

## CURRICULUM VITA

### Dorothea K. Thompson, Ph.D.

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**CURRENT TITLE:** Assistant Professor of Microbiology, Department of Biological Sciences, Purdue University

### EDUCATION

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- Ph.D.** Microbiology, The Ohio State University (Columbus, OH), December 1997. Dissertation Title: Regulation of Gene Transcription in the Archaeon *Haloferax volcanii* using the Heat Shock Response as a Model System. Advisor: Charles J. Daniels, Ph.D.
- M.A.** English (Specialization in Technical Writing/Scientific Discourse), Pennsylvania State University, (University Park, PA), May 1992
- M.S.** Anaerobic Microbiology, Virginia Polytechnic Institute and State University (Blacksburg, VA), August 1989. Thesis Title: Acetoacetyl Coenzyme A-Reacting Enzymes in Solvent-Producing *Clostridium beijerinckii* B593. Advisor: Jiann-Shin Chen, Ph.D.
- B.A.** Microbiology and English (Literature), *Summa Cum Laude*, Phi Beta Kappa, University of Tennessee, (Knoxville, TN), June 1986

### PROFESSIONAL SOCIETY MEMBERSHIPS, HONORS, AND AWARDS

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American Society for Microbiology, since 1989  
Oak Ridge Institute for Science and Education (ORISE) Fellowship, 1998-99  
J. Robie Vestal Award, Ohio Branch of the American Society for Microbiology, 1997  
Marquis Who's Who of American Women, 1997  
Braucher Award for academic merit (\$3,000), 1989-90  
Phi Beta Kappa Honor Society, inducted 1985  
Margaret Elizabeth Hodges Scholarship, 1984-85  
Phi Kappa Phi Honor Society, inducted 1984  
Frederick T. Bonham Scholarship, 1983-84  
Woman of Achievement Award for Outstanding Accomplishment in Scholarship, 1983

### RESEARCH INTERESTS:

My primary research interests and expertise focus on the mechanisms of transcription regulation in prokaryotic systems and the use of genomic technologies, such as DNA microarray-based transcriptome profiling, to describe the molecular basis underlying cellular adaptation to environmental stresses. My previous work defined the regulatory sequence motifs dictating basal and activated expression of archaeal heat shock genes and characterized the transcription of a differentially regulated eukaryotic-like TFIIB homologue in the archaeon *Haloferax volcanii*. My current work focuses on using a combination of targeted deletion mutagenesis, global gene expression profiling, and regulatory motif discovery to understand gene regulatory

networks controlling molecular responses to such environmental stresses as low/high pH, metal toxicity, and oxidative stress in the metal ion-reducing bacterium *Shewanella oneidensis* MR-1. Other projects have included the applications of microarray-based genomic technology in microbial detection.

## **PROFESSIONAL EXPERIENCE**

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- 2005-present **Assistant Professor of Microbiology**, Department of Biological Sciences, Purdue University (West Lafayette, IN).
- 2004-2005 **Group Leader and Research Staff Scientist**, Microbial Ecology and Functional Genomics Group, Environmental Sciences Division, Oak Ridge National Laboratory (Oak Ridge, TN). \*Earned a *Certificate in Supervisory Management* from the Department of Professional and Personal Development, The University of Tennessee, January 2005.
- 2002-2004 **R&D Associate Staff Scientist**; Environmental Sciences Division; Ecosystem Science, Plant and Microbial Genomics Group; Oak Ridge National Laboratory (Oak Ridge, TN).
- 2001-2002 **Research Assistant Professor**, Michigan State University (East Lansing, MI) and the Environmental Sciences Division, Oak Ridge National Laboratory (Oak Ridge, TN).
- 1999-2001 **Research Associate**, Environmental Sciences Division, Oak Ridge National Laboratory (Oak Ridge, TN). Supervisor: Jizhong Zhou, Ph.D.
- 1998-1999 **Oak Ridge Institute for Science and Education (ORISE) Fellow**, Division of Bacterial Parasitic and Allergenic Products, Center for Biologics Evaluation and Research, U.S. Food and Drug Administration (Bethesda, MD). Advisor: Margaret C. Bash, M.D.
- 1992-1997 **Graduate Research Associate**, Department of Microbiology, The Ohio State University (Columbus, OH).
- 1990-1992 **Graduate Teaching Assistant and Lecturer**, Department of English, The Pennsylvania State University (University Park, PA).
- 1986-1989 **Graduate Research Assistant**, Department of Anaerobic Microbiology, Virginia Tech (Blacksburg, VA).

