

**Alan A. DiSpirito, Ph.D.**

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**EDUCATION**

B.S., Biology	May 1977	Providence College, Providence, RI
M.S., Microbiology	May 1980	Ohio State University, Columbus, OH
Ph.D., Microbiology	May 1983	Ohio State University, Columbus, OH

**ACADEMIC EXPERIENCE**

2009 – Present, Professor, Department of Biochemistry, Biophysics, and Molecular Biology, Iowa State University

2004 – 2009, Associate Professor, Department of Biochemistry, Biophysics, and Molecular Biology, Iowa State University

1997 – 2004, Associate Professor, Department of Microbiology, ISU

1991 – 1997, Assistant Professor, Department of Microbiology, Immunology and Preventive Medicine ISU

1989 – 1991, Assistant Professor, Department of Biology, University of Texas at Arlington

1987 – 1989, Senior Research Fellow, Environmental Engineering Science, California Institute of Technology, laboratory of Mary E. Lidstrom

1985 – 1987, Postdoctoral Research Associate, Department of Microbiology, University of Washington, Seattle and Center for Great Lakes Studies, University of Wisconsin-Milwaukee, laboratory of Mary E. Lidstrom

1983 - 1985 Postdoctoral Research Associate, Department of Biochemistry, University of Minnesota, Laboratory of Alan B, Hooper

**PROFESSIONAL MEMBERSHIP**

American Society for Microbiology

American Chemical Society

**PROFESSIONAL AND UNIVERSITY ACTIVITIES**

*Editorial Boards:*

Applied and Environmental Microbiology: 2002-2014

Frontiers in Microbial Chemistry: 2011- 2014

Frontiers in Microbial Ecotoxicology and Bioremediation: 2011 - 2014

*Ad-Hoc Reviewer*

*Journals:*

Agriculture, Ecosystems and Environment

Antonie van Leeuwenhoek Journal of Microbiology

Applied and Environmental Microbiology

Applied Microbiology and Biotechnology

Archives of Biochemistry and Biophysics  
Biochemistry  
Biochemical Pharmacology  
Biotechnology Letters  
Canadian Journal of Microbiology  
Environmental Microbiology and Environmental Microbiology Reports  
Environmental Science and Technology  
FEMS Microbiology Letters  
FEMS Microbiology Reviews  
FEMS Microbial Ecology  
Frontiers in Microbiological Chemistry  
Frontiers in Microbial Ecotoxicology and Bioremediation  
Molecular Microbiology  
Methods in Enzymology  
Nature  
Peer Journal  
Journal of the American Chemical Society  
Journal of Bacteriology  
Journal of Biophysical Research  
Journal of Inorganic Biochemistry  
Journal of Proteome Research  
Microbiology  
Plos One  
Protein Expression and Purification  
Trends in Microbiology

*Agencies:*

Biotechnology and Biological Science Research Council, England  
Department of Energy  
National Pork Producers Council  
National Institute of Health  
National Science Foundation  
Netherlands Organization for Scientific Research  
NWO, Earth and Life Council, Netherlands  
Petroleum Research Fund  
Research Council of Norway  
Swiss National Science Foundation  
Systems Biology in Microorganisms (SysMO), Austria, Netherlands, Germany,  
Norway & United Kingdom  
United States Department of Agriculture

*Panel Reviewer:*

Department of Energy (2000, 2010)  
National Pork Producers Council (1997)  
National Institute of Health (2001)  
National Science Foundation (2006, 2010, 2014, 2015)  
Invited Participant in Department of Energy Advanced Research Projects Agency-  
Energy Workshops:  
Reducing Emissions using Methanotrophic Organisms for

Transportation Energy (2013)  
Natural Gas Sensing and Mitigation (2013)

*Planning Committees:*

International Round Table on Swine Odor, Iowa State University (1994)  
International Livestock Odor Conference, (1995)  
Central Iowa Prokaryotic Interest Group (1991 - 1995)  
Treasurer, American Society for Microbiology-North Central Branch (1999).

*Club Advisor:* Microbiology Club (1994 - 1996)

Microbiology Graduate Student Organization (1991 - 1999).

*Committees/Assignments*

*University:* Protein Facility User Committee, (1996 - 2004)

Faculty Senate (1998 - 2001)

Governance Committee-Faculty Senate (1999 - 2001).

