CURRICULUM VITAE

MAK ANDERSON SAITO

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EDUCATION

1990 The Sidwell Friends School, Washington D.C.
1994 Oberlin College, B.A., Biology and Environmental Studies majors, Chemistry minor (Highest Honors)
2001 MIT/WHOI Joint Program in Chemical Oceanography, Ph.D.

PROFESSIONAL EXPERIENCE

Constructed Wetlands Project Manager - Lorain County General Health District, Ohio, 1993-1995.
Research Assistant - Ohio Geological Survey, Lake Erie Division, 1994-1995.
Graduate Research Assistant, Woods Hole Oceanographic Institution, 1995-2001.
Harry Hess Post-Doctoral Scholar, Geosciences Department, Princeton University, 2001-2003.
Assistant Scientist, Marine Chemistry and Geochemistry Department, Woods Hole Oceanographic Institution, 2003-2007.
Associate Scientist, Marine Chemistry and Geochemistry Department, Woods Hole Oceanographic Institution, 2007-2011.
Associate Scientist with Tenure, Marine Chemistry and Geochemistry Department, Woods Hole Oceanographic Institution, 2011-present.

FELLOWSHIPS AND AWARDS

1990 Thomas Sidwell Award, The Sidwell Friends School
1993 Mellon Foundation Grant for Environmental Research, Oberlin College
1993 Environmental Careers Organization (ECO) - Student Initiated Project Fellowship
1994 Mellon Foundation Grant for Environmental Research, Oberlin College
1994 Norman Wright Biology Departmental Award, Oberlin College
1994 Joyce Gorn Award in Environmental Studies, Oberlin College
1995-1996 National Science Foundation Coastal Trainee Graduate Fellowship
1998-1999 Massachusetts Institute of Technology Martin Sustainability Fellow
1996-2000 EPA STAR Graduate Fellowship
2000 Ocean Venture Fund Research Grant, WHOI
2001-2003 Hess Post-doctoral Fellowship in Geosciences, Princeton University
2005 Office of Naval Research Young Investigator Award
2005 Ruth and Paul Fye WHOI Graduate Student Paper Award in Chemical Oceanography
2012 National Academy of Sciences Kavli Fellow
2012 Gordon and Betty Moore Foundation Marine Microbial Investigator Award

PROFESSIONAL AFFILIATIONS

Member, American Society for Limnology and Oceanography
Member, American Geophysical Union
Member, Union of Concerned Scientists

Member, American Society of Biochemistry and Molecular Biology
Member, American Chemical Society
Member, American Society for Mass Spectrometry
Member, The Geochemical Society

RESEARCH INTERESTS
Proteomics and marine metaproteomics
Trace metal biogeochemistry of bioactive metals and vitamins (Co, Fe, Cd, Zn, Mn, Ni, and B_{12})
Trace metal requirements and metalloenzyme usage in life (metallomics)
Discovery of novel metalloenzymes in microbes
Bioinorganic chemistry
The co-evolution of biogeochemical cycles and life throughout Earth history
The influence of human economies on global and regional biogeochemical cycles

PROFESSIONAL ACTIVITIES
WHOI (Non-Education Related):
Biosafety Committee, Chemistry Department representative
ICP-MS Facility Committee
75th Anniversary Committee

Outside WHOI (Other than Attendance at Society/National Meetings):

2002-2003	Participant in Diatom Genome Annotation (*Thalassiosira pseudonana*) at the Joint Genome Institute
2005	Co-Session Chair, Metal Cycling, ASLO meeting, Salt Lake City, February.
2005	Co-Session Chair, Trace Element Biogeochemistry, American Chemical Society Meeting – Geosciences Division, San Diego, March 17-18.
2006	Co-Session Chair, Trace Elements and Isotopes. ASLO meeting Victoria, Canada, June.
2011	Co-Session Chair, Trace Metals and their Nutritional Importance to Phytoplankton and Bacteria, ASLO Aquatic Sciences Meeting, San Juan Puerto Rico
2014	Co-Session Goldschmidt The Biogeochemical Cycling of the Nutrients N, P and Si: Terrestrial and Marine Insights for the Present, Past and Future
2011-2014	US Ocean Carbon and Biogeochemistry Steering Committee Member