## **PUBLICATIONS**

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### ***Books***

Zhou, J., **D. K. Thompson**, Y. Xu, and J. M. Tiedje. 2004. *Microbial Functional Genomics*. John Wiley & Sons, Inc., Hoboken, NJ.

### ***Peer-Reviewed Journal Articles, Commentaries, and Book Chapters***

Leaphart, A. B., **D. K. Thompson**, K. Huang, E. Alm, X. Wan, A. Arkin, S. D. Brown, L. Wu, T. Yan, X. Liu, and J. Zhou. 2005. Transcriptome analysis of *Shewanella oneidensis* gene expression in response to acidic and alkaline pH stress. *Journal of Bacteriology*, in review.

Brown, S. D., M. Martin, S. Deshpande, S. Seal, K. Huang, E. Alm, Y. Yang, L. Wu, T. Yan, X. Liu, A. Arkin, K. Chourey, J. Zhou, and **D. K. Thompson**. 2005. Cellular response of *Shewanella oneidensis* to strontium stress. *Applied and Environmental Microbiology*, in review.

Liu, Y., W. Gao, Y. Wang, L. Wu, X. Liu, T. Yan, E. Alm, A. Arkin, **D. K. Thompson**, M. W. Fields, and J. Zhou. 2005. Genomic expression responses of *Shewanella oneidensis* MR-1 to salt stress. *Journal of Bacteriology* 187:2501-2507.

- Wan, X.-F., N. VerBerkmoes, D. Stanek, L. A. McCue, D. Stanek, H. Connelly, L. J. Hauser, L. Wu, X. Liu, T. Yan, A. Leaphart, R. L. Hettich, J. Zhou, and **D. K. Thompson**. 2004. Transcriptomic and proteomic characterization of the Fur modulon in the metal-reducing bacterium *Shewanella oneidensis*. *Journal of Bacteriology* 186:8385-8400.
- Gao, H., S. Wang, X. Liu, T. Yan, L. Wu, E. Alm, A. Arkin, **D. K. Thompson**, and J. Zhou. 2004. Global transcriptome analysis of the heat shock response of *Shewanella oneidensis*. *Journal of Bacteriology* 186:7796-7803.
- Wu, L., **D. K. Thompson**, X. Liu, M. W. Fields, C. E. Bagwell, J. M. Tiedje, and J. Zhou. 2004. Development and evaluation of microarray-based whole-genome hybridization for detection of microorganisms within the context of environmental applications. *Environmental Science and Technology* 38:6775-6782.
- Zhou, J. and **D. K. Thompson**. 2004. Microarray Technology and Applications in Environmental Microbiology. In Sparks, D. L. (ed.), *Advances in Agronomy*, vol. 82. Elsevier Inc., San Diego, CA.
- Yost, C., L. Hauser, F. Larimer, **D. Thompson**, A. Beliaev, J. Zhou, Y. Xu, and D. Xu. 2003. A computational study of *Shewanella oneidensis* MR-1: Structural prediction and functional inference of hypothetical proteins. *OMICS: A Journal of Integrative Biology* 7:177-192.
- Liu, Y., J. Zhou, M. Omelchenko, A. Beliaev, A. Venkateswaran, J. Stair, L. Wu, **D. K. Thompson**, D. Xu, I. B. Rogozin, E. K. Gaidamakova, M. Zhai, K. S. Makarova, E. V. Koonin, and M. J. Daly. 2003. Transcriptome dynamics of *Deinococcus radiodurans* recovering from ionizing radiation. *Proceedings of the National Academy of Sciences* 100:4191-4196.
- Beliaev, A. S., **D. K. Thompson**, M. Fields, L. Wu, D. P. Lies, K. H. Nealson, and J. Zhou. 2002. Microarray transcription profiling of a *Shewanella oneidensis* *etrA* mutant. *Journal of Bacteriology* 184:4612-4616.
- Zhou, J., and **D. K. Thompson**. 2002. Challenges in applying microarrays to environmental studies. *Current Opinion in Biotechnology* 13:204-207.
- Thompson, D. K.**, A. S. Beliaev, C. S. Giometti, S. L. Tollaksen, T. Khare, D. P. Lies, K. H. Nealson, H. Lim, J. Yates III, C. C. Brandt, J. M. Tiedje, and J.-Z. Zhou. 2002. Transcriptional and proteomic analysis of a ferric uptake regulator (Fur) mutant of *Shewanella oneidensis*: Possible involvement of Fur in Energy Metabolism, Transcriptional Regulation and Oxidative Stress. *Applied and Environmental Microbiology* 68:881-892.
- Beliaev, A. S., **D. K. Thompson**, T. Khare, H. Lim, C. C. Brandt, G. Li, A. E. Murray, J. F. Heidelberg, C. S. Giometti, J. Yates III, K. H. Nealson, J. M. Tiedje, and J. Zhou. 2002. Gene and protein expression profiles of *Shewanella oneidensis* during anaerobic growth with different electron acceptors. *OMICS: A Journal of Integrative Biology* 6:39-60.
- Zhou, J.-Z. and **D. K. Thompson**. 2002. Microarrays: Applications in Environmental Microbiology, p. 1968-1979. In Britton, G. (ed.), *Encyclopedia of Environmental Microbiology*, vol. 4. John Wiley & Sons, New York.
- Wu, L., **D. K. Thompson**, G. Li, R. A. Hurt, J. M. Tiedje, and J. Zhou. 2001. Development and evaluation of functional gene arrays for detection of selected genes in the environment. *Applied and Environmental Microbiology* 67:5780-5790.

