

## Michael J. Wilkins

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### Professional Experience

- 2018- Assistant Professor, Colorado State University, Department of Soil and Crop Sciences, Fort Collins, CO, USA
- 2013-2018 Assistant Professor, The Ohio State University, School of Earth Sciences & Department of Microbiology, Columbus, OH, USA
- 2009-2013 Senior Staff Scientist, Biological Sciences Division, Pacific Northwest National Laboratory, Richland, WA, USA
- 2006-2008 Postdoctoral Research Associate, Department of Earth and Planetary Science, University of California, Berkeley, CA, USA

### Education

Ph.D. Geomicrobiology, University of Manchester, UK, April 2006  
BS Microbiology, University of Birmingham, UK, April 2002

### Research Funding

*Summary since Fall 2013: Contributed to \$4.2M in research funding (~ \$2M to the Wilkins Laboratory). Funding sources include industry (Dow), state (OWDA), and federal agencies (NSF, DOE). Instrumentation awards extend research funding, only PI led reported (estimated value \$320,000)*

#### ***Awarded and Active Grants***

National Science Foundation – Dimensions of Biodiversity. 2014-2018.

*Microbial Biodiversity and Functionality of Deep Shale and its Interfaces (DSIs).*

P Mouser (PI), **M Wilkins**, D Cole, S Sharma, K Wrighton. \$1,645,612 total. (**\$449,923** to Wilkins)

Department of Energy. Biological and Environmental Research. 2016-2018.

*Seasonal controls on dynamic hyporheic zone redox biogeochemistry.*

**M Wilkins** (PI), A. Sawyer, K. Williams. \$182,424 total. (**\$103,061** to Wilkins)

Ohio Water Development Authority. 2016-2018.

*Microbial drivers of iron and arsenic mobilization in Ohio aquifers.*

**M Wilkins** (PI). **\$406,934**

Department of Energy. National Energy Technology Laboratory. 2017-2018.

*Marcellus Shale Energy and Environment Laboratory.*

T Carr (lead PI), **M Wilkins**, K Wrighton, T Darrah, P Mouser. (**\$42,000** to Wilkins)

Dow Microbial Control. 2017-2020.

*Leveraging microbial metabolisms to influence production chemistry and well longevity during energy extraction.*

**M. Wilkins** (PI), K. Wrighton. \$245,729 total. (**\$125,147** to Wilkins)

**Grants submitted, Pending**

NASA, Exobiology. 2019-2022.

*Methylamine Cycling as a Conserved Metabolic Strategy in Subsurface Saline Habitats.*

**M Wilkins** (PI), K. Wrighton. \$403,160 total (**\$257,000** to Wilkins)

National Science Foundation – Geobiology and Low Temperature Geochemistry. 2019-2024

*CAREER: Fractured Shales as Portals into Cryptic Carbon and Nitrogen Cycling in the Deep Biosphere*

**M Wilkins (PI)**. \$557,223 total

**Completed Grants**

Department of Energy. Biological and Environmental Research. 2013-2017.

*Using Coupled 'Omics' Datasets to Infer Metabolic Processes in the Rifle Subsurface.*

S Hubbard (PI), **M Wilkins**. (**\$267,000** to Wilkins)

Department of Energy. Biological and Environmental Research. 2013-2014.

*Microbiological characterization of subsurface systems at the Hanford 300 Area, WA.*

J Zachara (PI), J Fredrickson, **M Wilkins**. (**\$58,000** to Wilkins)

Pacific Northwest National Laboratory – internal Laboratory Directed Research and Development funds. 2010-2013.

*Microbial processes accompanying deep geologic CO<sub>2</sub> sequestration.*

**M Wilkins** (PI). **\$400,000**

Pacific Northwest National Laboratory – internal Laboratory Directed Research and Development funds. 2010-2013.

*Advancing the use of microfluidic models for studying microbial communities: Integration of microfluidic model experimentation, multimodal imaging, and modeling.*

**M Wilkins** (PI), V Bailey, J Grate, G Orr, H Resat, C Zhang. \$1,250,000 total. (**\$432,643** to Wilkins)

**Awarded and Active Instrumentation Grants (only Wilkins as PI included)**

Department of Energy. Environmental Molecular Sciences Laboratory. 2015-2017.

*Dynamic sulfur pools as a control on methane flux in freshwater Prairie Pothole lacustrine sediments.*

**M Wilkins** (PI).

Equivalent dollar value for NMR, FT-ICR, and transcriptomics: \$118,547

Department of Energy, Environmental Molecular Sciences Laboratory. 2018.

*Life in the deep terrestrial subsurface: microbial metabolism before and after shale gas extraction.*

**M Wilkins** (PI), K Wrighton, P Mouser.

Equivalent dollar value for NMR and proteomics: \$71,072

Department of Energy. Joint Genome Institute. 2015-2016.

*Seasonal sulfur cycling as a control on methane flux in carbon-rich prairie pothole sediment ecosystems.*

**M Wilkins** (PI).

Equivalent dollar value for DNA sequencing: \$30,000

Department of Energy. Environmental Molecular Sciences Laboratory. 2011-2014.