*College:* Awards and Scholarship, Chair (1997 - 1999)

Curriculum Committee (2004 – 2012)

Ethics sub-committee (2004-2009)

Tenure and Promotion (2013)

*Departmental:* Departmental Officer for Graduate Education, 1997 – 2004

Graduate Admissions 1993 – 1994, 1997 – 2003 & 2011 - present

Strategic Planning 1997

Faculty search committees (member of 5 and chair of 2)

Curriculum Committee (2004 – 2015)

Promotion and Tenure (member of 6, chair of 1)

Post Tenure Review (member of 2)

Biochemistry Qualifying Exam Committee: 2010 - present

**CONTRACTS AND GRANTS RECEIVED**

44. Swartz, J.R., W. Blake, Semrau, J.D. and A.A. DiSpirito. 2/2/14 – 2/1/16. High Productivity Cell-Free Bioconversion of Methane. in Department of Energy Advanced Research Projects Agency-Energy \$4,500,000 (\$338,541 to ADS).
43. Semrau, J.D. and A.A. DiSpirito. 7/1/12 – 6/30/16. Role of Methanotrophs in Metal Mobilization and Mineral Weathering: Effects on In Situ Microbial Community Structure and the Sustainability of Subsurface Water. DOE (DE-SC00006630) (\$1,230,230; \$337,717 to ADS).
42. Kalyuzhnyansky, M.G., P. Dunfield, M.G. Klotz, J.C. Murrell, L.Y. Stein, S. Vuilleumier, A.A. DiSpirito, M. Jetten, H. Op den Camp, Y. Trotsenko, Y. Sakai, J.D. Semrau, F. Bringel, S. Dedysh, J. Vorholt, C. Knief. 2011 – 2012. Revising methanotrophy: a comprehensive genomic probing of the unexpected genetic and metabolic diversity of aerobic methane consuming bacteria. to JGI's Community Sequencing Program. DOE.
41. DiSpirito, A.A. and E. Münck. 7/15/10 – 6/30/14. Collaborative Research: The Membrane-Associated Methane Monooxygenase from *Methylococcus capsulatus* Bath: Metal Centers and Mechanism of Substrate Hydroxylation. NSF (CHE-10112271) (\$588,000; \$412,000 to ADS).

40. Stein, L.Y., M. Kruger, A.A. DiSpirito, and J.C. Murrell 2009 – 2010. Genome Sequencing of Representative Methanotrophic Bacteria to JGI's Community Sequencing Program. DOE.
39. Stein, L.Y., M. Kruger, A.A. DiSpirito, and J.C. Murrell 2007 – 2008. Genome Sequencing of Representative Type I and Type II Methanotrophic Bacteria to JGI's Community Sequencing Program. DOE.
38. Bobik, T., A.A. DiSpirito, and B. Nikolau. 9/06 – 9/07. Production of 3-hydroxypropionate from syngas. (\$75,000; \$25,000 to ADS).
37. Pometto, T.A. III, A. Mendosa, and A.A. DiSpirito. 12/06 – 12/07. Protecting Iowa's Economic Growth Through Animal Traceability and Discovery of Natural Antimicrobials. Battelle Fund (\$127,000; \$33,000 to ADS).
36. Bobik, T.A. and A.A. DiSpirito. 2005 - 2006 *The Production of 3-hydroxypropionate from Syngas*. USDA/ Biotechnology and Biorenewables Byproducts Consortium (\$50,000; \$25,000 to ADS).
35. Brown, R., A.A. DiSpirito, and B. Nikolau. 2003 – 2006. Biopolymers and Other Value-Added products from Distillers' Dried Grains. United States Department of Agriculture (\$ 1,000,000; \$117,998 to ADS).
34. DiSpirito, A.A. and R.Brown. 2003 – 2004. Fermentation of Syngas United States Department of Agriculture (\$67,998 to ADS).
33. DiSpirito, A.A. and A.E. Antholine. 2003 – 2006. Membrane-Associated Methane Monooxygenases from Type X and Type I Methanotrophs. Department of Energy. (\$270,006; \$212,008 to ADS).
32. Heindel, T.J., R.C. Brown, M.S. Hargrove, A.A. Suby, and A.A. DiSpirito. 2003 – 2005. Mass Transfer Measurements for Syngas Fermentation. USDA-Iowa Biotechnology Byproducts Consortium (\$114,550; \$24,550 to ADS).
31. Brown, R., T. Heindel, A.A. DiSpirito, B. Nikolau, G. Fenske. 2002 – 2003. Fiber to Biobased Products via Syn Gas Fermentation. Department of Energy, ISU Biorenewable Resources Consortium. (\$80,000; \$25,000 to ADS).
30. DiSpirito, A.A. and J.A. Zahn. 2002 - 2003. Mechanism of Methane Oxidation in Methanotrophs Expressing the Membrane-Associated Methane Monooxygenase. Department of Energy. (\$95,000).
29. Sung, S.W., A.A DiSpirito, P. Ball and C. Hatch. 2002 – 2003. Biological Sulfide Removal with Sulfur Reclamation. USDA/Iowa Biotechnology Byproducts Consortium (\$57,000).
28. Pometto III, A. L., D. Bazylnski, and A. A. DiSpirito. 2001 - 2002. Isolation and Purification of Hyperthermostable Hydrolytic-Enzyme Producing Microorganisms from Food Processing Industry Thermal Vents. USDA/Iowa Biotechnology Byproducts Consortium (\$94,000).
27. Pometto III, A. L., and A.A. DiSpirito. 2000 – 2001. Hyperthermostable Hydrolytic-Enzyme Producing Microorganisms from Food Processing Plant Hot Air Vents. USDA/Iowa Biotechnology Byproducts Consortium (\$57,500).
26. DiSpirito, A.A., G.A. Kraus, and G.J. Phillips. 2000. Glucose Production from Corn Stover and Cellulose from Photosynthetic Bacteria. Iowa State University Agriculture Experiment Station (\$9,000).
25. DiSpirito, A.A. 1999 - 2000. *Eubacterium coprostanoligense*. Iowa State University Research Foundation (\$7,500).
24. DiSpirito, A.A. 1999 - 2002. Mechanism of Methane Oxidation in Cells Expressing the

