**CURRICULUM VITAE**

**Matthew R McIlvin**

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Dept. of Marine Chemistry and Geochemistry

Woods Hole Oceanographic Institution

Woods Hole, MA 02543

**EDUCATION:**

Ph.D.: Analytical Chemistry, 2008. University of Massachusetts, Lowell

B.S.: Chemistry, 1998. University of Massachusetts, Dartmouth

B.S.: Mathematics, 1998. University of Massachusetts, Dartmouth

**PROFESSIONAL EXPERIENCE:**

Research Specialist, Woods Hole Oceanographic Inst., 2021-present

Research Associate III, Woods Hole Oceanographic Inst., 2013-2021

Research Associate II, Woods Hole Oceanographic Inst., 2004-2013

Graduate Research Assistant, Center for Marine Science and Tech., University of Mass., 1998-2004

Graduate Teaching Assistant, University of Mass. Dartmouth, 1997-2002

# Marine Mechanic, Ron’s Marine Service, Chatham, MA, 1990-2005

**RESEARCH INTERESTS:**

Marine Proteomics and Metaproteomics

Metalloproteomics of Marine Microbes and Human Pathogens

Geochemistry of Bioactive Metals

Analytical Method Development and Applications

**PARTICIPATION IN EDUCATION PROGRAM:**

Instructor (2001): University of Massachusetts, Dartmouth, Chemistry Lab and Organic Chemistry recitation

Laboratory Teaching Assistant, University of Massachusetts, Dartmouth (1997-2002): 4 semesters Physical Chemistry, 2 semesters Analytical Chemistry, Organic Chemistry, 3 semesters General Chemistry