- Thompson, D. K.**, C. D. Deal, C. Ison, J. Zenilman, and M. C. Bash. 2000. A typing system for *Neisseria gonorrhoeae* based on biotinylated oligonucleotide probes to PIB gene variable regions. *Journal of Infectious Diseases* 181:1652-1660.
- Thompson, D. K.**, J. R. Palmer, and C. J. Daniels. 1999. Expression and heat-responsive regulation of a TFIIIB homologue from the archaeon *Haloferax volcanii*. *Molecular Microbiology* 33:1081-1092.
- Thompson, D. K.**, and C. J. Daniels. 1998. Heat shock inducibility of an archaeal TATA-like promoter is controlled by adjacent sequence elements. *Molecular Microbiology* 27:541-551.
- Kuo, Y.-P.,\* **D. K. Thompson**,\* A. St. Jean, R. L. Charlebois, and C. J. Daniels. 1997. Characterization of two heat shock genes from *Haloferax volcanii*: A model system for transcription regulation in the *Archaea*. *Journal of Bacteriology* 179:6318-6324. (\*Authors contributed equally to this work.)
- Thompson, D. K.** 1993. Arguing for experimental facts in science: A study of research article results sections in biochemistry. *Written Communication* 10:106-128.
- Contributor for 1993 Bibliography: Relations of Literature and Science, 1989-1990. In *Configurations* 2:283-319.
- Thompson, D. K.**, and J.-S. Chen. 1990. Purification and properties of an acetoacetyl coenzyme A-reacting phosphotransbutyrylase from *Clostridium beijerinckii* ("*Clostridium butylicum*") NRRL B593. *Applied and Environmental Microbiology* 56:607-613.

#### **SELECTED ABSTRACTS (out of 36 total)**

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- Brown, S. D., K. Chourey, J. Zhou, and **D. K. Thompson**. 2005. Transcriptome dynamics of *Shewanella oneidensis* in response to chromium stress. Total Microarray Data Analysis and Interpretation, Cambridge Healthtech Institute, August 24-26, Washington, D.C.
- Brown, S. D., K. Chourey, J. Zhou, and **D. K. Thompson**. 2005. Transcriptome analysis of *Shewanella oneidensis* MR-1 shocked with hexavalent chromium. Abstract H-078, American Society for Microbiology General Meeting, Atlanta, GA.
- Chourey, K., S. D. Brown, J. Morrell-Falvey, M. Doktycz, and **D. K. Thompson**. 2005. Transcriptomics of chromium-adapted *Shewanella oneidensis* MR-1. Abstract H-079, American Society for Microbiology General Meeting, Atlanta, GA.
- D. K. Thompson**, M. R. Thompson, N. C. VerBerkmoes, S. D. Brown, K. Chourey, and R. L. Hettich. 2005. Proteome characterization of chromium-shocked and chromium-adapted *Shewanella oneidensis* MR-1. Abstract H-080, American Society for Microbiology General Meeting, Atlanta, GA.
- Brown, S. D., K. Chourey, M. Thompson, N. C. VerBerkmoes, R. L. Hettich, J. Zhou, and **D. K. Thompson** (PI). 2005. Transcriptome and proteome dynamics of the cellular response of *Shewanella oneidensis* to chromium stress. DOE-NABIR PI Workshop, April 18-20, Warrenton, Virginia.