- Membrane-Associated Methane Monooxygenase. Department of Energy. Project Number: 02-96ER20237 (\$274,506).
23. DiSpirito, A.A. and E.E. Cooper. 1999 - 2000. Development of a Standardized Method for Odor Quantification from Livestock Production Facilities: Stage II. Field Testing. National Pork Producers Council Project Number 00-056 (\$24,420).
  22. Mendonca, A., A.A. DiSpirito, L. Halverson. 1998 - 2000. Influence of Multiple Food Barriers on Heat Destruction of Bacterial Pathogens in Pork. Iowa State University Food Consortium (\$38,750).
  21. Pometto III, A.L., A.A. DiSpirito, A. Sittenfeld, and M. Moar. 1998 - 2001. Isolation of Hyperthermostable Hydrolytic-Enzyme Producing Microorganisms. Iowa State University Food Consortium (\$63,773).
  20. Pometto III, A. L., and A.A. DiSpirito. 1998-2001. Immobilized-Cell Bioreactor for Enhanced Succinic Acid Production. Iowa Corn Promotion Board (\$115,010).
  19. DiSpirito, A.A., J.A. Zahn, D.W. Russell, E.E. Cooper, and J.L. Hatfield. 1997 - 1998. Quantification of Odors from Livestock Wastes: Development of an Odor Index. National Pork Producers Council (\$73,200).
  18. Grant, M., T. Stahly, S. Hoff and A.A. DiSpirito. 1997 - 1998. Reduction of odor by modification of microbial processes associated with swine colon. Iowa Soybean Promotion Board, Iowa Corn Board and Iowa Pork Producers Association (\$55,400).
  17. Bundy, D., S. Hoff, R. Arrit and A.A. DiSpirito. 1997 - 1998. Predictive Model for Evaluating Odor Transmission from Swine Units to Neighboring Residence. Iowa Soybean Promotion Board, Iowa Corn Board and Iowa Pork Producers Association (\$9,800).
  16. Hatfield, J.L., J.A. Zahn, S. Hoff and A.A. DiSpirito. 1997 - 1998. Biofilters Designed for Odor Reduction from Livestock Wastes. Iowa Soybean Promotion Board, Iowa Corn Board and Iowa Pork Producers Association (\$44,900).
  15. DiSpirito, A.A., J.A. Zahn, J.L. Hatfield, and L. Halverson. 1997 - 1998. Odor Remediation in Anaerobic Livestock Waste Lagoons Using Phototrophic Bacteria. Iowa Soybean Promotion Board, Iowa Corn Board and Iowa Pork Producers Association (\$31,500).
  14. Beattie, G.A. and A.A. DiSpirito. 1996 - 1997. Evaluation of Terrestrial Plants to Reduce Odor Transmission from Livestock Waste Facilities. Iowa Soybean Promotion Board, Iowa Corn Board and Iowa Pork Producers Association (\$18,000).
  13. Halverson, L., A.A. DiSpirito, D. Bazylinski, J.L. Hatfield and J.A. Zahn. 1996 - 1997. Development of a Diagnostic Tool to Indicate Potential Odor Emission from Anaerobic Lagoons. Iowa Soybean Promotion Board, Iowa Corn Board and Iowa Pork Producers Association (\$18,000).
  12. DiSpirito, A.A., L. Halverson, D. Bundy, J.L. Hatfield and J.A. Zahn. 1996 - 1997. Quantification of Odors from Livestock Wastes. Iowa Soybean Promotion Board, Iowa Corn Board and Iowa Pork Producers Association (\$34,000).
  11. DiSpirito, A.A. Characterization of the Membrane-Associated Methane Oxidation System in *Methylococcus capsulatus* Bath. 1996 - 1999. Department of Energy. Project Number. 02-96ER20237 (\$282,000).
  10. Beitz, D.C. and A.A. DiSpirito. 1995 - 1996. Evaluation of Cholesterol Reductase Technology to Reduce Cholesterol in Food Products. (\$22,050).
  9. Bundy, D. and A.A. DiSpirito. 1995 - 1996. Predictive Model for Evaluating Odor Transmission from Swine Units to Neighboring Residence. Iowa Soybean Promotion Board, Iowa Corn Board and Iowa Pork Producers Association (\$45,000).