**SUPERVISION AT WHOI:**

**Graduate Students**:

Dominique Kelly, 2022-present

Annaliese Meyer, 2021-present

Becca Chmiel, 2016-2022

Marissa Kellogg, 2016-2022

Deepa Rao, 2016-2020

Lydia Babcock-Adams, 2016-2021

Noelle Held, 2015-2019

Jingxuan Li, 2017-present

Marianne Acker, 2016-2021

Nick Hawco, 2012-2017

Rene Boiteau, 2012-2017

Erin Bertrand, 2011-2012

Carly Buchwald, 2006-2011

David Wang, 2011

Dan Rogers, 2004-2009

Erin Banning, 2004-2009

Caitlin Frame, 2005-2010

Tyler Goepfert, 2011-2013

Abigail Noble, 2011-2012

**Postdoctoral Investigators**:

Ichiko Sugiyama, 2022-present

Margaret Brisbin, 2020-2022

Natalie Cohen, 2017-2020

Mike Mazzotta, 2018-2020

Jaci Saunders, 2017-2019

Randelle Bundy, 2014-2017

Julia Gauglitz, 2014-2017

Kate Mackey, 2011-2014

Alyson Santoro, 2008-2011

**CRUISE PARTICIPATION AND FIELD WORK:**

2023 April-June R/V Atlantis, Costa Rica to California, CliOMZ

2019 October R/V Atlantic Explorer, Bermuda, AUV Clio testing, BATS

2019 June R/V Atlantic Explorer, Bermuda to Woods Hole, AUV Clio

2018 Feb.-Mar. R/V Atlantis, Cape Verde to Puerto Rico

2018 June R/V Atlantic Explorer, Bermuda, AUV Clio testing, BATS 2017 July R/V Armstrong, Woods Hole, AUV Clio trials

2016 Jan.-Feb. R/V Falcor, Hawaii to Tahiti

2010 June R/V Sproul, Santa Barbara Basin, Foraminifera N cycle

2009 October R/V Sproul, Santa Barbara Basin, Foraminifera N cycle

2009 June R/V Sproul, Santa Barbara Basin, Foraminifera N cycle

2008 June-July R/V Knorr, Woods Hole to Virginia, GEOTRACES intercal

2007 September R/V Sproul, Santa Barbara Basin, Foraminifera N cycle

2006 Feb., March Magueyes, Puerto Rico, Sponge Biodiversity

2005 Oct.-Nov. R/V Knorr, Chile to Mexico, Peru Upwelling

2004 July-Aug. R/V Kilo Moana, Hawaii, SEEDS-II iron experiment

2002 Jan.-Feb. R/V Roger Revelle, New Zealand, SOFeX iron experiment

2001 Sept.-Oct. R/V Seaward Johnson, Florida to Tenerife

2000 October R/V Seaward Johnson, Florida to Bermuda

**PROFESSIONAL AFFILIATIONS:**

Member, American Society of Mass Spectrometry, 2012-present

**PAPERS IN REFEREED JOURNALS AND BOOKS:**

1. Johnson, M. D., Moeller, H. V., Paight, C., Kellogg, R. M., McIlvin, M. R., Saito, M. A., & Lasek‐Nesselquist, E. (2023). Functional control and metabolic integration of stolen organelles in a photosynthetic ciliate. Current Biology, 33(5), 973-980.e5. <https://doi.org/10.1016/j.cub.2023.01.027>
2. Brisbin, M. M., Schofield, A., McIlvin, M. R., Krinos, A. I., Alexander, H., & Saito, M. A. (2023). Vitamin B12 conveys a protective advantage to phycosphere-associated bacteria at high temperatures. ISME Communications, 3(1). https://doi.org/10.1038/s43705-023-00298-6
3. Bayer, B., Saito, M. A., McIlvin, M. R., Lücker, S., Moran, D. M., Lankiewicz, T. S., Dupont, C. L., & Santoro, A. E. (2021). Metabolic versatility of the nitrite-oxidizing bacterium Nitrospira marina and its proteomic response to oxygen-limited conditions. The ISME Journal, 15(4), 1025–1039. <https://doi.org/10.1038/s41396-020-00828-3>
4. Chmiel, R., Lanning, N., Laubach, A., Lee, J.-M., Fitzsimmons, J., Hatta, M., Jenkins, W., Lam, P., McIlvin, M., Tagliabue, A., & Saito, M. (2022). Major processes of the dissolved cobalt cycle in the North and equatorial Pacific Ocean. Biogeosciences, 19(9), 2365–2395. <https://doi.org/10.5194/bg-19-2365-2022>
5. Cohen, N. R., Noble, A. E., Moran, D. M., McIlvin, M. R., Goepfert, T. J., Hawco, N. J., German, C. R., Horner, T. J., Lamborg, C. H., McCrow, J. P., Allen, A. E., & Saito, M. A. (2021). Hydrothermal trace metal release and microbial metabolism in the northeastern Lau Basin of the South Pacific Ocean. Biogeosciences, 18(19), 5397–5422. <https://doi.org/10.5194/bg-18-5397-2021>
6. Held, N. A., Sutherland, K. M., Webb, E. A., McIlvin, M. R., Cohen, N. R., Devaux, A. J., Hutchins, D. A., Waterbury, J. B., Hansel, C. M., & Saito, M. A. (2021). Mechanisms and heterogeneity of in situ mineral processing by the marine nitrogen fixer Trichodesmium revealed by single-colony metaproteomics. ISME Communications, 1(1). <https://doi.org/10.1038/s43705-021-00034-y>