*Investigating the effects of geologic CO<sub>2</sub> sequestration on microbial physiology, metabolism, and functionality.*

**M Wilkins** (PI).

Equivalent dollar value for NMR, transcriptomics: \$102,583

## **Oral Presentations by MJ Wilkins**

*Summary: 22 total oral presentations both international and national since 2014  
2018 (4), 2017 (3), 2016 (3), 2015 (6), and 2014 (6)*

### **Invited University, Federal, or Industry Seminars**

- Department of Chemical Engineering, University of Wyoming, WY, USA (Feb. 2018)
- Department of Soil and Crop Science, Colorado State University, CO, USA (Jan. 2018)
- Department of Geology, Miami University, OH, USA (Sept. 2017)
- Biological Sciences Division, Pacific Northwest National Laboratory, WA, USA (Feb. 2017)
- Marine Science and Technology Center, University of Maryland, MD, USA (April 2016)
- Department of Microbiology, University of Akron, OH, USA (April 2015)
- Department of Geology, West Virginia University, WV, USA (April 2015)
- Baker-Hughes, Houston, TX, USA (March 2015)
- Department of Biological Sciences, Scripps Institution of Oceanography, CA, USA (Oct. 2015)
- Department of Geology, Michigan State University, MI, USA (Oct. 2014)
- Department of Microbiology, Miami University, OH, USA (Sept. 2014)
- Department of Geology, Wright State University, OH, USA (March 2014)
- Washington State University, WA, USA (March 2012)

### **Conference or Workshop Presentations**

- Goldschmidt 2018, Boston, USA (August 2018). (Invited)
- 5<sup>th</sup> International Symposium on Microbial Sulfur Metabolism, Vienna, Austria (April 2018). (Invited)
- Multiomics Meeting 2017, Richland, WA, USA (August 2017). (Invited)
- Recent Advances in Microbial Control, San Diego, CA, USA (Oct. 2016) (Invited)
- UK Geomicrobiology Network, Bangor, UK (June 2016) (Invited)
- American Geophysical Union, Fall Meeting. San Francisco, CA, USA (Dec. 2015) (Invited)
- DCO Workshop on Extreme Biophysics, Washington DC, USA (Nov. 2015) (Invited)
- Joint International Continental Drilling Program (ICDP)/International Ocean Discovery Program (IODP) meeting, Seoul, South Korea (August 2014) (Invited)
- International Continental Drilling Program (ICDP), Potsdam, Germany (May 2014) (Invited)
- Ohio Branch ASM meeting, Columbus, OH, USA (April 2014) (Invited)
- International Society for Microbial Ecology (ISME) Annual Meeting, Copenhagen, Denmark. (August 2012) (Contributed)
- American Geophysical Union, Fall Meeting. San Francisco, CA, USA (Dec. 2011) (Contributed)

- Joint International Symposia for Subsurface Microbiology and Environmental Microbiology (ISSM/ISEB), Jackson Hole, WY, USA (July 2005) (Contributed)

## **Publications**

*Summary: 62 publications*

*Total citations (via Google Scholar): 2655 (H-index 26, i-10 44)*

*\*denotes graduate student supervised by Wilkins, #Wilkins corresponding author*

## **Journal Articles**

1. Dalcin Martins P\*, Danczak RE\*, Roux S, Frank J, Borton MA, Wolfe RA, Burris MN, and **Wilkins MJ**<sup>#</sup> (2018) Viral and Metabolic Controls on High Rates of Microbial Sulfur and Carbon Cycling in Wetland Ecosystems. *Microbiome*. In Press
2. Danczak RE\*, Johnston MD, Kenah C, Slattery M, and **Wilkins MJ**<sup>#</sup> (2018) Microbial community cohesion mediates community turnover in unperturbed aquifers. *mSystems*. doi: 10.1128/mSystems.00066-18
3. Borton MA, Hoyt DW, Roux S, Daly RA, Welch SA, Nicora CD, Purvine S, Eder EK, Hanson AJ, Sheets JM, Morgan DM\*, Sharma S, Carr TR, Cole DR, Mouser PJ, Lipton MS, **Wilkins MJ**, and Wrighton KC (2018) Coupled laboratory and field investigations resolve microbial interactions that underpin persistence in hydraulically fractured shales. *Proceedings of the National Academy of Sciences*. doi: 10.1073/pnas.1800155115
4. Stegen JC, Johnson T, Fredrickson JF, **Wilkins MJ**, Konopka AE, Nelson WC, Arntzen EV, Chrisler WB, Chu RK, Fansler SJ, Kennedy DW, Resch CT, Tfaily MM, and Zachara J. (2018) Influences of Organic-C Speciation on Hyporheic Corridor Biogeochemistry and Microbial Ecology. *Nature Communications*, 9:585. doi: 10.1038/s41467-018-02922-9
5. Grotoli AG, Dalcin Martins P\*, **Wilkins MJ**, Johnston MD, Warner ME, Cai WJ, Melman TF, Hoadley KD, Pettay DT, Hu X, Levas S, and Schoepf V (2018) In the face of global change, coral with stable microbiomes are also physiologically stable. *PLoS One*, doi: 10.1371/journal.pone.0191156
6. Danczak RE\*, Johnston MD, Kenah C, Slattery M, Wrighton KC, and **Wilkins MJ**<sup>#</sup> (2017) Members of the Candidate Phyla Radiation are functionally differentiated by carbon and nitrogen cycling capabilities. *Microbiome*, doi: 10.1186/s40168-017-0331-1
7. Booker AE\*, Borton MA, Daly RA, Welch S, Nicora CD, Hoyt DW, Wilson T, Purvine SO, Sharma S, Mouser PJ, Cole DR, Lipton MS, Wrighton KC, and **Wilkins MJ**<sup>#</sup> (2017) Sulfide Generation by Dominant Colonizing *Halanaerobium* Microorganisms in Hydraulically Fractured Shales. *mSphere*, doi: 10.1128/mSphereDirect.00257-17
8. Booker AE\*, Johnston MD, Daly RA, Wrighton KC, and **Wilkins MJ**<sup>#</sup> (2017) Draft genome sequences of multiple *Frackibacter* strains isolated from hydraulically fractured shale environments. *ASM Genome Announcements*. 5:32 e00608-17. doi: 10.1128/genomeA.00608-17
9. Saup CM\*, Williams KH, Rodriguez-Freire L, Cerrato JM, Johnston MD, and **Wilkins MJ**<sup>#</sup> (2017) Anoxia stimulates microbially catalyzed metal release from Animas River sediments. *Environmental Science: Processes and Impacts*. doi: 10.1039/C7EM00036G
10. Yabusaki SB, **Wilkins MJ**, Fang Y, Williams KH, Arora B, Bargar J, Beller HR, Bouskill NJ, Brodie EL, Christensen JN, Conrad MJ, Danczak RE\*, King E, Spycher NF, Steefel CI,