8. DiSpirito, A.A. and D. Bundy. 1995 - 1996. Quantification of Odors from Livestock Wastes. Iowa Soybean Promotion Board, Iowa Corn Board and Iowa Pork Producers Association (\$68,500).
7. DiSpirito, A.A. and D.L. Harris. 1994 - 1995. Assessment of Alternative Treatment Methods to Control Odor in Livestock Wastes Grant from Premium Standard Farm (\$49,000).
6. DiSpirito, A.A. Manipulation of Microbial Activities and Populations in Aerated and Anaerobic Lagoons. 1993 - 1998. ISU Agriculture and Home Economics Experiment Station (\$90,000).
5. DiSpirito, A.A. and D.C. Beitz. 1993 - 1994. Isolation of Cholesterol Reductase Genes from *Eubacterium coprostanoligenes*. Iowa State University Research Grant (\$7,500).
4. DiSpirito, A.A. Preparation of Ribonuclease H. BioMiracles Inc., Miami, OH. 1992-1995 (\$25,000).
3. Prometto III, A.L., C.S. Oulman and A.A. DiSpirito. 1992 - 1995. Assessment of Bioremediation Potential of Composted Soybean Hulls Blended with Oil-Degrading Bacteria to Clean Up Oil Spills Iowa Soybean Production Board (\$76,680).
2. DiSpirito, A.A. and E. Bellion. 1991 - 1992. Removal of Chlorinated Hydrocarbons by Methane Oxidizing Bacterial Advanced Technology Program of Texas. Project Number 003653-118. (\$115,000).
1. Lidstrom, M.E. and A.A. DiSpirito. 1989 - 1992. Methane Oxidation by Methanotrophs. National Institute of Health Project Number. GM-40859 (\$259,600).