7. Held, N. A., Waterbury, J. B., Webb, E. A., Kellogg, R. M., McIlvin, M. R., Jakuba, M., Valois, F. W., Moran, D. M., Sutherland, K. M., & Saito, M. A. (2022). Dynamic diel proteome and daytime nitrogenase activity supports buoyancy in the cyanobacterium Trichodesmium. Nature Microbiology, 7(2), 300–311. <https://doi.org/10.1038/s41564-021-01028-1>
8. Held, N., Waterbury, J., Webb, E., Kellogg, R., McIlvin, M., Jakuba, M., Valois, F., Moran, D., Sutherland, K., & Saito, M. (2022). Why does Trichodesmium fix nitrogen during the day? Special biochemistry linking biogeochemical cycles. <https://doi.org/10.5194/egusphere-egu22-9136>
9. Kellogg, R. M., Moosburner, M. A., Cohen, N. R., Hawco, N. J., McIlvin, M. R., Moran, D. M., DiTullio, G. R., Subhas, A. V., Allen, A. E., & Saito, M. A. (2022). Adaptive responses of marine diatoms to zinc scarcity and ecological implications. Nature Communications, 13(1), 1995. https://doi.org/10.1038/s41467-022-29603-y
10. Kellogg, R. M., Moran, D. M., McIlvin, M. R., Subhas, A. V., Allen, A. E., & Saito, M. A. (2022). Lack of a Zn/Co substitution ability in the polar diatom Chaetoceros neogracile RS19. Limnology and Oceanography, 67(10), 2265–2280. https://doi.org/10.1002/lno.12201
11. Marshall, T., Granger, J., Casciotti, K. L., Dähnke, K., Emeis, K.-C., Marconi, D., McIlvin, M. R., Noble, A. E., Saito, M. A., Sigman, D. M., & Fawcett, S. E. (2022). The Angola Gyre is a hotspot of dinitrogen fixation in the South Atlantic Ocean. Communications Earth & Environment, 3(1). https://doi.org/10.1038/s43247-022-00474-x
12. Mazzotta, M. G., McIlvin, M. R., Moran, D. M., Wang, D. T., Bidle, K. D., Lamborg, C. H., & Saito, M. A. (2021). Characterization of the metalloproteome of Pseudoalteromonas (BB2-AT2): biogeochemical underpinnings for zinc, manganese, cobalt, and nickel cycling in a ubiquitous marine heterotroph. Metallomics: Integrated Biometal Science, 13(12). https://doi.org/10.1093/mtomcs/mfab060
13. Saunders, J. K., McIlvin, M. R., Dupont, C. L., Kaul, D., Moran, D. M., Horner, T., Laperriere, S. M., Webb, E. A., Bosak, T., Santoro, A. E., & Saito, M. A. (2022). Microbial functional diversity across biogeochemical provinces in the central Pacific Ocean. Proceedings of the National Academy of Sciences of the United States of America, 119(37), e2200014119. https://doi.org/10.1073/pnas.2200014119
14. Walworth, N. G., Saito, M. A., Lee, M. D., McIlvin, M. R., Moran, D. M., Kellogg, R. M., Fu, F.-X., Hutchins, D. A., & Webb, E. A. (2022). Why environmental biomarkers work: Transcriptome-proteome correlations and modeling of multistressor experiments in the marine bacterium Trichodesmium. Journal of Proteome Research, 21(1), 77–89. https://doi.org/10.1021/acs.jproteome.1c00517McIlvin MR., Saito MA. Online nanoflow two-dimension comprehensive active modulation reversed phase-reversed phase liquid chromatography high-resolution mass spectrometry for metaproteomics of environmental and microbiome samples. Journal of Proteome Research, 2021;20(9), 4589–4597.
15. Li J, Boiteau RM, Babcock-Adams L, Acker M, Song Z, McIlvin MR, & Repeta DJ. Element-selective targeting of nutrient metabolites in environmental samples by inductively coupled plasma mass spectrometry and electrospray ionization mass spectrometry. Frontiers in Marine Science, 2021;8. https://doi.org/10.3389/fmars.2021.630494
16. Gauglitz JM, Boiteau RM, McLean, C., Babcock-Adams, L., McIlvin, M. R., Moran, D. M., Repeta, D. J., & Saito MA. Dynamic proteome response of a marine Vibrio to a gradient of iron and ferrioxamine bioavailability. Marine Chemistry, 2021;229(103913), 103913.
17. Cohen NR, McIlvin MR, Moran DM, Held NA, Saunders JK, Hawco, NJ, Brosnahan M, DiTullio GR, Lamborg C, McCrow JP, Dupont CL, Allen AE, Saito MA. Dinoflagellates alter their carbon and nutrient metabolic strategies across environmental gradients in the central Pacific Ocean. Nature Microbiology. 2021;6(2), 173–186.