- Tokunaga T, Versteeg R, Waichler SR, and Wainright HM (2017) Water Table Dynamics and Biogeochemical Cycling in a Shallow, Variably-Saturated Floodplain. *Environmental Science & Technology*. doi: 10.1021/acs.est.6b04873
11. Dalcin Martins P\*, Hoyt DW, Bansal S, Mills CT, Tfaily M, Tangen BA, Finocchiaro RG, Johnston MD, McAdams BC, Solensky MJ, Smith GJ, Chin Y-P, and **Wilkins MJ**<sup>#</sup> (2017) Abundant carbon substrates drive extremely high sulfate reduction rates and methane fluxes in Prairie Pothole Wetlands. *Global Change Biology*. doi: 10.1111/gcb.13633
  12. Danczak RE\*, Yabusaki SB, Williams KH, Fang Y, Hobson C, and **Wilkins MJ**<sup>#</sup> (2016) Snowmelt induced hydrologic perturbations drive dynamic microbiological and geochemical behaviors across a shallow riparian aquifer. *Frontiers in Earth Sciences*. 4:57. doi: 10.3389/feart.2016.00057
  13. Danczak RE\*, Sawyer AH, Williams KH, Stegen JC, Hobson C, and **Wilkins MJ**<sup>#</sup> (2016) Seasonal hyporheic dynamics control coupled microbiology and geochemistry in Colorado River sediments. *Journal of Geophysical Research – Biogeosciences*. doi: 10.1002/2016JG003527
  14. Anantharaman K, Brown CT, Hug LA, Sharon I, Castelle CJ, Probst AJ, Thomas BC, Singh A, **Wilkins MJ**, Karaoz U, Brodie EL, Williams KH, Hubbard SS, and Banfield JF (2016) Thousands of microbial genomes shed light on interconnected biogeochemical processes in an aquifer system. *Nature Communications*, 7, 13219. doi:10.1038/ncomms13219
  15. Daly RA, Borton MA, **Wilkins MJ**, Hoyt DW, Wolfe R, Kountz DJ, Welch SA, Marcus DN, Trexler RV, McRae J, Krzycki JA, Cole DR, Mouser PJ, and Wrighton KC (2016) Microbial metabolisms in a 2.5-km-deep ecosystem created by hydraulic fracturing in shales. *Nature Microbiology* 1, 16146 doi:10.1038/nmicrobiol.2016.146
  16. Wrighton KC, Castelle CJ, Varaljay V, Satagopan S, Brown CT, **Wilkins MJ**, Thomas BC, Williams KH, Tabita FR, and Banfield JF (2016) RubisCO of a nucleotide pathway from Archaea is central to the metabolism of diverse uncultivated bacteria. *ISME Journal*. doi: 10.1038/ismej.2016.53
  17. Stegen JC, Fredrickson JF, **Wilkins MJ**, Konopka AE, Nelson WC, Arntzen EV, Chrisler WB, Chu RK, Danczak RE\*, Fansler SJ, Kennedy DW, Resch CT, and Tfaily M (2016) Coupled Microbiome-Biogeochemical Responses to Groundwater-Surface Water Mixing. *Nature Communications*. 7, 11237. doi:10.1038/ncomms11237
  18. Harvey OR, Qafoku NP, Cantrell KJ, **Wilkins MJ**, and Brown CF (2015) A Geochemical Perspective on Hydrogenotrophic Methanogenesis: Mechanism, Kinetics and Effects on Aqueous Geochemistry. *Geochimica et Cosmochimica Acta*. 173, 232-245
  19. McGuinness LR, **Wilkins MJ**, Williams KH, Long PE, and Kerkhof L (2015) Active bacteria using uranium as a terminal electron acceptor at the Rifle, CO, Integrated Field Research Site. *PLoS One*. doi: 10.1371/journal.pone.0137270
  20. Hug LA, Thomas BC, Sharon I, Brown CT, Sharma R, Hettich RL, **Wilkins MJ**, Williams KH, Singh A, and Banfield JF (2015) Critical biogeochemical functions in the subsurface are associated with bacteria from new phyla and little studied lineages. *Environmental Microbiology*, doi: 10.1111/1462-2920.12930