#### **PATENTS AND INVENTION DISCLOSURE MEMORANDUMS**

9. Zischka, H., J. Lichmanegger, A.A. DiSpirito and J.D. Semrau. 2016. Methods and Means of Treating Copper Related Diseases, Disclosure filed 1/30/16
8. DiSpirito, A.A., J.D. Semrau, D.W. Choi and D.R. Keeney. 2014. *Use of Methanobactin*. US Patent no. 8,735,538; United States Patent and Trademark Office, Washington, DC.
7. Semrau, J.D. Im, J., S.-W. Lee, S. Yoon, A.A. DiSpirito, W. Gallagher, S. Hartsel, M.T. McEllistrem. 2014. *Methylocystis strain SB2 Materials and Methods*. US Patent no. 8,629,239; United States Patent and Trademark Office, Washington, DC.
6. DiSpirito, A.A., D.W. Choi, J.D. Semrau, and D.R. Keeney. 2011. *Use of Methanobactin and Gold Nanoparticles and Soluble forms of Au(0)* US Patent no. 7,932,052; United States Patent and Trademark Office, Washington, DC.
5. DiSpirito, A.A., J.A. Zahn, D.W. Graham, H.J. Kim, M. Alterman, and C. Larive. 2007. *Methanobactin: A Copper Binding Compound having Antibiotic and Antioxidant Activity Isolated from Methanotrophic Bacteria*. US Patent no. 0171519 A1; United States Patent and Trademark Office, Washington, DC.
4. DiSpirito, A.A., Y.S. Do, J.A. Zahn, and G. Phillips. 2002. *A Rhodobacter Strain for Odor Remediation of Anaerobic Livestock Waste Lagoons and Biomass Production.*, US Patent no. 6,489,156; United States Patent and Trademark Office. Washington, DC
3. Zahn, J.A., J.L. Hatfield, Y.S. Do, and A.A. DiSpirito. 1999. *Functional Classification of Swine Manure Management Systems Based on Solution-Phased Chemical and Gas Emission Characteristics*. USDA Invention Report No. 0012.00. United States Department of Agriculture, Agriculture Research Service, Office of the Administrator, Washington, D.C.
2. DiSpirito, A.A. and J.A. Zahn. 1999. *Methods and Means for Quantification of Odors from Livestock Wastes*. Patent No. 5,898,003. United States Patent and Trademark Office. Washington, DC.

1. DiSpirito, A.A. and J.A. Zahn. 1998. *Device for Quantification of Odors from Liquid Livestock Wastes*. Patent No. 5,766.551. United States Patent and Trademark Office. Washington, DC.

## **PUBLICATIONS**

### **Journal Publications**

90. Lichtmanegger, J., C. Leitinger, R. Winner, S. Schmitt, S. Schulz, Y. Kabiri, C. Eberhagen, T. Rieder, D. Janik, F. Neff, M. Aichler, A.A. DiSpirito, N.L. Bandow, B.S. Baral, A. Flatler, E. Kremmer, G. Denk, S. Hohenester, F. Eckardt-Schupp, N. Dencher, J. Adamski, U. Merle, D.N. Gotthardt, G. Kroemer, K.H. Weiss and H. Zischka. 2016. Methanobactin: a new effective treatment strategy against acute liver failure in a Wilson disease rat model. *J. Clin Invest.* In press.
