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Education

- 1996-2000 Ph.D. Department of Microbiology, Cornell University
Major: Microbiology
Minors: Biochemistry, Agricultural/Biological Engineering
- 1993-95 M.S. Biological Sciences, Mississippi State University
Major: Microbiology Minor: Biochemistry
- 1989-93 B.S. Biology, Western Kentucky University
Major: Biology/Chemistry (Honors Program)

Professional Experience

- 2001-present **Research Staff Scientist**, Oak Ridge National Laboratory
Assess microbial ecology of contaminated sites using molecular- and culture-based techniques, isolation of metal-reducing, denitrifying, and heavy-metal resistant microbes, development of functional, community, and metagenomic DNA microarrays, physiological characterization of bacterial isolates
- 2000-2001 **Postdoctoral Research Associate**, Oak Ridge Associated Universities
Coordinate microbial characterization of DOE field research site at ORNL, assess microbial ecology of contaminated sites, assist in development of functional and community DNA microarrays
- 1996-2000 **Graduate Research Assistant**, Department of Microbiology, Cornell University, conducted and initiated independent research combining microbial physiology and molecular biology, advised and coordinated undergraduate research, assisted in manuscript reviews and grant writing. Researched the role and regulation of polysaccharide hydrolases from anaerobic rumen bacteria
- 1999 **Teaching Assistant**, Cornell University, **Bacterial Physiology Laboratory**
- 1997-99 **Instructor**, Cornell University, co-developed microbiology course
Instructor, Cornell University, **Undergraduate Microbiology**
Instructor, Cornell University, **Microbiology Ambassador Program**
- 1993-95 **Graduate Research Assistant**, Department of Biological Sciences, Mississippi State University, conducted scientific research dealing with gastrointestinal bacteria, assisted undergraduate researchers
- 1993-95 **Instructor**, Mississippi State University, **Undergraduate Microbiology Laboratory** and **Undergraduate Botany Laboratory**

- 1994 **Microbiological Consultant**, Grand Gulf Nuclear Power Station, Port Gibson, Mississippi
- 1992-93 **Undergraduate Honors Program research**, Western Kentucky University
- 1991-93 **Undergraduate Teaching Assistant and Laboratory Technician**, Biology Department, Western Kentucky University

Manuscripts

Fields, M.W. and J.B. Russell. 2001. Purification and characterization of a novel glucomannokinase of *Prevotella bryantii* B₁₄, and its possible role in β -glucanase expression. Microbiol. 147:1035-1043

Jarvis, G.N., **M.W. Fields**, D.A. Adamovich, C.E. Arthurs, and J.B. Russell. 2001. The mechanism of carbonate killing of *Escherichia coli*. Letts. Appl. Microbiol. 33:196-200

Fields, M.W., S. Mallik, and J.B. Russell. 2000. *Fibrobacter succinogenes* S85 ferments cellulose just as fast as cellobiose until limited by cellulose surface area. Appl. Microbiol. and Biotech. 54:570-574

Fields, M.W. and J.B. Russell. 2000. Alternative pathways of glucose transport in *Prevotella bryantii* B₁₄. FEMS Microbiol. Letts. 183:137-142

Fields, M.W. and J.B. Russell. 1998. The role of ruminal carboxymethylcellulases in the degradation of β -glucans from cereal grains. FEMS Microbiol. Ecol. 27:261-268

Fields, M.W., D.B. Wilson, and J.B. Russell. 1997. A mutant of *Prevotella ruminicola* B₁₄ deficient in β -1,4-endoglucanase and mannanase activities. FEMS Microbiol. Letts. 154:9-15

Gardner, R.G., J.E. Wells, **M.W. Fields**, D.B. Wilson, and J.B. Russell. 1997. A *Prevotella ruminicola* B₁₄ operon encoding extracellular polysaccharide hydrolases. Curr. Microbiol. 35:274-277

Fields, M.W., P.E. Ryals, and K.L. Anderson. 1997. Polysaccharide-inducible outer membrane proteins of *Bacteroides xylanolyticus* X5-1. Anaerobe 3:43-48