21. Brown CT, Hug LA, Thomas BC, Sharon I, Castelle CJ, Singh A, **Wilkins MJ**, Wrighton KC, Williams KH, and Banfield JF (2015) Unusual Biology Across a Group Comprising >15% of Domain Bacteria. *Nature*, doi: 10.1038/nature14486
22. Long PE, Williams KH, Davis JA, Fox PM, **Wilkins MJ**, Yabusaki SB, Fang Y, Waichler SR, Berman ESF, Gupta M, Chandler DP, Murray C, Peacock AD, Giloteaux L, Handley KM, Lovley DR, and Banfield JF (2015) Bicarbonate Impact on U(VI) Bioreduction in a Shallow Alluvial Aquifer. *Geochimica et Cosmochimica Acta*, 150, 106-124
23. Grate JW, Kai-For M, Shin Y, Vasdekis A, Warner M, Kelly R, Orr G, Hu D, Dehoff K, Brockman F, and **Wilkins MJ** (2015) Alexa Fluor-labeled Fluorescent Cellulose Nanocrystals for Bioimaging Solid Cellulose in Spatially-Structured Microenvironments. *Bioconjugate Chemistry*, doi: 10.1021/acs.bioconjchem.5b00048
24. Merkley E, Wrighton KC, Castelle CJ, Anderson, B, **Wilkins MJ**, Shah V, Arbour T, Brown J, Singer S, Smith R, and Lipton, MS (2015) Changes in protein expression across laboratory and field experiments in *Geobacter bemi*. *Journal of Proteome Research*, 14, 1361-1375
25. Castelle CJ, Wrighton KC, Thomas BC, Hug LA, Brown CT, **Wilkins MJ**, Frischkorn KR, Tringe SG, Singh A, Markillie LM, Taylor RC, Williams KH, and Banfield JF (2015) Genomic expansion of Domain Archaea highlights roles for organisms from new phyla in subsurface anaerobic carbon cycling. *Current Biology*, 25, 690-701
26. Kieft TL, Onstott TC, Ahonen L, Aloisi V, Colwell FS, Engelen B, Fendrihan S, Gaidos E, Harms U, Head I, Kallmeyer J, Kiel Reese B, Lin L-H, Long PE, Moser DP, Mills H, Sar P, Schulze-Makuch D, Stan-Lotter H, Wagner D, Wang P-L, Westall F, and **Wilkins MJ** (2015) Workshop to develop deep-life continental scientific drilling projects. *Scientific Drilling*, 3, 1-11
27. **Wilkins MJ**<sup>#</sup>, Daly R, Mouser PJ, Trexler R, Sharma S, Cole DR, Wrighton KC, Biddle JF, Denis EH, Fredrickson JK, Kieft TL, Onstott TC, Petersen L, Pfiffner SM, Phelps TJ, and Schrenk MO (2014) Trends and future challenges in sampling the deep terrestrial biosphere. *Frontiers in Microbiology*, doi: 10.3389/fmicb.2014.00481
28. **Wilkins MJ**<sup>#</sup>, Hoyt DW, Marshall MJ, Alderson PA, Plymale AE, Markilli LM, Tucker AE, Walter ED, Linggi BE, Dohnalkova AC, and Taylor RC (2014) CO<sub>2</sub> exposure at pressure impacts metabolism and stress responses in the model sulfate-reducing bacterium *Desulfovibrio vulgaris* strain Hildenborough. *Frontiers in Microbiology*, doi: 10.3389/fmicb.2014.00507
29. Holmes DE, Giloteaux L, Chaurasia A, Williams KH, Luef B, **Wilkins MJ**, Wrighton KC, Thompson C, Comolli LR, and Lovley DR (2014) Evidence of *Geobacter*-associated phage in a uranium contaminated aquifer. *ISME Journal*, doi:10.1038/ismej.2014.128
30. Vasdekis AE, **Wilkins MJ**, Grate JW, Kelly RT, Konopka AE, Xantheas SS and Chang TM (2014) Solvent immersion imprint lithography. *Lab On A Chip*, 14, 2072-2080
31. **Wilkins MJ**<sup>#</sup>, Kennedy DW, Castelle CJ, Field EK, Stepanauskas R, Fredrickson JK, and Konopka A (2014) Single cell genomics reveal metabolic strategies for microbial growth and survival in an oligotrophic aquifer. *Microbiology*, 160: 362-372
32. Wrighton KC, Castelle CJ, **Wilkins MJ**, Hug, LA, Sharon I, Thomas BC, Handley KM, Mullin SW, Nicora CD, Singh A, Lipton MS, Long PE, Williams KH, and Banfield JF