18. Breier JA, Jakuba MV, Saito MA, Dick GJ, Grim SL, Chan EW, McIlvin MR, Moran DM, Alanis BA, Allen AE, et al. Revealing ocean-scale biochemical structure with a deep-diving vertical profiling autonomous vehicle. Science robotics. 2020;5(48). http://dx.doi.org/10.1126/scirobotics.abc7104. doi:10.1126/scirobotics.abc7104
19. Held NA, Webb EA, McIlvin MM, Hutchins DA, Cohen NR, Moran DM, Kunde K, Lohan MC, Mahaffey C, Woodward EMS, et al. Co-occurrence of Fe and P stress in natural populations of the marine diazotroph *Trichodesmium*. Biogeosciences. 2020;17(9):2537–2551.
20. Kellogg MM, McIlvin MR, Vedamati J, Twining BS, Moffett JW, Marchetti A, Moran DM, Saito MA. Efficient zinc/cobalt inter‐replacement in northeast Pacific diatoms and relationship to high surface dissolved Co : Zn ratios. Limnology and oceanography. 2020;(l11471). http://dx.doi.org/10.1002/lno.11471. doi:10.1002/lno.11471
21. Saito MA, McIlvin MR, Moran DM, Santoro AE, Dupont CL, Rafter PA, Saunders JK, Kaul D, Lamborg CH, Westley M, et al. Abundant nitrite-oxidizing metalloenzymes in the mesopelagic zone of the tropical Pacific Ocean. Nature geoscience. 2020;13(5):355–362.
22. Hawco NJ, McIlvin MM, Bundy RM, Tagliabue A, Goepfert TJ, Moran DM, Valentin-Alvarado L, DiTullio GR, Saito MA. Minimal cobalt metabolism in the marine cyanobacterium Prochlorococcus. Proceedings of the National Academy of Sciences of the United States of America. 2020;117(27):15740–15747.
23. Mazzotta MG, McIlvin MR, Saito MA. Characterization of the Fe metalloproteome of a ubiquitous marine heterotroph, Pseudoalteromonas (BB2-AT2): multiple bacterioferritin copies enable significant Fe storage. Metallomics: integrated biometal science. 2020;12(5):654–667.
24. Bayer B, Saito MA, McIlvin MR, Lücker S, Moran DM, Lankiewicz TS, Dupont CL, Santoro AE. Metabolic versatility of the nitrite-oxidizing bacterium Nitrospira marina and its proteomic response to oxygen-limited conditions. The ISME journal. 2020. http://dx.doi.org/10.1038/s41396-020-00828-3. doi:10.1038/s41396-020-00828-3
25. Diaz JM, Plummer S, Hansel CM, Andeer PF, Saito MA, McIlvin MR. NADPH-dependent extracellular superoxide production is vital to photophysiology in the marine diatom Thalassiosira oceanica. Proceedings of the National Academy of Sciences of the United States of America. 2019;116(33):16448–16453.
26. Held NA, McIlvin MR, Moran DM, Laub MT, Saito MA. Unique patterns and biogeochemical relevance of two-component sensing in marine bacteria. mSystems. 2019;4(1). http://dx.doi.org/10.1128/mSystems.00317-18. doi:10.1128/mSystems.00317-18
27. Kwakye GF, Jiménez JA, Thomas MG, Kingsley BA, McIIvin M, Saito MA, Korley EM. Heterozygous huntingtin promotes cadmium neurotoxicity and neurodegeneration in striatal cells via altered metal transport and protein kinase C delta dependent oxidative stress and apoptosis signaling mechanisms. Neurotoxicology. 2019;70:48–61.
28. Saito MA, Bertrand EM, Duffy ME, Gaylord DA, Held NA, Hervey WJ 4th, Hettich RL, Jagtap PD, Janech MG, Kinkade DB, et al. Progress and challenges in ocean metaproteomics and proposed best practices for data sharing. Journal of proteome research. 2019;18(4):1461–1476.
29. Tarrant E, P Riboldi G, McIlvin MR, Stevenson J, Barwinska-Sendra A, Stewart LJ, Saito MA, Waldron KJ. Copper stress in Staphylococcus aureus leads to adaptive changes in central carbon metabolism. Metallomics: integrated biometal science. 2019;11(1):183–200. doi: 10.1039/c8mt00239h
30. Cohen NR, Gong W, Moran DM, McIlvin MR, Saito MA, Marchetti A. Transcriptomic and proteomic responses of the oceanic diatom Pseudo-nitzschia granii to iron limitation: Intracellular processes of an iron-limited diatom. Environmental microbiology. 2018;20(8):3109–3126.
