Hansen, G. J. Zylstra, B. Maurer, and R. H. Olsen. 1983. *Pseudomonas* streptomycin resistance transposon associated with R-plasmid mobilization. *J. Bacteriol.* 155:40-48.