

CURRICULUM VITAE

Daâd A. Saffarini
Professor
University of Wisconsin-Milwaukee
Department of Biological Sciences
3209 N. Maryland Ave
Milwaukee, WI, 53211
Phone: 414-229-2964 email: daads@uwm.edu

Academic training

- 1975-1979 University of Jordan, Amman/Jordan
 B. S. in Biology
1983-1985 University of Wisconsin-Milwaukee
 M.S. in Biological Sciences (advisor-Professor Gerald Bergtrom)
1985-1988 University of Wisconsin-Milwaukee
 Ph.D. in Biological Sciences (advisor-Professor Gerald Bergtrom)
1989-1992 Center for Great Lakes Studies (currently School of Freshwater Studies,
 UWM)
 Postdoctoral Research fellow (advisor- Professor Kenneth Nealson)

Honors and Awards

- 1999 University of Wisconsin Graduate School Research Committee Award
1996 Faculty Research Grant, Univ. of Massachusetts.
1975-1979 Scholarship, Ministry of Education, Amman, Jordan
1984-1988 Fellowship, AMIDEAST, Washington, D.C.

Professional Experience

- 2010-present Chair, Department of Biological Sciences
2010- present Professor, Dept. Biological Sciences (UWM)
2003-2010 Associate Professor, Dept. of Biological Sciences (UWM)
1998-2003 Assistant Professor, University of Wisconsin-Milwaukee
1995-1998 Assistant Professor, University of Massachusetts at Amherst
1992-1995 Assistant Scientist, Center for Great Lakes Studies, UWM
 (advisor- Professor Kenneth Nealson)

Extramural Grants:

- 4/14/09-9/30/13. Role of microenvironments and transition zones in subsurface reactive contaminant transport. Department of Energy (Battelle). D. Saffarini. \$93,000
6/1/07-3/31/12, Department of Energy. Integrated genome based studies of *Shewanella* ecophysiology. D. Saffarini. \$674,856.
1/15/06-6/30/10. National Science Foundation. cAMP Signaling and anaerobic respiration in *Shewanella oneidensis*. D. Saffarini. \$360,000
3/1/05-2/28/8. Department of Energy (Batelle). Identification of surface proteins involved in metal

binding in *S. oneidensis*. D. Saffarini. \$250,000
11/1/04-10/30/05. Department of Energy (Batelle). Isolation and characterization of *gsp* mutants of *Shewanella oneidensis*. D. Saffarini. \$45,000
8/1/00-7/31/2003. Department of Energy. Anaerobic Fe(III) reduction by *Shewanella putrefaciens*: Analysis of the electron transport chain. D. Saffarini (PI) and Kristene Sureras. \$276,000.
1/1/1997- 31/7/2001. National Science Foundation. Molecular and Genetic Analysis of Anaerobic Iron-Dependent Respiration in *Shewanella putrefaciens* MR-1. D. Saffarini. \$300,000

Teaching

I have taught Microbial Genetics, Environmental Microbiology, General Microbiology for microbiology majors, Microbiology for nursing and health sciences students, and graduate seminars. I also teach a graduate course in scientific writing.

Research Interests

I am interested in the mechanisms that regulate anaerobic respiration in *Shewanella oneidensis* MR-1. This bacterium is a metal reducer that can respire a large number of electron acceptors under anaerobic conditions. Our research led to the identification of the major proteins (MtrC and MtrB) are required for metal reduction. We also identified the cAMP receptor protein (CRP) as the major regulator of anaerobic respiration in *S. oneidensis* MR-1. This finding was unexpected. CRP is known to regulate carbon metabolism in many bacteria, and its role in the regulation of anaerobic respiration is unusual, especially since it lacks redox sensing domains that would allow its activation under anaerobic conditions. We have identified adenylate cyclase. We are currently trying to identify the signals that allow activation of CRP in MR-1. In addition, we have recently identified an unusual *c* cytochrome, SirA, that appears to act as a terminal sulfite reductase. This enzyme does not resemble known sulfite reductases, but appears to catalyze the same reaction carried out by all known reductases identified to date. The mechanisms of sulfite reduction and its regulation are currently under investigation.