- (2014) Metabolic interdependencies between phylogenetically novel fermenters and respiratory organisms in an unconfined aquifer. *ISME Journal*, 8, 1452–1463; doi:10.1038/ismej.2013.249
33. Handley KM, Wrighton KC, Miller CS, **Wilkins MJ**, Kantor RS, Thomas BC, Williams KH, Gilbert JA, Long PE and Banfield JF (2014) Disturbed subsurface microbial communities follow equivalent trajectories despite different structural starting points. *Environmental Microbiology*, doi: 10.1111/1462-2920.12467
  34. **Wilkins MJ**<sup>#</sup>, Wrighton KC, Nicora, CD, Williams KH, McCue LA, Handley KM, Miller CS, Giloteaux L, Montgomery AP, Lovley DR, Banfield JF, Long PE and Lipton MS (2013) Fluctuations in species-level protein expression occur during element and nutrient cycling in the subsurface. *PLoS One*, 8(3): e57819
  35. Holmes DE, Giloteaux L, Williams KH, Wrighton KC, **Wilkins MJ**, Thompson CA, Roper TJ, Long PE and Lovley DR (2013) Enrichment of specific protozoan populations during *in situ* bioremediation of uranium-contaminated groundwater. *ISME Journal*, 7: 1286-1298
  36. Holmes DE, Giloteaux L, Barlett M, Chavan MA, Smith JA, Williams KH, **Wilkins MJ**, Long PE and Lovley DR (2013) Molecular analysis of the *in situ* growth rate of subsurface *Geobacter* species. *Applied and Environmental Microbiology*, 79: 1646-1653
  37. Giloteaux L, Holmes DE, Williams KH, Wrighton KC, **Wilkins MJ**, Montgomery AP, Smith JA, Orellana R, Thompson CA, Roper TJ, Long PE and Lovley DR (2013) Characterization and transcription of arsenic respiration and resistance genes during *in situ* uranium bioremediation. *ISME Journal*, 7: 370-83
  38. Jin H, Lin C, Shang J, **Wilkins MJ**, Liu Y, Gong W, Xu W, Squier T, and Long PE (2013) A  $\beta$ -Like Peptide Displayed on Bacteriophage T7 Catalyzes Chromate and Uranyl Reduction. *Journal of Environmental Protection*, 4: 857-868. doi: 10.4236/jep.2013.48100.
  39. Williams KH, **Wilkins MJ**, N'Guessan AL, Arey B, Dodova E, Dohnalkova A, Holmes D, Yang L, Lovley DR, Banfield JF and Long PE (2013) Field evidence of selenium bioreduction in a uranium contaminated aquifer. *Environmental Microbiology Reports*, 5: 444-452
  40. Fang Y, **Wilkins MJ**, Yabusaki SB, Lipton MS and Long PE (2012) Evaluation of a genome-scale *in silico* metabolic model of *Geobacter metallireducens* using proteomic data from a field biostimulation experiment. *Applied and Environmental Microbiology*, 78:8735-8742
  41. Luef B, Fakra SC, Csencsits R, Wrighton KC, Williams KH, **Wilkins MJ**, Downing KH, Long PE, Comolli LR and Banfield JF (2012) Iron-reducing bacteria accumulate ferric oxyhydroxide nanoparticle aggregates that may support planktonic growth. *ISME Journal*, 7: 338-350
  42. Webb-Robertson BJM, Bailey VL, Fansler SJ, **Wilkins MJ** and Hess NJ (2012) Spectral signatures for the classification of microbial species using Raman spectra. *Analytical and Bioanalytical Chemistry*, 404: 563-572.
  43. Pearce CI, **Wilkins MJ**, Zhang C, Heald S, Fredrickson JK and Zachara JF (2012) Pore-scale imaging and characterization of biogeochemical controls on iron and uranium speciation under flow conditions. *Environmental Science and Technology*, 46: 7992-8000

44. Konopka A and **Wilkins MJ** (2012) Application of meta-transcriptomics and -proteomics to analysis of *in situ* physiological state. *Frontiers in Microbiology*, 3:184
45. Wrighton KC, Thomas BC, Sharon I, Miller CS, Castelle CJ, VerBerkmoes NC, **Wilkins MJ**, Hettich RL, Lipton MS, Williams KH, Long PE and Banfield JF (2012) Fermentation, hydrogen, and sulfur metabolism in multiple uncultivated bacterial phyla. *Science*, 337: 1661
46. Handley KM, Wrighton KC, Piceno YM, Andersen GL, DeSantis TZ, Williams KH, **Wilkins MJ**, N'Guessan LA, Peacock A, Bargar J, Long PE and Banfield JF (2012) High- Density PhyloChip profiling of stimulated aquifer microbial communities reveals a complex response to acetate amendment. *FEMS Microbiology Ecology*, 81: 188-204.
47. Campbell KM, Davis JA, Bargar J, Giammar D, Bernier-Latmani R, Kukkadapu R, Williams KH, Varamani H, Ulrich KU, Stubbs J, Yabusaki S, Figueroa L, Leshner E, **Wilkins MJ**, Peacock A and Long PE (2011) Composition, stability, and measurement of reduced uranium phases for groundwater bioremediation at Old Rifle, CO. *Applied Geochemistry*, 26: S167-169
48. **Wilkins MJ**<sup>#</sup>, Callister SJ, Miletto M, Williams KH, Nicora CD, Lovley DR, Long PE and Lipton MS (2011) Development of a biomarker for *Geobacter* activity and strain composition; Proteogenomic analysis of the citrate synthase protein during bioremediation of U(VI). *Microbial Biotechnology*, 4: 55-63
49. Callister SJ, **Wilkins MJ**, Lipton MS, Nicora CD, Williams KH, Banfield JF, VerBerkmoes NC, Hettich RL, N'Guessan AL, Mouser PJ, Elifantz H, Lovley DR and Long PE (2010) Analysis of biostimulated microbial communities from two field experiments reveals temporal and spatial differences in proteome profiles. *Environmental Science & Technology*, 44: 8897-8903.
50. Elifantz H, N'Guessan AL, Mouser PJ, Williams KH, **Wilkins MJ**, Risso C, Holmes DE, Long PE and Lovley DR (2010) Expression of acetate permease-like (*apl*) genes in subsurface communities of *Geobacter* species under fluctuating acetate concentrations. *FEMS Microbiology Ecology*, 73: 441-449
51. N'Guessan AL, Elifantz H, Nevin KP, Mouser PJ, Methe B, Woodward TL, Manley K, Williams KH, **Wilkins MJ**, Larsen JT, Long PE and Lovley DR (2010) Molecular analysis of phosphate limitation in *Geobacteraceae* during the bioremediation of a uranium-contaminated aquifer. *ISME Journal*, 4: 253-266
52. Williams KH, Long PE, Davis JA, **Wilkins MJ**, N'Guessan AL, Yang L, Newcomer D, Spane FA, McGuinness L, Kerkhof LJ, Dayvault R and Lovley DR (2011) Acetate availability and its influence on sustainable bioremediation of uranium-contaminated groundwater. *Geomicrobiology Journal*, 28: 519-539
53. **Wilkins MJ**, Livens FR, Vaughan DJ, Beadle I, Small J and Lloyd JR (2010) Fe(III) reduction in the subsurface at a low-level radioactive waste disposal site. *Geomicrobiology Journal*, 27: 231-239.
54. **Wilkins MJ**, VerBerkmoes NC, Williams KH, Callister SJ, Hettich RL, Lipton MS, Mouser PJ, Elifantz H, N'Guessan AL, Lovley DR, Long PE and Banfield JF (2009) Proteogenomic monitoring of *Geobacter* physiology during stimulated uranium bioremediation. *Applied and Environmental Microbiology*, 75: 6591-6599