31. Bender SJ, Moran DM, McIlvin MR, Zheng H, McCrow JP, Badger J, DiTullio GR, Allen AE, Saito MA. Colony formation in *Phaeocystis antarctica*: connecting molecular mechanisms with iron biogeochemistry. Biogeosciences. 2018;15(16):4923–4942.
32. Bundy RM, Boiteau RM, McLean C, Turk-Kubo KA, McIlvin MR, Saito MA, Van Mooy BAS, Repeta DJ. Distinct siderophores contribute to iron cycling in the mesopelagic at station ALOHA. Frontiers in marine science. 2018;5. http://dx.doi.org/10.3389/fmars.2018.00061. doi:10.3389/fmars.2018.00061
33. Saito MA, Noble AE, Hawco N, Twining BS, Ohnemus DC, John SG, Lam P, Conway TM, Johnson R, Moran D, McIlvin MR. The acceleration of dissolved cobalt’s ecological stoichiometry due to biological uptake, remineralization, and scavenging in the Atlantic Ocean. Biogeosciences. 2017;14(20):4637–4662
34. Chong W, Jiménez J, McIIvin M, Saito MA, Kwakye GF. Α-synuclein enhances cadmium uptake and neurotoxicity via oxidative stress and caspase activated cell death mechanisms in a dopaminergic cell model of Parkinson’s disease. Neurotoxicity research. 2017;32(2):231–246.
35. Boiteau RM, Mende DR, Hawco NJ, McIlvin MR, Fitzsimmons JN, Saito MA, Sedwick PN, DeLong EF, Repeta DJ. Siderophore-based microbial adaptations to iron scarcity across the eastern Pacific Ocean. Proceedings of the National Academy of Sciences of the United States of America. 2016;113(50):14237–14242. DOI: 10.1073/pnas.1608594113
36. Mackey KRM, Post AF, McIlvin MR, Saito MA. Physiological and proteomic characterization of light adaptations in marine Synechococcus: Light adaptations in marine Synechococcus. Environmental microbiology. 2017;19(6):2348–2365. DOI: 10.1111/1462-2920.13744
37. Saito MA, Breier C, Jakuba M, McIlvin M, and Moran D. 2017. Envisioning a Chemical Metaproteomics Capability for Biochemical Research and Diagnosis of Global Ocean Microbiomes. In: The Chemistry of Microbiomes: Proceedings of a Seminar Series, National Academies Press, National Academies of Sciences, Engineering, Medicine. 29-36.
38. Walworth NG, Fu F-X, Webb EA, Saito MA, Moran D, Mcllvin MR, Lee MD, Hutchins DA. Mechanisms of increased Trichodesmium fitness under iron and phosphorus co-limitation in the present and future ocean. Nature communications. 2016;7(1):12081. DOI: 10.1038/ncomms12081.
39. Swanner ED, Wu W, Hao L, Wüstner ML, Obst M, Moran DM, McIlvin MR, Saito MA, Kappler A. Physiology, Fe(II) oxidation, and Fe mineral formation by a marine planktonic cyanobacterium grown under ferruginous conditions. Frontiers in earth science. 2015;3. http://dx.doi.org/10.3389/feart.2015.00060. doi:10.3389/feart.2015.00060
40. Mackey KRM, Post AF, McIlvin MR, Cutter GA, John SG, Saito MA. Divergent responses of Atlantic coastal and oceanic Synechococcus to iron limitation. Proceedings of the National Academy of Sciences of the United States of America. 2015;112(32):9944–9949.
41. Marconi D, Alexandra Weigand M, Rafter PA, McIlvin MR, Forbes M, Casciotti KL, Sigman DM. Nitrate isotope distributions on the US GEOTRACES North Atlantic cross-basin section: Signals of polar nitrate sources and low latitude nitrogen cycling. Marine chemistry. 2015;177:143–156.
42. Saito MA, Dorsk A, Post AF, McIlvin MR, Rappé MS, DiTullio GR, Moran DM. Needles in the blue sea: sub-species specificity in targeted protein biomarker analyses within the vast oceanic microbial metaproteome. Proteomics. 2015;15(20):3521–3531.
43. Andeer PF, Learman DR, McIlvin M, Dunn JA, Hansel CM. Extracellular haem peroxidases mediate Mn(II) oxidation in a marine Roseobacter bacterium via superoxide production: Peroxidases mediate superoxide-based Mn oxidation. Environmental microbiology. 2015;17(10):3925–3936.
44. Santoro AE, Dupont CL, Richter RA, Craig MT, Carini P, McIlvin MR, Yang Y, Orsi WD, Moran DM, Saito MA. Genomic and proteomic characterization of “Candidatus Nitrosopelagicus brevis”: an ammonia-oxidizing archaeon from the open ocean. Proceedings of the National Academy of Sciences of the United States of America. 2015;112(4):1173–1178.