Panel member for National Science Foundation (Chemical Oceanography and Polar Programs)
Panel member for NASA Astrobiology Program (2012)
Vice-Chair Bioinorganic Chemistry Gordon Research Conference 2012 (defunct)
Associate Editor – Marine Chemistry
Review Editor – Frontiers in Aquatic Microbiology
Editorial Board – Frontiers in Microbiological Chemistry
Advisory Board Member – Metallomics Royal Society Journal
Manuscript reviewer for Aquatic Microbial Ecology, Aquatic Sciences, Aquatic Toxicology, Astrobiology, Biogeosciences, Biotechnology Progress, Deep-Sea Research, Earth Atmospheric Planetary Science Letters, Ecology, Environmental Microbiology, Environmental Science and Technology, Estuarine, Coastal and Shelf Science, Frontiers in Aquatic Microbiology, Geobiology, Geochemical Transactions, Journal of Geophysical Research – Oceans, Limnology and Oceanography, Limnology and Oceanography Methods, Marine Chemistry, Marine Ecology Progress Series, Nature, Nature Biotechnology, Nature Geosciences, Plant Cell & Environment, Plos One, Proceedings of the Royal Society B, Proceedings National Academy of Science USA, Science.

Proposal reviewer for National Science Foundation, NASA, NSERC, Hudson River Foundation, Deutsche Forschungsgemeinschaft (DFG), United States-Israel Binational Science Foundation, Academia Sinica Taiwan, Netherlands Organization for Scientific Research.

PARTICIPATION IN EDUCATION

1996	Aquatic Chemistry, MIT – Teaching assistant for graduate level class
1999	Supervised UCSB undergraduate summer research student, Jordan Watson
2001-2003	Supervised Princeton graduate students, Madeli Castruita, Haewon Park, and Alison Doerr in François Morel's lab
2002-present	Member of thesis committee for Madeli Castruita (Chemistry Department, Princeton University, co-advised by Ed Stiefel and François Morel)
2002-2006	Member of thesis committee for Rachel Wisniewski (Chemical Oceanography, MIT/WHOI Joint Program, advisor: Jim Moffett)
2003-2007	Member of thesis committee for Seth John (Chemical Oceanography, MIT/WHOI Joint Program, advisor: Ed Boyle)
2004-present	Supervised WHOI Summer Student Fellows/Interns Erin Bertrand (Bates College, 2005) and Alexandra Borst (Pomona College, 2004), Allison St. Vincent (MIT, 2009), Sarah Choyke (Haverford, 2009), Emily Lorch (Plymouth UK, 2009, 2010), Noelle Held (Stetson University, 2013)
2004-2009	Advised MIT-WHOI graduate student Anne Thompson (co-advised with Chisholm)
2005-2008	Advised MIT-WHOI Masters student Whitney Krey (co-advised with Delong/Webb)
2005-2011	Advising MIT-WHOI graduate student Alysia Cox
2006-2012	Advising MIT-WHOI graduate students Erin Bertrand and Abigail Noble
2010-2013	Advised MIT-WHOI Masters Student Tyler Goepfert
2010	Advised University of Duisberg-Essen Master's Student Daniel Tabersky
2011-2012	Co-advised MIT-WHOI graduate student Carly Buchwald (with K. Casciotti)
2011-2013	Advising MIT-WHOI graduate Student David Wang
2011-present	Advising MIT-WHOI graduate Student Nick Hawco
2014-present	Advising MIT-WHOI graduate Student Noelle Held

Committee Member for Jake Waldbauer (Chisholm Student)
Committee Member for Yanmei Shi (DeLong Student)
Committee Member for Laure-Anne Ventouras (DeLong Student)
Committee Member for Daniel Ohnemus (Lam Student)
Committee Member for Carly Buchwald (Casciotti Student)
Committee Member for Rene Boiteau (Repeta Student)
Committee Member for Bethanie Edwards (Van Mooy Student)
Chaired Thesis Proposal Defense of Kathleen Munson (Lamborg Student)
Chaired Doctoral Thesis of Virginia Rich (Ed DeLong Student June 2008)
Chaired Doctoral Thesis of Li Li (U. Mass Boston, Gordon Wallace Advisor)
First-year Chemical Oceanography Graduate Student Advising Committee (2003-2004, 2010-2011)
WHOI Chemical Oceanography General Exam Co-Coordinator (2005, 2011)