55. Li L, Steefel CI, Williams KH, **Wilkins MJ** and Hubbard SS (2009) Mineral transformations and biomass accumulation during uranium bioremediation at Rifle, Colorado. *Environmental Science & Technology*, 43: 5429-5435
56. Williams KH, Kemna A, **Wilkins MJ**, Druhan J, Arntzen E, N'Guessan AL, Long PE, Hubbard SS and Banfield JF (2009) Geophysical monitoring of microbial activity during stimulated subsurface bioremediation. *Environmental Science & Technology*, 43: 6717-6723
57. Mouser PJ, N'Guessan AL, Elifantz H, Holmes DE, Williams KH, **Wilkins MJ**, Long PE and Lovley DR (2009) Impact of heterogeneous ammonium availability on community structure and the expression of nitrogen fixation and ammonium transporter genes during *in situ* bioremediation of uranium-contaminated groundwater. *Environmental Science & Technology*, 43: 4386-4392
58. Hand VL, Lloyd JR, Vaughan DJ, **Wilkins MJ** and Boulton S (2008) Experimental studies of the influence of grain size, oxygen availability and organic carbon availability on bioclogging in porous media. *Environmental Science & Technology*, 42: 1485-1491
59. **Wilkins MJ**, Livens FR, Vaughan DJ, Beadle I and Lloyd JR (2007) The influence of microbial redox cycling on radionuclide mobility in the subsurface at a low-level radioactive waste storage site. *Geobiology*, 5: 293-301
60. **Wilkins MJ**, Wincott PL, Livens FR, Vaughan DJ and Lloyd JR (2007) Growth of *Geobacter sulfurreducens* on poorly crystalline Fe(III) oxyhydroxide coatings. *Geomicrobiology Journal*, 24: 199-204
61. **Wilkins MJ**, Livens FR, Vaughan DJ and Lloyd JR (2006) The impact of Fe(III)-reducing bacteria on uranium mobility. *Biogeochemistry*, 78: 125-150
62. Davis JA, Curtis GP, **Wilkins MJ**, Kohler M, Fox P, Naftz DL and Lloyd JR (2006) Processes affecting transport of uranium in a suboxic aquifer. *Physics and Chemistry of the Earth*, 31: 548-555

### Book Chapters

1. Wrighton KC, Daly RA and **Wilkins MJ** (2017) Illuminating the Microbial Dark Matter Beneath your Feet: Microbial Catalysis in the Terrestrial Subsurface. In *The Chemistry of Microbiomes: Proceedings of a Seminar Series*. The National Academies Press. doi: 10.17226/24751
2. **Wilkins MJ** and Fredrickson JK (2015) Terrestrial Subsurface Ecosystem. In *Erlich's Geomicrobiology*, 6<sup>th</sup> Edition; Erlich H, Newman DK, Kappler A, Eds.
3. Melton SJ, Yu H, Ali MF, Williams KH, **Wilkins MJ**, Long PE and Blake DA (2008) Detection of hexavalent uranium with inline and field portable immunosensors. In *Uranium, Mining, and Hydrogeology*; Merkel BJ; Hasche-Berger A, Eds. Springer-Verlag; Berlin.

### Submitted

1. Heavner GLW, Mansfeldt CB, **Wilkins MJ**, Nicora CD, Edwards EA, and Richardson RE (2018) Detection of Organohalide-Respiring Enzyme Biomarkers at a Bioaugmented TCE-Contaminated Field Site. *Frontiers in Microbiology*. Submitted
2. Daly RA, Roux S, Borton MA, Morgan DM, Johnston MD, Booker AE\*, Hoyt DW, Meulia T, Wolfe RA, Hanson AJ, Mouser PJ, Sullivan MB, Wrighton KC, and **Wilkins MJ**<sup>#</sup> (2018)

Viruses control dominant bacteria colonizing the terrestrial deep biosphere after hydraulic fracturing. *Nature Microbiology*. In revision.