Leaphart, A. B., J. Zhou, and **D. K. Thompson**. 2003. Microarray transcription profiling of acidic- and basic-pH stress tolerance in *Shewanella oneidensis* MR-1. Abstract H-003, American Society for Microbiology General Meeting, Washington, D.C.

**Thompson, D. K.**, A. Beliaev, G. Li, C. S. Giometti, S. Tollaksen, D. Lies, K. H. Nealson, and J. Zhou. 2000. Generation and analysis of a *fur* (ferric uptake regulator) mutant of *Shewanella oneidensis* MR-1 using genomic and proteomic approaches. 8<sup>th</sup> Annual International Meeting on Small Genomes, Lake Arrowhead, CA.

## GRANTS: PRINCIPAL INVESTIGATOR/CO-INVESTIGATOR

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- Elucidating the Molecular Basis and Regulation of Chromium(VI) Reduction by *Shewanella oneidensis* MR-1 and Resistance to Metal Toxicity Using Integrated Biochemical, Genomics and Proteomic Approaches. Dorothea K. Thompson, PI. (Funded by the DOE Natural and Accelerated Bioremediation Research [NABIR] Program, 2003).
- Rapid Deduction of Stress Response Pathways in Metal/Radionuclide Reducing Bacteria. Co-investigator with Adam Arkin and Terry Hazen (PIs) and others. (Funded by the DOE Genomics:GTL Program, 2002.)
- Using Live Cell Imaging Technologies to Probe Molecular Interactions between Bacterial Cells and Heavy Metals. Dorothea K. Thompson, PI. Steven Brown, Mitchel Doktycz, and Jennifer Morrell, Co-PIs. (Funded by the Oak Ridge National Laboratory Seed Money Fund, 2004-2005).

## PATENTS

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Zhou, J.-Z., L. Wu, and **D. K. Thompson**. 2002. Detecting microorganisms using whole genomic DNA or RNA microarray, In pending.

## INVITED TALKS

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“Functional Genomics of the Metal-Reducing Bacterium *Shewanella oneidensis* MR-1: Insights into Transcription Regulation and Stress Response Pathways.” Department of Environmental Toxicology, University of California at Santa Cruz, February, 2004.

“Functional Genomics of the Metal-Reducing Bacterium *Shewanella oneidensis* MR-1: Insights into Transcription Regulation and Stress Response Pathways.” Department of Biological Sciences, Purdue University, January 20, 2004.

“Functional Genomics of the Metal-Reducing Bacterium *Shewanella oneidensis* MR-1: Insights into Transcription Regulation and Stress Response Pathways.” 11<sup>th</sup> International Conference on Microbial Genomes, September 28-October 2, 2003, Durham, NC.

“Transcriptome Dynamics of *Deinococcus radiodurans* Recovering from Ionizing Radiation.” NASA Astrobiology Institute General Meeting, February 10-12, 2003, Phoenix, AZ.

“Using Microarray Technology to Analyze Microbial Community Structure and Function in Natural Environments.” The 9<sup>th</sup> International Conference on Microbial Genomes, October 28-November 1, 2001, Gatlinburg, TN.

“Oligonucleotide Probes to PI Variable Regions.” Gonococcal Typing Workshop at the 13<sup>th</sup> Meeting of the International Society for Sexually Transmitted Diseases Research, 15 July 1999, Denver, CO.

“The Development of an Oligonucleotide-Based Genotyping System for *Neisseria gonorrhoeae*.” STD Interest Group, Johns Hopkins University, 19 May 1999, Baltimore, MD.

## **PROFESSIONAL SERVICE**

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- Organizing Committee (appointed position) for Science and Technology Discussion Series, 2003 (Oak Ridge National Laboratory)
- Institutional Biosafety Committee (Oak Ridge National Laboratory)
- Ad hoc reviewer for the *Journal of Bacteriology* (4 papers), *Applied and Environmental Microbiology* (9 papers), *FEMS Microbiology Letters*, and the *Journal of Clinical Microbiology* (3 papers)
- Panel reviewer for the U.S. Department of Energy Natural and Accelerated Bioremediation Research (NABIR) Program merit review, May 2004
- Search committee for Director of the ORNL Joint Institute in Biological Sciences
- Proposal reviewer for the U.S. Department of Energy Small Business Innovation Research (SBIR) Program.
- Reviewed proposal for the ORNL Seed Money Fund.