45. Hutchins DA, Walworth NG, Webb EA, Saito MA, Moran D, McIlvin MR, Gale J, Fu F-X. Irreversibly increased nitrogen fixation in Trichodesmium experimentally adapted to elevated carbon dioxide. Nature communications. 2015;6(1):8155.
46. Saito MA, McIlvin MR, Moran DM, Goepfert TJ, DiTullio GR, Post AF, Lamborg CH. Multiple nutrient stresses at intersecting Pacific Ocean biomes detected by protein biomarkers. Science (New York, N.Y.). 2014;345(6201):1173–1177.
47. Tostevin R, Turchyn AV, Farquhar J, Johnston DT, Eldridge DL, Bishop JKB, McIlvin M. Multiple sulfur isotope constraints on the modern sulfur cycle. Earth and planetary science letters. 2014;396:14–21.
48. Casciotti KL, Buchwald C, McIlvin M. Implications of nitrate and nitrite isotopic measurements for the mechanisms of nitrogen cycling in the Peru oxygen deficient zone. Deep-sea research. Part I, Oceanographic research papers. 2013;80:78–93.
49. Bertrand, Erin M., Dawn M. Moran, Matthew R. McIlvin, Jeffrey M. Hoffman, Andrew E. Allen, and Mak A. Saito. "Methionine synthase interreplacement in diatom cultures and communities: Implications for the persistence of B12 use by eukaryotic phytoplankton." Limnology and Oceanography 58, no. 4 (2013): 1431-1450.
50. Aguirre JD, Clark HM, McIlvin M, Vazquez C, Palmere SL, Grab DJ, Seshu J, Hart PJ, Saito M, Culotta VC. A manganese-rich environment supports superoxide dismutase activity in a Lyme disease pathogen, Borrelia burgdorferi. The journal of biological chemistry. 2013;288(12):8468–8478.
51. Mackey KRM, Paytan A, Caldeira K, Grossman AR, Moran D, McIlvin M, Saito MA. Effect of temperature on photosynthesis and growth in marine Synechococcus spp. Plant physiology. 2013;163(2):815–829. DOI:10.1104/pp.113.221937.
52. Buchwald C, Santoro AE, McIlvin MR, Casciotti KL. Oxygen isotopic composition of nitrate and nitrite produced by nitrifying cocultures and natural marine assemblages. Limnology and oceanography. 2012;57(5):1361–1375.
53. Bernhard JM, Casciotti KL, McIlvin MR, Beaudoin DJ, Visscher PT, Edgcomb VP. Potential importance of physiologically diverse benthic foraminifera in sedimentary nitrate storage and respiration: NITRATE CYCLING BY BENTHIC FORAMINIFERA. Journal of geophysical research. 2012;117(G3). http://dx.doi.org/10.1029/2012jg001949. doi:10.1029/2012jg001949.
54. Bernhard JM, Edgcomb VP, Casciotti KL, McIlvin MR, Beaudoin DJ. Denitrification likely catalyzed by endobionts in an allogromiid foraminifer. The ISME journal. 2012;6(5):951–960.
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56. McIlvin MR, Casciotti KL. Technical updates to the bacterial method for nitrate isotopic analyses. Analytical chemistry. 2011;83(5):1850–1856.
57. Casciotti KL, McIlvin M, Buchwald C. Oxygen isotopic exchange and fractionation during bacterial ammonia oxidation. Limnology and oceanography. 2010;55(2):753–762.
58. McIlvin MR, Casciotti KL. Fully automated system for stable isotopic analyses of dissolved nitrous oxide at natural abundance levels: Automated isotopic analyses of nitrous oxide. Limnology and oceanography, methods. 2010;8(2):54–66.
59. Higgins MB, Robinson RS, Casciotti KL, McIlvin MR, Pearson A. A method for determining the nitrogen isotopic composition of porphyrins. Analytical chemistry. 2009;81(1):184–192.
60. Casciotti KL, McIlvin MR. Isotopic analyses of nitrate and nitrite from reference mixtures and application to Eastern Tropical North Pacific waters. Marine chemistry. 2007;107(2):184–201.
61. Casciotti KL, Böhlke JK, McIlvin MR, Mroczkowski SJ, Hannon JE. Oxygen isotopes in nitrite: analysis, calibration, and equilibration. Analytical chemistry. 2007;79(6):2427–2436.
62. McIlvin MR, Casciotti KL. Method for the analysis of delta18O in water. Analytical chemistry. 2006;78(7):2377–2381.
63. McIlvin MR, Altabet MA. Chemical conversion of nitrate and nitrite to nitrous oxide for nitrogen and oxygen isotopic analysis in freshwater and seawater. Analytical chemistry. 2005;77(17):5589–5595.