3. Volker Evans M, Panescu J, Hanson AJ, Welch SA, Sheets JM, Nastasi N, Daly RA, Cole DR, Darrah TH, **Wilkins MJ**, Wrighton KC, and Mouser PJ (2018) Influence of *Marinobacter* and *Arcobacter* taxa on system biogeochemistry during early production of hydraulically fractured shale gas wells in the Appalachian Basin. *Frontiers in Microbiology*. Submitted

### Highlighted Press

- Article of 2018 paper describing shale biogeochemistry across multiple wells that was published in PNAS  
<https://news.osu.edu/news/2018/06/25/research-fracking-microbes/>
- Article on 2017 paper describing sulfidogenesis in a dominant shale-dwelling microorganism  
<https://www.asm.org/index.php/mbiosphere/item/6649-fractured-shale-makes-a-cozy-home-for-sulfur-cycling-microbes>
- Article on 2016 research in hyperheic zone function  
<http://www.pnnl.gov/news/release.aspx?id=4265>
- Articles on 2016 paper describing microbial communities in hydraulically fractured shales  
<http://arstechnica.com/science/2016/09/fracking-creates-an-ecosystem-2-5km-beneath-the-earths-surface/>  
<http://discovermagazine.com/2017/janfeb/90-digging-deep-for-new-bacteria> (Candidatus Frackibacter was listed in the ‘100 top stories of 2016’)
- Article on 2016 paper describing expansion of the microbial tree of life  
<https://www.sciencedaily.com/releases/2016/10/161024090624.htm>
- Articles on 2015 Nature paper describing new physiology in the Candidate Phyla Radiation  
<http://news.berkeley.edu/2015/06/15/newfound-groups-of-bacteria-are-mixing-up-the-tree-of-life/>  
<https://www.quantamagazine.org/20150728-at-tiny-scales-a-giant-burst-on-tree-of-life/>

### Mentoring

#### Doctoral Students Dissertation Advisor – 4 current Ph.D. students

- 2015-current: Anne Booker (Microbiology Ph.D., OSU)  
Dissertation: *Identifying Key Microbial Metabolisms in Human-Impacted Deep Shale Formations*  
Awarded: Outstanding student oral presentation, Ohio Branch ASM meeting, April 2017  
OSU Microbiology travel award 2017
- 2016-current Casey Saup (Earth Sciences Ph.D., OSU)  
Dissertation: *Hydrologic controls on microbially-mediated metal release in riverbed environments*  
Awarded: American Institute of Professional Geologists Scholarship, 2016  
Geological Society of America research grant, 2016

Central Ohio Gem and Mineral Show Scholarship, 2016  
Friends of Orton Hall award, 2016  
American Association of Petroleum Geologists Student Travel  
Grant, 2016

James Price (Earth Sciences Ph.D.- co-advised with Prof. A. Grottoli, OSU)  
Dissertation: *Microbial responses to coral bleaching*  
Awarded: OSU first year graduate fellowship, 2016  
International Society for Reef Studies Graduate Fellowship, 2017

2018-current Kaela Amundson (Soil and Crop Sciences Ph.D., CSU)  
Dissertation: To be decided

Graduated: Paula Dalcin Martins (Microbiology Ph.D., OSU, 2013-2018)  
Dissertation: *Coupled Carbon and Sulfur Biogeochemical Cycling in Prairie  
Pothole Lake Sediment Ecosystems*  
Awarded: OSU Microbiology outstanding teaching award, 2016  
ISME '16 meeting travel grant  
OSU Global Gateway Grant award, 2017  
Geochemical Society Goldschmidt 2017 travel award

Robert Danczak (Microbiology Ph.D., OSU, 2013-2018)  
Dissertation: *Understanding the Impact of Dynamic Hydrology on  
Biogeochemical Cycling in Shallow Aquifers*  
Awarded: OSU Microbiology outstanding teaching award, 2016  
DOE student travel grant, SBR meeting 2016

#### **Undergraduate laboratory researchers**

Previous: Marie Burris (Microbiology, 2017-2018)  
Ally Brady (Earth Sciences, 2017, now Ph.D. student at Michigan State  
University)  
Michael Whaley (Environmental Engineering 2016-2017)  
Mackenzie Lynes (Microbiology 2014-2016, now Ph.D. student at Montana State  
University)  
Kevin Eberle (Microbiology 2015-2016)  
Joanna Twist (Microbiology 2013-2014)

#### **Student Committee Member (in addition to Major students above):**

1. Morgan Volker (Ph.D. in progress, Ohio State University). *Investigating transformation and biodegradation of synthetic polyacrylamides in hydraulically fractured shale systems*
2. Gary Trubl (Ph.D. in progress, Ohio State University). *Viruses in arctic permafrost*
3. Rowan McLaughlan (Ph.D. in progress, Ohio State University). *Coral adaptation/acclimatization to global change*
4. Corey Wallace (Ph.D. in progress, Ohio State University). *Surface water-groundwater exchange and its effect on N transformation in the tidal freshwater zone*