2008-present	Instructor for Marine Bioinorganic Chemistry, MIT-WHOI Graduate Level Course 12.741

SUPERVISION AT WHOI

Technical Staff:

Dawn Moran, Research Assistant III, 2007-present
Dr. Matt McIlvin, Research Associate III, 2010-present
Dr. Vladimir Bulygin, Research Associate II, 2007-2009

Abigail Noble, Research Assistant II, 2004-2006
Erin Bertrand, Research Assistant II, 2005-2006
Tyler Goepfert, Research Assistant II, 2004-2005; Research Assistant III, 2005-2008 (currently in MIT/WHOI Joint Program)

Post-Doctorates:
Chad Hammerschmidt, Postdoctoral Scholar, 2005-2007
Katherine Mackey, Postdoctoral Scholar, 2011-2013
Sara Bender, Postdoctoral Scholar, 2013-present
Tristan Horner, Postdoctoral Scholar, 2014-present
Julia Gauglitz, Postdoctoral Scholar, 2014-present

CRUISE PARTICIPATION AND FIELD WORK

1995 June	R/V Westward, Coastal Atlantic
1996 June	R/V Oceanus, Sargasso Sea
1997 March	R/V Oceanus, Sargasso Sea
1998 February	R/V Oceanus, Sargasso Sea
1998 August	R/V Oceanus, Sargasso Sea
1999 September	R/V Oceanus, Sargasso Sea
2000 August-October	R/V Melville, San Diego CA to Arica, Chile
2003 June-July	R/V Kilo Moana, Seattle to Dutch Harbor, Alaska
2004 February	R/V Kilo Moana, Central Pacific - *Chief Scientist*
2005 January	R/V Wecoma, Hawaiian Islands, E-Flux program
2005 July-August	R/V Knorr, Panama to Galapagos - *Chief Scientist*
2005/2006 December-January	R/V N.B. Palmer, Ross Sea, Antarctica
2006 June	R/V Seward Johnson, Equatorial Atlantic
2006 November-December	R/V N.B. Palmer, Ross Sea, Antarctica
2007 November-December	R/V Knorr, South Atlantic - *Chief Scientist*
2009 January-February	McMurdo Sound, Antarctica - *Expedition leader*
2009 November-December	McMurdo Sound, Antarctica - *Expedition leader*
2011 October 1-26th, 2012	R/V Kilo Moana, Central Pacific - *Co-Chief Scientist with Carl Lamborg*

PAPERS IN REFEREED JOURNALS AND BOOKS (*Ph.D. Advisee, reprints at www.whoi.edu/saitolab)

1. Saito, M. A., M. R. McIlvin, D. M. Moran, T. J. Goepfert, G. R. DiTullio, A. F. Post, and C. H. Lamborg. 2014. Multiple nutrient stresses at intersecting Pacific Ocean biomes detected by protein biomarkers. *Science* **345**:1173-1177.
2. Lamborg, C. H., C. R. Hammerschmidt, K. L. Bowman, G. J. Swarr, K. M. Munson, D. C. Ohnemus, P. J. Lam, L.-E. Heimburger, M. J. A. Rijkenberg, and M. A. Saito. 2014. A global ocean inventory of anthropogenic mercury based on water column measurements. *Nature* 512:65-68.
3. Austin, Rachel Narehood, and Mak A. Saito. 2014 "Metals in Marine Biochemistry." *Metallomics* 6.6 (2014): 1105-1106.
4. Alyson E. Santoro, Chris L. Dupont, R. Alexander Richter, Matthew T. Craig, Paul Carini, Matthew R. McIlvin, Youngik Yang, William Orsi, Dawn Moran and Mak A. Saito. Genomic and proteomic characterization of *Candidatus* Nitrosopelagicus brevis: an ammonia-oxidizing archaeon from the open ocean. *In review.*