**PUBLISHED ABSTRACTS:**

LI Jingxuan, Lydia Babcock-Adams, Zhongchang Song, Matthew R McIlvin, Daniel Repeta. An algorithm to characterize cobalt ligands in GEOTRACES samples. Ocean Sciences Meeting 2020. San Diego, California, February 20, 2020. Poster presentation.

Marissa Morgan Kellogg, Mak A Saito, Mark Moosburner, Tyler Coale, Andrew E Allen, Matthew R McIlvin, Dawn M Moran. Identification of a putative Zn metallochaperone (ZCRP-A) in multiple marine diatoms and characterization in Phaeodactylum tricornutum. Ocean Sciences Meeting 2020. San Diego, California, February 20, 2020. Poster presentation.

Michael Mazzotta, Matthew R McIlvin, Mak A Saito. Elucidating Novel Trace Metal Biogeochemical Relationships of Marine Heterotrophic Bacteria through Metalloproteomics. Ocean Sciences Meeting 2020. San Diego, California, February 20, 2020. Poster presentation.

Claire Medley, John A Breier, Michael Jakuba, Eric W Chan, Rodney J Johnson, Matthew R McIlvin, Quinn Wright Montgomery, Paloma Lopez, Mak A Saito. Comparison of HPLC Derived Phytoplankton Pigments from Autonomously Collected Samples and CTD Methods to Evaluate the Integration of Autonomous Vehicles as Platforms for Enhancing Ocean Time-series Programs. Ocean Sciences Meeting 2020. San Diego, California, February 20, 2020. Poster presentation.

Natalie Cohen, Dawn M Moran, Matthew R McIlvin, Abigail Emery Noble, John McCrow, Andrew E Allen, Mak A Saito. The influence of hydrothermal metal inputs on protistan and particle-associated bacterial metabolism in the Lau Basin of the tropical South Pacific Ocean. Ocean Sciences Meeting 2020. San Diego, California, February 20, 2020. Poster presentation.