5. Kelsey Danner (Ph.D. in progress, Ohio State University). *Effects of tiled drainage on N transformations in agricultural ditches*
6. Kerri Dobson (Ph.D. in progress, Ohio State University). *Multiple stressor effects on coral*
7. Garrett Smith (Ph.D. in progress, Ohio State University). *Methane Oxidation at Variable Oxygen Concentrations in Freshwater Wetland Soils and Culture, and Methanotroph Lanthanide Acquisition Strategy*
8. Eric Mumper (Ph.D. in progress, Ohio State University). *Magnetotactic bacteria in freshwater sediments*
9. Deon Knights (Ph.D. in progress, Ohio State University). *Nitrate removal in coastal freshwater wetlands*
10. Melisa Diaz (Ph.D. in progress, Ohio State University). *Spatial and temporal geochemical characterization of aeolian dust from the McMurdo Dry Valleys, Antarctica*
11. Samantha Israel (MS in progress, Ohio State University). *The Potential Role of Dissolved Molybdenum, Iron, and Vanadium in Harmful Algal Blooms in Ohio Lakes*
12. George Grant (Ph.D. in progress, Ohio State University). *Exploring the past to predict the future*
13. Kelsey Crossen (MS, 2017, Ohio State University). *Microbial community dynamics during permafrost thaw*
14. James Dunn (MS, 2017, Ohio State University). *Phage-display evolution and affinity analysis of small mineral-binding peptides*
15. Katie Trieber (MS, 2017 Ohio State University). *Effect of sand-mud interbedding on gas hydrate occurrence and saturation*
16. Brandon McAdams (Ph.D., 2017, Ohio State University). *Redox environments of benthic porewaters along a characteristic hydrogeochemical gradient of the Prairie Pothole Wetlands*
17. Ryan Trexler (MS, 2016, Ohio State University). *Lipid analysis and microbial community characterization of subsurface shale*
18. Edwin Buchwalter (MS, 2016, Ohio State University). *The geochemical and spatial argument for microbial life surviving into early diagenesis in the Appalachian Basin*
19. Timothy Pryshlak (MS, 2015, Ohio State University). *Impact of permeability structure on exchange rates and solute residence times in the hyporheic zone*
20. Amy Boaro (Ph.D., 2014, Washington State University). *Microbial community perturbation responses in cellulolytic bioreactors: an integrated meta-omics approach*

### **Teaching Experience**

UG=undergraduate students, G=graduate students, E=typical enrollment numbers

#### **Courses taught at The Ohio State University (2013-present)**

- Environmental Geoscience - Earth Sci 2203 (U, E40-60)
- Geomicrobiology - Micro/Earth Sci 5160 (U, G, E10-25)
- Advanced Topics in Molecular Microbiology – Micro 7060 (G, E10)
- Microbiology Graduate Student Seminar (G, E40)

- Earth Sciences Graduate Student Seminar (G, E40)
- Independent Study Mentor (UG, G)

Awarded OSU School of Earth Sciences 'Outstanding Graduate Teaching Award' (2017)

## **Leadership and Service**

### **Ohio State University Service**

- School of Earth Sciences, Graduate Committee (2017-current)
- School of Earth Sciences. Departmental Chair Search. Member. (2016-2017)
- School of Earth Sciences. Undergraduate Committee. Member. (2016-2017)
- School of Earth Sciences. Friends of Orton Hall. Member. (2015-2017)
- School of Earth Sciences. Curriculum Committee. Member. (2014-2015)

### **Scientific Leadership**

#### *Session and Workshop organization*

- Co-Chair of Microbial Communities Initiative Symposium at Pacific Northwest National Laboratory: 'Beyond the Batch: Physical and Biological Structure of Microbial Communities'. 2011.
- Co-chair, 'Sampling the Deep Terrestrial Biosphere' workshop at Ohio State University, 20<sup>th</sup> February 2014 (<http://u.osu.edu/workshop/>)
- Session co-chair, American Geophysical Union Fall meeting. December 2014. "Impacts of Natural Gas Extraction and Production on the Microbiology and Biogeochemistry of Shale Formations"
- Session co-chair, American Geophysical Union Fall meeting. December 2015. "Bridging microbial ecology to geochemistry: insight from environmental and experimental studies"

### **Outreach and Service**

- Presenter at the Columbus Museum of Science and Industry (COSI) event 'Portal to the Public'. 2014
- Presenter at the Columbus Museum of Science and Industry (COSI) event 'COSI: After Dark'. 2015
- Speaker at OSU undergraduate microbiology club, March 2017
- Judge at OSU Denman undergraduate research forum 2014-2018
- Judge at OSU NMS undergraduate research forum 2014-2017
- Judge of graduate research posters, American Geophysical Union Fall meeting, San Francisco, CA. 2015

### **Journal and Grant review**

#### *Editor positions*

- Frontiers Systems Microbiology, Review Editor
- Journal of Geophysical Research – Biogeosciences – Associate Editor

### **Journal Reviewer**

- Nature Microbiology; International Society for Microbial Ecology (ISME); Frontiers in Microbiology; Microbiome; Wetlands; Environmental Microbiology Reports; PLoS One; Journal of Geophysical Research; Nature Scientific Reports; Applied and Environmental

Microbiology; Microbial Ecology; Environmental Science and Technology; Geobiology; ASM  
M-Systems; Biogeosciences

**Grant Reviewer**

- National Science Foundation (Arctic Natural Sciences, Earth Sciences, Geobiology and Low Temperature Geochemistry)
- Department of Energy Small Business Innovation Research (SBIR)
- Department of Energy Subsurface Biogeochemical Research (SBR)
- Department of Energy Joint Genome Institute (JGI)
- Department of Energy Environmental Molecular Sciences Laboratory (EMSL)

**Memberships**

- American Geophysical Union
- American Society for Microbiology
- International Society for Environmental Biogeochemistry