5. Guannel, M. L., Haring, D., Twiner, M.J., Wang, Z., Noble, A., Lee, P., Saito, M.A., and Rocap, G. Toxigenicity and biogeography of the diatom *Pseudo-nitzschia* across distinct environmental regimes in the South Atlantic Ocean. *Marine Ecol. Prog. Series.* In press.
6. Peter A. Lee, Erin M. Bertrand*, Mak A. Saito, Giacomo R. DiTullio. Influence of Vitamin B_{12} availability on oceanic dimethylsulfide. *In Revision for Limnology and Oceanography*.
7. Katherine Mackey, Chia-Te Chein, Anton F Post, Mak A Saito and Adina Paytan. Rapid and gradual modes of aerosol trace metal dissolution in seawater. *In review at Frontiers in Microbiological Chemistry.*
8. Alysia D. Cox* and Mak A. Saito. Enriched stable isotope uptake and cadmium addition experiments with natural phytoplankton assemblages in the Costa Rica Upwelling Dome. *In review at Marine Chemistry.*
9. Elizabeth D Swanner, Noah J Planavsky, Stefan V Lalonde, Leslie J Robbins, Andrey Bekker, Olivier J Rouxel, Mak A Saito, Andreas Kappler, Stephen J Mojzsis, Kurt O Konhauser, Cobalt and marine redox evolution. *Earth and Planetary Science Letters.* 390 (2014): 253-263.
10. Nathan A. Ahlgren, Abigail Noble, Alison Patton, Kathryn Roache-Johnson, Laurel Jackson, Daniela Robinson, Lisa Moore, Mak Saito, Gabrielle Rocap. The unique trace metal and macronutrient conditions of the Costa Rica upwelling dome support a distinct and dense community of *Synechococcus. In Revision at Limnology and Oceanography.*
11. Alysia Cox* and Mak Saito. 2013. Proteomic responses of oceanic Synechococcus WH8102 to phosphate and zinc scarcity and cadmium additions. *Frontiers in Microbiological Chemistry*. **4:**387. doi: 10.3389/fmicb.2013.00387
12. Abigail E. Noble*, Dawn M. Moran, Andrew E. Allen, and Mak A. Saito. 2013. Dissolved and particulate trace metal micronutrients under the McMurdo Sound seasonal sea ice: basal sea ice communities as a capacitor for iron. *Frontiers in Microbiological Chemistry.* doi: 10.3389/fchem.2013.00025
13. Alexander H, Jenkins BD, Rynearson TA, Saito MA, Mercier ML and Dyhrman ST (2012) Identifying reference genes with stable expression from high throughput sequence data. *Frontiers in Aquatic Microbiology*. **3**:385. doi: 10.3389/fmicb.2012.00385
14. Erin M. Bertrand*, Dawn M. Moran, Matthew R. McIlvin, Jeffrey M. Hoffman, Andrew E. Allen, and Mak A. Saito. Methionine synthase interreplacement in diatom cultures and communities and the persistence of B_{12} use by eukaryotic phytoplankton. 58:4. 1431-1450. *Limnology and Oceanography.*
15. Saito, M.A., A.E. Noble*, A. Tagliabue, T. J. Goepfert, C.H. Lamborg, W.J. Jenkins. 2013. A Large Hydrothermal Iron Plume in the South Atlantic and Implications for Global Iron Cycling. *Nature Geosciences. 6*(9), 775-779.
16. J. Daphne Aguirre, Hillary M. Clark, Matthew McIlvin, Christine Vazquez, Shaina L. Palmere, Dennis Grab, J. Seshu, Mak A. Saito and Valeria C. Culotta. 2013. A Manganese-Rich Environment Supports Superoxide Dismutase Activity in the Lyme Disease Pathogen, *Borrelia burgdorferi. Journal of Biological Chemistry.* http://www.jbc.org/cgi/doi/10.1074/jbc.M112.433540
17. Robbins, L.J., S.V. Lalonde, M.A. Saito, N.J. Planavsky, A.M. Mloszewska, E. Pecoits, C. Scott, C.L. Dupont, A. Kappler, and K.O. Konhauser. 2013. Authigenic iron oxide proxies for marine zinc over geological time and implications for eukaryotic metallome evolution. *Geobiology.* DOI: 10.1111/gbi.12036.
18. Moore, C.M., Mills, M.M., Arrigo, K.R., Berman-Frank, I., Bopp, L., Boyd,P.W., Galbraith, E.D., Geider, R.J., Guieu, C., Jaccard, S.L., Jickells, T.D., LaRoche, J., Lenton, T., Mahowald, N.M., Marañón, E., Marinov, I., Moore,J.K., Nakatsuka, T., Oschlies, A., Saito, M.A., Thingstad, T.F.,

Tsuda, A., and Ulloa, O. 2013. Processes and patterns of Ocean Nutrient Limitation. *Nature Geosciences*. 6 702-710.