Publications (* indicates corresponding author):

- Al-Sheboul, S., **D. Saffarini***. 2011. Identification and analysis of the *Shewanella oneidensis* major oxygen-independent coproporphyrinogen III oxidase gene. *Anaerobe* **17**:501-505.
- Shirodkar, S., S. Reed, M. Romine, **D. Saffarini***. 2011. The octaheme SirA catalyses dissimilatory sulfite reduction in *Shewanella oneidensis* MR-1. *Environ. Microbiol. Environ. Microbiol.* **13**:108-115.
- Shroff, N., M. Charania, **D. Saffarini***. 2010. ArcB1, a homolog of the *Escherichia coli* ArcB, regulates dimethyl sulfoxide reduction in *Shewanella oneidensis* MR-1. *J. Bacteriol.* **192**: 3227-3230.

- Bodemer, G. W. Antholine, L. Basova, **D. Saffarini**, A. Pacheco. 2010. The effect of detergents and lipids on the properties of the outer-membrane protein OmcA from *Shewanella oneidensis*. *J. Biol. Inorg. Chem.* **15**:749-758.
- Bouhenni, R., G. Vora, J. Biffinger, S. Shirodkar, K. Brockman, R. Ray, P. Wu, B. Johnson, E. Biddle, M. Marshall, L. Fitzgerald, B. Little, J. Fredrickson, A. Beliaev, B. Ringeison, **D. Saffarini***. 2010. The role of *Shewanella oneidensis* outer surface structures in extracellular electron transfer. *Electroanalysis* **22**:856-864.
- Reardon, C., A. Dohnalkova, P. Nichimuthu, D. Kennedy, **D. Saffarini**, B. Arey, L. Shi, Z. Wang, D. Moore, J. McLean, D. Moyles, M. Marshall, J. Zachara, J. Fredrickson, A. Beliaev. 2010. Role of outer-membrane cytochromes MtrC and OmcA in the biomineralization of ferrihydrite by *Shewanella oneidensis* MR-1. *Geobiology* **8**:56-68.
- Charania, M., K. Brockman, Y. Zhang, G. Pinchuk, A. Beliaev, J. Fredrickson and **D. Saffarini***. 2009. Involvement of a class III adenylate cyclase in the regulation of anaerobic respiration in *Shewanella oneidensis* MR-1. *J. Bacteriol.* **191**:4298-4306.
- Fredrickson, J., M. Romine, A. Beliaev, J. Auchtung, M. Driscoll, T. Gardner, K. Neilson, A. Osterman, G. Pinchuk, J. Reed, D. Rodionov, J. Rodrigues, **D. Saffarini**, M. Serres, A. Spormann, I. Zhulin and J. Tiedje. 2008. Towards environmental systems biology of *Shewanella*. *Nat. Rev. Microbiol.* **6**: 592-603.
- [McLean, J. S.](#), [G. Pinchuk](#), [O. Geydebrekht](#), [C. Bilskis](#), [B. Zakrajsek](#), [E. Hill](#), **D. Saffarini**, [M. Romine](#), [Y. Gorby](#), [J. Fredrickson](#) and [A. Beliaev](#). 2008. Oxygen-dependent autoaggregation in *Shewanella oneidensis* MR-1. *Environ. Microbiol.* **10**:1861-1876.
- Marshall, M., A. Plymale, D. Kennedy, L. Shi, Z. Wang, S. Reed, A. Dohnalkova, C. Simonson, C. Liu, **D. Saffarini**, M. Romine, J. Zachara, A. Beliaev and J. Fredrickson. 2008. Hydrogenase- and outer membrane c-type cytochrome-facilitated reduction of technetium(VII) by *Shewanella oneidensis* MR-1. *Environ Microbiol.* **10**:125-136.
- Bretschger, O., A. Obratsova, C. Sturm, I. Chang, Y. Gorby, S. Reed, C. Culley, C. Reardon, S. Barua, M. Romine, J. Zhou, A. Beliaev, R. Bouhenni, **D. Saffarini**, F. Mansfeld, B. Kim, J. Fredrickson, K. Neilson. 2007. Current production and metal oxide reduction by *Shewanella oneidensis* MR-1 wild type and mutants. *Appl Environ Microbiol.* **73**:7003-7012.
- Biju, V., D. Pan, Y. Gorby, J. Fredrickson, J. McLean, **D. Saffarini** and H. Lu. 2007. Combined spectroscopic and topographic characterization of nanoscale domains and their distributions of a redox protein on bacterial cell surfaces. *Langmuir.* **23**:1333-1338.
- Gorby, Y., S. Yanina, J. McLean, K. Rosso, D. Moyles, A. Dohnalkova, T. Beveridge, I. Chang, B. Kim, K. Kim, D. Culley, S. Reed, M. Romine, **D. Saffarini**, E. Hill, L. Shi, D. Elias, D. Kennedy, G. Pinchuk, K. Watanabe, S. Ishii, B. Logan, K. Neilson and J. Fredrickson. 2006. Electrically conductive bacterial nanowires produced by *Shewanella oneidensis* strain MR-1 and other microorganisms. *Proc Natl Acad Sci U S A.* 2006 **103**:11358-63.