Mak A Saito, Matthew R McIlvin, Eric W Chan, Dawn M Moran, Brian Searle, Natalie Cohen, Marissa Morgan Kellogg, Rebecca Chmiel, Paloma Lopez, Fernando Pacheco, Zachary Anderso, Rodney J Johnson, Michael Jakuba, John A Breier. Gradients in Functional Capabilities in the Sargasso Sea as determined by Metaproteomes collected by the Biogeochemical AUV Clio. Ocean Sciences Meeting 2020. San Diego, California, February 20, 2020. Oral Presentation.

Sydney Plummer, Colleen Hansel, Peter F Andeer, Mak A Saito, Matthew R McIlvin. NADPH-dependent extracellular superoxide production is vital to photophysiology in the marine diatom Thalassiosira oceanica. Ocean Sciences Meeting 2020. San Diego, California, February 20, 2020. Poster presentation.

John A Breier Jr, Eric W Chan, Mak A Saito, Michael Jakuba, Brianna Alanis, Rebecca Chmiel, Marissa Morgan Kellogg, Matthew R McIlvin, Dawn M Moran, Victor Naklicki, Paloma Lopez, Quinn Wright Montgomery, Rodney Johnson. High-resolution Upper Ocean Metal Distributions within the Sargasso Sea Revealed using the Clio Autonomous Vehicle. Ocean Sciences Meeting 2020. San Diego, California, February 20, 2020. Oral Presentation.

Korinna Kunde, Noelle Held, Clare Davis, Neil Wyatt, Matthew R McIlvin, Malcolm Woodward, Mak A Saito, Alessandro Tagliabue, Claire Mahaffey, Maeve C Lohan. Trace Metal Availability for Alkaline Phosphatases: A Proteomic Perspective from the Oligotrophic North Atlantic. Ocean Sciences Meeting 2020. San Diego, California, February 20, 2020. Poster presentation.

Matthew R. McIlvin, Mak A Saito. Methods for Metaproteomic Analysis of the Ocean. ASMS 2019 Atlanta. American Society of Mass Spectrometry. Atlanta, Georgia. June 4 2019. Poster presentation.

John A Breier, Michael Jakuba, Mak A Saito, Gregory Dick, Daniel Gomez-Ibanez, Kaitlyn Tradd, Sharon L Grim, Rebecca Chmiel, Matthew R McIlvin, Abigail Emery Noble, Brianna Alanis, Marissa Morgan Kellogg, Javier Garcia. Clio: a vertical sampling AUV for next-generation ocean sectional studies. ASLO Ocean Sciences Meeting Portland Oregon, February 15, 2018. Poster presentation.

Mak A Saito, Matthew R McIlvin. Dawn M Moran, Alyson E Santoro, Eric A Webb, Michael D Lee. Christopher L Dupont. Tristan J Horner, Noelle Held. Surveying Metalloproteins in the Euphotic Zone and Oxygen Minimum Zone of the Central Pacific Ocean and Their Influence on Biogeochemical Cycles. ASLO Ocean Sciences Meeting Portland Oregon, February 15, 2018. Oral Presentation.

Alyson E Santoro, Mak A Saito, Matthew R McIlvin, Dawn M Moran. Trace Metal Requirements of Nitrite-Oxidizing Bacteria: Implications for Nitrite Oxidation in the Upper Mesopelagic. ASLO Ocean Sciences Meeting Portland Oregon, February 15, 2018. Poster presentation.

Lydia Babcock-Adams, Luis Valentin-Alvarado, Rene Boiteau, Amy M McKenna, Matthew R McIlvin, John B Waterbury, James W Moffett, Daniel Repeta. Molecular Characterization of Copper Binding Ligands Produced by the Marine Cyanobacterium Synechococcus sp. WH 7803 in Response to Increasing Copper. ASLO Ocean Sciences Meeting Portland Oregon, February 15, 2018. Poster presentation.

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