19. Mackey, KRM, K Caldiera, A Grossman, D Moran, M McIlvin, A Paytan, & M Saito. 2013. Effect of temperature on photosynthesis and growth in diverse marine *Synechococcus* strains. *Plant Physiology*. DOI:10.1104/pp.113.221937

20. Bertrand EM*, Allen AE, Dupont CL, Norden-Krichmar T, Bai J, Saito MA. 2012. Impact of Cobalamin Starvation on Diatom Molecular Physiology and the Identification of a Novel Cobalamin Acquisition Protein. *Proc. Nat. Acad. Sci.* www.pnas.org/cgi/doi/10.1073/pnas.1201731109

21. Katherine RM Mackey, Kathryn Roberts, Michael W Lomas, Mak A Saito, Anton F Post, Adina Paytan. 2012. Variable solubility and ecological impact of atmospheric phosphorus deposition. *Environ. Sci. Technol.* DOI: 10.1021/es3007996

22. Mak A. Saito. 2012. The Rise of Oxygen and Aerobic Biochemistry. *Structure*. 20:1. 1–2.

23. Noble*, A.E., C.H. Lamborg, D. Ohnemus, P.J. Lam, K. T.J. Goepfert, C.I. Measures, C.H. Frame, K.L. Casciotti, G.R.DiTullio, J. Jennings, and M.A. Saito. 2012. Basin-scale plumes of cobalt, iron, and manganese emanating from the Benguela-Angola front in the South Atlantic Ocean. 57:4. 989-1010. *Limnology and Oceanography.*

24. Jakuba, R., M.A. Saito, J.W. Moffett , Y. Xu. 2012. Dissolved zinc in the subarctic North Pacific and Bering Sea: Its distribution, speciation, and importance to primary producers. In Press at *Global Biogeochemical Cycles*. 26, GB2015, doi:10.1029/2010GB004004

25. Sonya T. Dyhrman, Bethany D. Jenkins, Tatiana A. Rynearson, Mak A. Saito, Melissa L. Mercier, Harriet Alexander, LeAnn P. Whitney, Andrea Drzewianowski, Vladimir V. Bulygin, Erin M. Bertrand, Zhijin Wu, Claudia Benitez-Nelson, Abigail Heithoff. 2012. Coordination in the transcriptome and proteome of the diatom *Thalassiosira pseudonana* reveals a diverse phosphorus stress response. *PLoS One*. 7:3. e33768.

26. Saito, M.A., Vladimir Bulygin, Dawn Moran, Craig Taylor, and Christopher Scholin. 2011. Examination of Microbial Proteome Preservation Techniques Applicable to Autonomous Environmental Sample Collection. *Front. Microbio.* 2:215. doi: 10.3389/fmicb.2011.00215

27. Louie L. Wurch, Erin M. Bertrand, Mak A. Saito, Benjamin A.S. Van Mooy and Sonya T. Dyhrman Proteome changes driven by phosphorus stress and recovery in the brown tide-forming alga, *Aureococcus anophagefferens. PLOS One*. 6(12): e28949. doi:10.1371/journal.pone.0028949

28. Gregory F. de Souza, Ben C. Reynolds, Jörg Rickli, Martin Frank, Mak Saito, Loes J. A. Gerringa and Bernard Bourdon. 2012. Southern Ocean control of silicon stable isotope distribution in the deep Atlantic Ocean. *Global Biogeochemical Cycles.* 26, GB2035, doi:10.1029/2011GB004141

29. Jill A. Sohm, Jason Hilton, Abigail Noble, Jonathan P. Zehr, Mak A. Saito, Eric A. Webb. 2011. Nitrogen fixation in the South Atlantic Gyre and the Benguela upwelling system. *Geophys. Res. Lett.* 38, L16608, doi:10.1029/2011GL048315

30. Thompson, A.W. *, K. Huang, M.A. Saito, S.W. Chisholm. 2011. Transcriptome response of high and low-light adapted *Prochlorococcus* strains to changing iron availability. *ISME Journal*. 1-15. doi: 10.1038/ismej.2011.49.