- Marshall, M., A. Beliaev, A. Dohnalkova, D. Kennedy, L. Shi, Z. Wang, M. Boyanov, B. Lai, K. Kemner, J. McLean, S. Reed, D. Culley, V. Bailey, C. Simonson, **D. Saffarini**, M. Romine, J. Zachara and J. Fredrickson. 2006. *c*-Type cytochrome-dependent formation of U(IV) nanoparticles by *Shewanella oneidensis*. *PLoS Biology* **4**:1324-1333.
- Bouhenni, R., A. Gehrke, and D. **Saffarini***. 2005. Identification of genes involved in cytochrome *c* biogenesis in *Shewanella oneidensis* using a modified *mariner* transposon. *Appl. Environ. Microbiol.* **71**:4935-3937.
- Braun, T. F. , M. K. Khubbar, D. A. **Saffarini** and M. J. McBride. 2005. *Flavobacterium johnsoniae* gliding motility genes identified by *mariner* mutagenesis. *J. Bacteriol.* **187**:6943-6952.
- Saffarini***, D. R. Schultz and A. Beliaev. 2003. Involvement of cyclic AMP (cAMP) and CAMP receptor protein in anaerobic respiration of *Shewanella oneidensis*. *J. Bacteriol.* **185**:3668-3671.
- Saffarini***, D., S. Blumberman, and K. Mansoorabadi. 2002. Role of menaquinones in Fe(III) reduction by membrane fractions of *Shewanella putrefaciens*. *J. Bacteriol.* **184**:846-848.
- Beliaev, A., **Saffarini***, D., McLaughlin, J. and Hunnicutt, D. 2001. MtrC, an outer membrane decaheme *c* cytochrome required for metal reduction in *Shewanella putrefaciens* MR-1. *Molecular Microbiology.* **39**:722-730.
- Venkateswaran, K., Moser, D.P., Dollhopf, M.E., Lies, D.P., **Saffarini**, D.A., MacGregor, B.J., Ringelberg, D.B., White, D.C., Nishijima, M., Sano, H., Burghardt, J. Stackebrandt, E. and Nealson, K.H. 1999. Polyphasic taxonomy of the genus *Shewanella* and description of *Shewanella oneidensis* sp. nov. *Int. J. Syst. Bacteriol.* **49**: 705-724.
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- Saffarini**, D.A and K.H. Nealson. 1993. Sequence and genetic characterization of *etrA*, an *fnr* analog that regulates anaerobic respiration in *Shewanella putrefaciens* MR-1.

- J. Bacteriol. 175:7938-7944.
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- Trewitt, P., D. **Saffarini** and G. Bergtrom. 1988. Multiple clustered genes of the hemoglobin VIIB subfamily of *Chironomus thummi thummi* (Diptera). *Gene* **69**:91-100.
- Trewitt, P., D. **Saffarini** and G. Bergtrom. 1987. Nucleotide sequence of the intronless gene expressing a member of the globin VIIB subfamily from *Chironomus thummi* (Diptera). *Nucl. Acids Res.* **15**:5494.
- Saffarini**, D., P. Trewitt, M. Castro, P. Wejksnora and G. Bergtrom. 1985. Deoxynucleotide sequence of an insect cDNA codes for an unreported member of the *Chironomus thummi* globin gene family. *Biochem. Biophys. Res. Com.* **133**:641-647.