89. Gu, W., UI-H M. Farhan, B.S. Baral, E.A. Turpin, N.L. Bandow, A.A. DiSpirito, J. Lichtmanegger, E. Kremmer, H. Zischka and J.D. Semrau. 2016. A TonB dependent transporter is responsible for methanobactin uptake by *Methylosinus trichosporium* OB3b. *Appl. Environ. Microbiol.* **82**:
88. DiSpirito, A.A., J.D. Semrau, J.C. Murrell, W.H. Gallagher, C. Dennison, and S. Vuilleumier. 2016. Methanobactin and the link between copper and bacterial methane oxidation. *Microbiol. Mol. Biol. Rev.* **80**:
87. Farhan, UI-H. M, W. Gu, A.A. DiSpirito, and J.D. Semrau. 2016. Marker exchange mutagenesis of *mxoF* encoding for the large subunit of *Mxa*-methanol dehydrogenase in *Methylosinus trichosporium* OB3b. *Appl. Environ. Microbiol.* **82**: In press.
86. Flynn, J. Hirayama, H., Sakai, Y. Dunfield, P., Klotz, M., Knief, C., Op den Camp, H. Jetten, M., Khmelenina, V., Trotsenko, Y., Murrell, C., Semrau, J. Mette Svenning, L. Stein, Nikos Kyrpides, N. Shapiro, T. Woyke, F. Bringel, S. Vuilleumier, A.A. DiSpirito, and M. Kalyuzhnaya. 2015. Draft genomes of gamma proteobacterial methanotrophs isolated from marine ecosystems. *Appl. Environ. Microbiol.* **81**: In press
85. Farhan, UI-H M., B. Kalidass, N.L. Bandow, E. Turpin, A.A. DiSpirito and J.D. Semrau. 2015. Cerium regulates expression of alternative methanol dehydrogenases in *Methylosinus trichosporium* OB3b. *Appl. Environ. Microbiol.* **81**: 7546 – 7554.
84. Farhan, UI-H. H, M.F., B. Kalidass, A. Vorobev, B. Baral, A.A. DiSpirito, and J.D. Semrau. 2015. Methanobactin from *Methylocystis* strain SB2 affects gene expression and methane monooxygenase activity in *Methylosinus trichosporium* OB3b. *Appl. Environ. Microbiol.* **81**: 2466 - 2473.
83. Kalidass, B, M.F. UI-Haque, B.S. Baral, A.A. DiSpirito, and J.D. Semrau. 2015. Competition between metals for binding to methanobactin enables expression of soluble methane monooxygenase in the presence of copper. *Appl. Environ. Microbiol.* **81**: 1024 - 1034. (*spotlight feature article*).
82. Baral, B.S., N.L. Bandow, A. Vorobev, B.C. Freemeier, B.H. Bergman, T. Herdendorf, N. Fuentes, L. Ellias, E. Turpin, J.D. Semrau, and A.A. DiSpirito. 2014. Mercury binding by methanobactin from *Methylocystis* strain SB2. *J. Inorgan. Biochem.* 141: 161 – 169.
81. Vorobev, A., S. Jagadevan, B.S. Baral, A.A. DiSpirito, B.C. Freemeier, B.H. Bergman, N.L. Bandow and J.D. Semrau. 2013. Detoxification of mercury by methanobactin from *Methylosinus trichosporium* OB3b. *Appl. Environ. Microbiol.* **79**: 5918 – 5926. . (*spotlight feature article*).
80. Kits, K.D., M.G. Kalyuzhnaya, M.G. Klotz, M.S.M. Jetten, H.J.M. Op den Camp, S. Vuilleumier, F. Bringel, A.A. DiSpirito, J.C. Murrell, D. Bruce, J.-F. Cheng, A.