31. E. M. Bertrand*, M.A. Saito, P.A. Lee, R.B. Dunbar,G.R. DiTullio. 2011. Iron limitation of springtime bacterial and phytoplankton populations in the Ross Sea: Interactive effects of iron and vitamin B_{12} nutrition. *Front. Microbiology*. 2:160. doi: 10.3389/fmicb.2011.00160

32. Saito, M.A., E.M. Bertrand, V. Bulygin, D. Moran, S. Dutkiewicz, F.M. Monteiro, M.J. Follows, F.W. Valois, J.B. Waterbury. 2011. Iron Conservation by Reduction of Metalloenzyme Inventories in the Marine Diazotroph *Crocosphaera watsonii*. *Proc. Natl. Acad. Sci*. doi:10.1073/pnas.1006943108.

33. Saito, M.A., T.J. Goepfert, A.E. Noble, P.N. Sedwick, G.R. DiTullio. 2010. A Seasonal Study of Dissolved Cobalt in the Ross Sea of Antarctica: Micronutrient Control, Absence of Observed Scavenging, and Relationships with Zn, Cd, and P. *Biogeosciences*.7. 4059-4082.

34. Bertrand, E.M.*, M.A. Saito,Y. Jae Jeon,B.A. Neilan. 2011. Vitamin B_{12} biosynthesis gene diversity in the Ross Sea: the identification of a new group of polar B_{12}-biosynthesizers. *Environmental Microbiology*. doi:10.1111/j.1462-2920.2011.02428.x

35. Gobler, C.J. et al (and 29 others). Ecological Niche of Harmful Alga, *Aureococcus Anophagefferens*, revealed in genome. 2010. *Proc. Natl. Acad. Sci*.

36. Higgins, M.B., F.L. Wolfe-Simon, R.S. Robinson, Y. Qin, M.A. Saito and A. Pearson. 2011. Paleoenvironmental implications of taxonomic variation among $\delta^{15}N$ values of chloropigments. *Geochimica et Cosmochimica Acta.* 75:22. 7351-7363.

37. Sedwick, P. N., C. M. Marsay, A. M. Aguilar-Islas, M. C. Lohan, B. M. Sohst, M. C. Long, K. R. Arrigo, R. B. Dunbar, M. A. Saito, W. O. Smith and G. R. DiTullio. Early-season depletion of dissolved iron in the Ross Sea polynya: Implications for iron dynamics on the Antarctic continental shelf. Accepted at *Journal of Geophysical Research*

38. Wu, Z., B.D. Jenkins, T.A. Rynearson, S.T. Dyhrman, M.A. Saito, M. Mercier, L. Whitney. 2010. Empirical Bayes Analysis of Sequencing-based Transcriptional Profiling without Replicates. *BMC Bioinformatics*. 11:564. doi:10.1186/1471-2105-11-564.

39. Saito, M.A. 2009. Less Nickel for More Oxygen. *Nature*. 458. 714-715.

40. Saito, M.A. and T.J. Goepfert. 2008. Zinc-cobalt co-limitation in *Phaeocystis antarctica*. *Limnology and Oceanography*, 53(1). 266-275.

41. Saito, M.A., T.J. Goepfert, and J.T. Ritt. 2008. Some thoughts on the concept of co-limitation: Three definitions and the importance of bioavailability. *Limnology and Oceanography*, 53(1). 276-290.

42. Church, M.J., K.M. Björkman, D.M. Karl, M.A. Saito, and J.P. Zehr. 2008. Regional distributions of nitrogen fixing bacteria in the Pacific Ocean. *Limnology and Oceanography*. 53(1). 63-77.

43. Noble, A.E.* and M.A. Saito, K. Maiti, C. Benitez-Nelson. 2008. A concentrating mechanism for cobalt within a cyclonic eddy and sources of cobalt, manganese, and iron in intermediate waters near the Hawaiian Islands. *Deep-Sea Research II.* 55. 1473-1490

44. Bertrand*, E.M., M.A. Saito, J.M. Rose, C.R. Riesselman, M.C. Lohan, A.E. Noble, P.A. Lee, G.R. DiTullio. 2007. Vitamin B_{12} and iron co-limitation of phytoplankton growth in the Ross Sea. *Limnology and Oceanography*, 52(3). 1079-1093.