Fields, M.W. and J.B. Russell. 2001. The glucomannokinase of *Prevotella bryantii* B₁₄: sequence homology with the regulatory glucokinases of gram-positive microorganisms. J. Mol. Microbiol. Biotech. (submitted)

Beliaev, A.S., D.K. Thompson, **M.W. Fields**, L. Wu, D.P. Lies, K.H. Neelson, and J. Zhou. 2001. Microarray expression profiling in *Shewanella oneidensis* MR-1 indicates involvement of *etrA* in global gene regulation. J. Bac. (submitted)

Yan, T., **M.W. Fields**, L. Wu, S. Carroll, J.M. Teidje, and J. Zhou. 2001. The diversity of nitrite reductase genes (*nirS* and *nirK*) from nitrate- and uranium-contaminated groundwater. *Appl. Environ. Microbiol.* (submitted)

Fields, M.W., S.L. Carroll, and J. Zhou 2001. Denitrifying bacteria isolated from nitrate- and uranium-contaminated waste sites and the ability to denitrify processed groundwater. *Environ. Microbiol.* (in preparation)

Fields, M.W., T. Yan, S.L. Carroll, and J. Zhou. 2001. Bacterial community composition from groundwater contaminated with different levels of nitrate, uranium, and heavy metals. *Appl. Environ. Microbiol.* (in preparation)

Technical Reports

Fields, M.W. 1999. Accurate quantitation of RNA for hybridization blots using the VersaFluor fluorometer. Tech Note 2436, US/EG Rev A, Bio-Rad, Inc.

Grants/Support:

PI – Community-Wide Analysis of Unique Sequences and Functions from Uncultured Microorganisms using DNA Microarrays, LDRD-ORNL (funded)

Co-PI - Integrated analysis of protein complexes and regulatory networks involved in anaerobic energy metabolism of *Shewanella oneidensis* MR-1, LAB 01-20, DOE Microbial Cell Project (funded)

Abstracts:

- 2001 9th International Conference on Microbial Genomes, Gatlinburg, TN
The Diversity of Nitrite Reductase Genes (*nirS* and *nirK*) from Bacterial Communities in Groundwater Contaminated with Nitrate, Uranium and Heavy Metals
- 2001 Department of Energy, 4th NABIR Workshop, Warrenton, VA
Microbial characterization of mixed waste sites and the development of DNA microarray methodology
- 2001 Department of Energy, 4th NABIR Workshop, Warrenton, VA
Field-scale evaluation of uranium-contaminated groundwater at the NABIR field research site at Oak Ridge, TN
- 2001 Department of Energy, 4th NABIR Workshop, Warrenton, VA
Understanding the roles of spatial isolation and carbon in microbial community structure, dynamics and activity for bioremediation
- 2000 American Society for Microbiology, 100th General Meeting, Los Angeles, CA
The regulation of β -glucanase expression by the ruminal bacterium, *Prevotella bryantii* B₁₄

- 1998 International Symposium on Microbial Ecology, 8th Symposium, Halifax, Canada
The role of ruminal carboxymethylcellulases in the degradation of glucans from cereal grains
- 1998 American Society for Microbiology, 98th General Meeting, Atlanta, GA
Microbiology Ambassadors: An undergraduate teaching experience in high school classrooms
- 1997 American Society for Microbiology, 97th General Meeting, Miami Beach, FL
Properties of a *Prevotella ruminicola* B₁₄ mutant deficient in CMCase and mannanase activities
- 1995 The Rumen Conference, 23rd Meeting, Chicago, IL
Conjugal transfer of transposon Tn1545 into *Eubacterium cellulosolvens* 5494
- 1995 American Society for Microbiology, South Central Branch, Little Rock, AR
Presence of polysaccharide inducible proteins in the outer membrane of *Bacteroides xylanolyticus* X5-1
- 1995 American Society for Microbiology, 95th General Meeting, Washington, D.C.
SDS-PAGE shows polysaccharide inducible membrane proteins from *Bacteroides xylanolyticus* X5-1 and *Prevotella ruminicola* 23
- 1994 American Society for Microbiology, South Central Branch, Shreveport, LA
Detection of inducible proteins in *Bacteroides thetaiotaomicron*, *Bacteroides xylanolyticus*, *Prevotella ruminicola* with SDS-PAGE