- Copeland, L. Goodwin, L. Hauser, A. Lajus, M.L. Lapidus, S. Lucas, C. Medtgue, S. Pittluck, T. Woyke, A. Zeytun and L.Y. Stein. 2013. Genome sequence of the obligate gammaproteobacterial methanotrophs *Methylomicrobium album* strain BG8. *Genome A* **1**: 00170-013.
79. Khmelenina, V.N., D. Beck, C. Munk, K. Davenport, H. Daligault, T. Erkkila, L. Goodwin, W. Gu, C.-C. Lo, M. Scholz, H. Teshima, Y. Xu, P. Chain, A.A. DiSpirito, F. Bringel, S. Dedysh, P. Dunfield, M.S.M. Jetten, M.G. Klotz, M. Svenning, C. Murrell, H.J.M. Op den Camp, D. Sakai, J. Semrau, Y.A. Trotsenko, S. Vuilleumier, J. Vorhold, C. Knief, L.Y. Stein, and M.G. Kalyuzhnaya. 2013. Draft genome sequence of the *Methylomicrobium buryatense* 5G haloalkalotolerant methanotrophic bacterium. *Genome A* **1**: e0053-13.
78. Semrau, J.D., S. Jagadevan, A.A. DiSpirito, A. Khalifa, J. Scanlan, B. Bergman, B.C. Freemeir, B.S. Baral, N.L. Bandow, A. Vorobev, D.H. Haft, S. Vuilleumier, J.C. Murrell. 2013. Methanobactin and mmoD work in concert to act as the “copper switch” in methanotrophs. *Environ. Microbiol.* **15**: 3077 – 3086.
77. Khadem, A., A. Pol, A. Wiczorek, S. Vuilleumier, H. Harhangi, P. Dunfield, M. Kalyuzhnaya, C. Murrell, K.-J. Francoijs, H. Stunnenberg, L. Stein, A.A. DiSpirito, J. Semrau, A. Lajus, C. Médigue, M. Klotz, M. Jetten, and H. Op den Camp. 2012. Draft genome sequence of the volcano-inhabiting thermoacidophilic methanotroph *Methylacidiphilum fumarolicum* strain SolV. *J. Bacteriol.* **194**: 3729 – 3730.
76. Bandow, N. Gilles V.S., Freesmeier B.C., Semrau J.D., Krentz B., Gallagher W., McEllistrem M.T., Hartsel S.C., Choi D.W., Hargrove M.S., Heard, T.M., Chesner L.M., Braunreiter K.M., Cao B.V., Gavitt, M.M., Hoopes J.Z., Johnson J.M., Polster E.M., Schoenick B.D., Umlauf A.M., and DiSpirito A.A. 2012. Spectral and copper binding properties of methanobactin from the facultative methanotroph *Methylocystis* strain SB2. *J. Inorgan. Biochem.* **110**: 72 – 82.
75. Vuilleumier, S., V.N. Khmelenina, F. Bringel, A.S. Reshetnikov, A. Lajus, S. Mangenot, Z. Rouy, H. J. M. Op den Camp, M.S. M. Jetten, A.A. DiSpirito, P. Dunfield, M.G. Klotz, J.D. Semrau, L.Y. Stein, V. Barbe, Claudine Médigue, Y.A. Trotsenko and M.G. Kalyuzhnaya. 2012. Genome sequence of the haloalkaliphilic methanotrophic bacteria *Methylomicrobium alcliphilum* 20Z. *J. Bacteriol.* **194**: 551-552.
74. Sturms, R., A.A. DiSpirito, D.B. Fulton and M.S. Hargrove. 2011. Hydroxylamine reduction by ammonia by plant hemoglobins. *Biochemistry* **50**: 10829 - 10835
73. Sturms, R., A.A. DiSpirito and M.S. Hargrove. 2011. Plant and cyanobacterial hemoglobins reduce nitrite to nitric oxide under anoxic conditions. *Biochemistry* **50**: 4273 - 4280.
72. Semrau, J.D. and A.A. DiSpirito. 2011. Facultative methanotrophy: implications and applications. *FEMS Microbiol. Lett.* **323**: 1 - 12.
71. Kakar, S., R. Sturms, A. Savage, J.C. Nix, A.A. DiSpirito and M.S. Hargrove. 2011 Crystal structures of *Parasponia* and *Trema* hemoglobins: different heme coordination is linked to quaternary structure. *Biochemistry* **50**: 3873 - 3878 .
70. Stein, L.Y., F. Bringel, A.A. DiSpirito, S. Han, M.S.M. Jetten, M.G. Kalyuzhnaya, K.D. Kits, Martin G. Klotz, Huub J.M. Op den Camp, J.D. Semrau, S. Vuilleumier, D. Bruce, J.-F Cheng, A. Copeland, K.W. Davenport, L. Goodwin, S. Han, L. Hauser, A. Lajus, M.L. Land, A. Lapidus, S. Lucas, C. Médigue, S. Pittluck, and T. Woyke. 2011. Genome sequence of the methanotrophic alphaproteobacterium, *Methylocystis* sp. Rockwell (ATCC 49242). *J. Bacteriol.* **193**: 2668 - 2669.