45. Montsant, A., A.E. Allen, S. Coesel, A. De Martino, A. Falciatore, M. Heijde, K. Jabbari, U. Maheswari, M. Mangogna, E. Rayko, M. Siaut, A. Vardi, K.E. Apt, J.A. Berges, A. Chiovitti, A.K. Davis, M.Z. Hadi, T.W. Lane, J.C. Lippmeier, D. Martinez, M.S. Parker, G.J. Pazour, M.A. Saito, K. Thamatrakoln, D.S. Rokhsar, E.V. Armbrust, C. Bowler. 2007. Identification and Comparative Genomic Analysis of Signaling and Regulatory Components in the Diatom *Thalassiosira pseudonana*. *Journal of Phycology. 43. 585-604.*

46. Moore, L., A. Coe, E. Zinser, M.A. Saito, M. Sullivan, D. Lindell, K. Frois-Moniz, J. Waterbury, S.W. Chisholm. 2007. Culturing of the marine cyanobacterium *Prochlorococcus. Limnology and Oceanography Methods.* 5. 353-362.

47. John, S.G., R.W. Geis, M.A. Saito, E.A. Boyle. 2007. Zinc isotope fractionation during high-affinity and low-affinity transport in *Thalassiosira oceanica*. *Limnology and Oceanography*. 52(6). 2710-2714.

48. Castruita, M., M.A. Saito, P.C. Schottel, L. A. Elmegreen, S. Myneni, E. I. Stiefel, and F. M. M. Morel. 2006. Overexpression and characterization of an iron storage and DNA-binding Dps protein from *Trichodesmium erythraeum*. *Applied and Environmental Microbiology,* 72(4): 2918-2924.

49. Saito, M.A. and D.L. Schneider. 2006. Examination of the precipitation chemistry and improvements in precision using the $Mg(OH)_2$ preconcentration ICP-MS method for high-throughput analysis of open-ocean Fe and Mn in seawater. *Analytica Chimica Acta,* 565, 222-233.

50. Lane[+], T.W., M.A. Saito[+], G.N. George, I.J. Pickering, R.C. Prince, F.M.M. Morel. 2005. A Cadmium Enzyme from a Marine Diatom. *Nature,* 435, 42. [+]*co-first authors, written by Saito*

51. Saito, M.A., G. Rocap, J.W. Moffett. 2005. Production of Cobalt Binding Ligands in a *Synechococcus* Feature at the Costa Rica Upwelling Dome. *Limnology and Oceanography,* 50, 279-290.

52. Armbrust, E.V., J.A. Berges, C. Bowler, B.R. Green, D. Martinez, N.H. Putnam, S. Zhou, A.E. Allen, K.E. Apt, M. Bechner, M.A. Brzezinski, B.K. Chaal, A. Chiovitti, A.K. Davis, M.S. Demarest, J.C. Detter, T. Glavina, D. Goodstein, M.Z. Hadi, U. Hellsten, M. Hildebrand, B.D. Jenkins, J. Jurka, V.V. Kapitonov, N. Kröger, W.W.Y. Lau, T.W. Lane, F.W. Larimer, J.C. Lippmeier, S. Lucas, M. Medina, A. Montsant, M. Obornik, M.S. Parker, B. Palenik, G.J. Pazour, P. M. Richardson, T.A. Rynearson, M.A. Saito, D.C. Schwartz, K. Thamatrakoln, K. Valentin, A.Vardi, F.P. Wilkerson, D. S. Rokhsar. 2004. Analysis of whole genome sequence of the centric diatom *Thalassiosira pseudonana*. *Science*, 306, 79-86.

53. Edgcomb, V.P., S.J. Molyneaux, M.A. Saito, K. Lloyd, S. Böer, C.O. Wirsen, M.S. Atkins and A. Teske. 2004. Sulfide Ameliorates Metal Toxicity for Deep-Sea Hydrothermal Vent Archaea. *Applied and Environmental Microbiology,* 70(4): 2551-2555.