69. Yoon, S. A.A. DiSpirito, S.M. Kraemer and J.D. Semrau. 2011. A simple assay for screening microorganisms for chalkophore production. *Meth. Enzymol.* **495**: 248 -259.
68. Bandow, N.L. W.H. Gallager, L. Behling, D.W. Choi, J.D. Semrau, S.C. Hartsel, V.S. Gilles, and A.A. DiSpirito. 2011. Isolation of methanobactin from the spent media of methane oxidizing bacteria. *Meth. Enzymol.* **495**: 260 - 269.
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66. Zischka, H., J. Lichtmanegger, S. Schulz, S. Schmitt, N. Jagemann, D. Hamöller, L. Jennen, C. Rust, N. Larochette, L. Galluzzi, V. Chajes, N. Bandow, V.S. Gilles, A.A. DiSpirito, I. Esposito, M. Goettlicher, K.H. Summer<sup>1</sup> and G. Kroemer. 2011. Mitochondria membrane crosslinking and fragmentation in Wilson disease. *J. Clin. Investigation.* 121: 1508 – 1518.
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**Conference Proceedings, Encyclopedia and Book Chapters**

11. Hooper, A.B. and A.A. DiSpirito. 2013. Chemoautotrophy. *In*. W.J. Lansford. Jr. and M.D. Lane (eds.) *The Encyclopedia of Biological Chemistry*, 2<sup>nd</sup> edition. vol 1. pp. 486 – 492. Waltham, MA: Academic Press.
10. Choi, D.W. A.A. DiSpirito, D.C. Chipman and R.C. Brown. 2011. Hybrid processing. pp. 280 – 306. *In* R.C. Brown (ed.). *Thermochemical Process of Biomass: Conversion into Fuels, Chemicals and Power*, Wiley, Indianapolis, IN.
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1. DiSpirito, A.A. and O.H. Tuovinen. 1984. Oxidation of nonferrous metals by thiobacilli. p. 11-29. *In*. W.R. Strohl and O.H. Tuovinen (eds.), Microbial Chemoautotrophy. Ohio State University Press. Washington, D.C.

#### **INVITED SPEAKER AND DISCUSSION LEADER**

29. University of Iowa. Inorganic Biochemistry Group (2012)
28. University of Nevada Las Vegas, Department of Life Sciences (2011)
27. University of Wisconsin-Eau Claire. Department of Chemistry (2011)
26. Gordon Research Conference on The Molecular Basis of Microbial One-Carbon Metabolism, Bates College Lewiston, Maine (2010)
25. Gordon Research Conference on The Molecular Basis of Microbial One-Carbon Metabolism, Bates College Lewiston, Maine (2008)
24. Gordon Research Conference on The Molecular Basis of Microbial One-Carbon Metabolism, Oxford UK (2006)
23. Workshop on Phototrophic Dairy Lagoons. sponsored by Eastern Stanislaus Resource Conservation District, Yosemite Farm Credit and California Dairy Campaign, Davis, CA (2006)
22. Montana State University. Department of Microbiology (2005)
21. University of Wisconsin-Eau Claire. Department of Chemistry (2004)
20. Cargill National Fermentation Meetings, Evansville, IA. (2003)
19. Biogeochemical Controls on Motility and Bioavailability of Metals in Soils and Groundwater Monte Verita, Ascona, Switzerland, Semrau, J.D. and A.A. DiSpirito (2003)
18. Gordon Research Conference on The Molecular Basis of Microbial One-Carbon Metabolism, Connecticut College, CN (2000)
17. 50th Environmental Engineering Conference, University of Kansas. (2000)
16. American Society of Microbiology, National Meeting, Chicago, IL (1999)
15. American Society of Microbiology, North Central Branch, University of South Dakota (1998)
14. Gordon Research Conference on The Molecular Basis of Microbial One-Carbon Metabolism, New England College, NH (1998)

13. University of Michigan, Department of Civil and Environmental Engineering & Department of Microbiology (1998)
12. Georgia Institute of Technology, Department of Biology (1996)
11. American Association of Swine Practitioners Annual Meeting, Minneapolis, Minnesota (1996)
10. International Livestock Odor Conference, Iowa State University (1995)
9. American Society of Microbiology, North Central Branch, University of Iowa (1995)
8. Allen D. Leman Swine Conference, St. Paul, MN (1995)
7. Iowa Ground Water Association, Des Moines (1995)
6. University of Minnesota, Department of Genetics and Cell Biology (1994)
5. Abbot Laboratories, Chicago, IL, Agricultural Products Division (1993)
4. University of Wisconsin, Eau Claire, Department of Chemistry (1993)
3. Michigan State University, Department of Microbiology (1993)
2. University of California, San Francisco, Department of Biochemistry and Biophysics (1984)
1. Illinois Institute of Technology, Department of Biology (1983)

### **COURSES TAUGHT**

16. Introduction to Bioenergetics and Metabolism (graduate)
15. Comprehensive Biochemistry I (graduate)
14. Comprehensive Biochemistry II (graduate)
13. Techniques in Biochemical Research (undergraduate)
12. Biochemistry I (undergraduate)
11. Microbial Diversity (undergraduate)
10. Microbial Physiology and Genetics (undergraduate)
9. Microbial Physiology Laboratory (undergraduate)
8. Microbial Physiology (undergraduate)
7. General Microbiology Laboratory (undergraduate)
6. General Microbiology (undergraduate)
5. Industrial Microbiology and Biotechnology (undergraduate)
4. Molecular Biology of Prokaryotes (undergraduate)
3. Water Microbiology Laboratory (undergraduate)
2. General Biology Laboratory (undergraduate)
1. General Biology (undergraduate)