54. Saito, M.A., G.R. DiTullio, J.W. Moffett. 2004. Cobalt and Nickel in the Peru Upwelling Region: A major flux of labile cobalt utilized as a micronutrient. *Global Biogeochemical Cycles,* 18, GB4030, 1-14.

55. Morel, F.M.M., A.J. Milligan and M.A. Saito. 2003. "Marine Bioinorganic Chemistry: The Role of Trace of Metals in the Oceanic Cycles of Major Nutrients" in *Treatise on Geochemistry* edited by K.K. Turekian, H.D. Holland, Elsevier Science Ltd, Cambridge, UK.

56. Saito, M.A., D. Sigman, F.M.M. Morel. 2003. The bioinorganic chemistry of the ancient ocean: the co-evolution of cyanobacterial metal requirements and biogeochemical cycles at the Archean-Proterozoic boundary? *Inorganica Chimica Acta,* 356C: 308-318.

57. Atkins, M.S.; M.A. Hanna, E.A. Kupetsky, M.A. Saito, C.D. Taylor, C.O. Wirsen. 2002. Tolerance of flagellated protozoa to extreme environmental conditions potentially encountered at deep-sea hydrothermal vents. *Marine Ecological Progress Series,* 226:63-75.

58. Saito, M.A. and J.W. Moffett. 2002. Temporal and Spatial Variability of Cobalt in the Atlantic Ocean. *Geochimica et Cosmochimica Acta,* 66(11):1943-1953.

59. Saito, M.A., S.W. Chisholm, J.W. Moffett, J. Waterbury. 2002. Cobalt limitation and uptake in the marine cyanobacterium *Prochlorococcus. Limnology and Oceanography,* 47(6):1629-1636.

60. Saito, M.A. and J.W. Moffett. 2001. Complexation of cobalt by natural organic ligands in the Sargasso Sea as determined by a new high-sensitivity electrochemical cobalt speciation method suitable for open ocean work. *Marine Chemistry,* 75:49-68.

61. Saito, M.A. 2001. The Biogeochemistry of Cobalt in the Sargasso Sea. Ph.D. Thesis. MIT/WHOI Joint Program in Chemical Oceanography.

PATENTS

Cobalamin Acquisition Protein and Use Thereof. US Provisional Patent No. 61/640261. Mak Saito and Erin Bertrand.

OTHER PUBLICATIONS/OUTREACH

Antarctic Adventures. 2011 – Children's Book on Antarctic Science, Elizabeth Saito and Mak Saito, self-published. All proceeds donated to local children's organizations. www.antarcticadventurebook.com

CORSACS Antarctica Cruises Outreach Website (Controls on Ross Sea Algal Community Structure www.whoi.edu/sites/Corsacs, with over 16,000 unique visitors)

Oceanus Audio Slideshow on Antarctic Proteomic Research: www.whoi.edu/oceanus/invisiblerealm

Oceanus Article on Diazotroph Proteomic Research: www.whoi.edu/oceanus/hotbunking

Oceanus Article on Vitamin B_{12} Claw and Proteomics: www.whoi.edu/oceanus/proteomics

Oceanus Article on Lyme Disease and metalloenzymes

Living Lab Live Radio Interview, National Public Radio WCAI, June 3rd 2013.
http://capeandislands.org/post/marine-microbes-hold-clues-biomedical-researchers

Evening Presentation for the Woods Hole Children's School of Science on Antarctica and Vitamins, July 2013.

Media interviews regarding South Atlantic Hydrothermal Iron Plume Study August 2013 (New York Times – Science Times, Die Weld (Germany), Sciencedaily, La Gran Epoca (Spain).
http://www.sciencedaily.com/releases/2013/08/130819171822.htm
http://www.nbcnews.com/science/science-news/huge-iron-rich-plume-discovered-beneath-atlantic-ocean-f6C10962826
http://www.nytimes.com/2013/08/27/science/vein-of-iron-in-south-atlantic.html?_r=0

Oceanus Article on Metaproteomics in the Oceans: http://www.whoi.edu/oceanus/feature/proteomics

NSF Press Release on Metaproteomics: http://www.nsf.gov/news/news_summ.jsp?cntn_id=132505

Yahoo News: http://news.yahoo.com/crafty-ocean-bacteria-conquer-food-deserts-114623572.html

PUBLISHED ABSTRACTS

Matthew McIlvin, J. Dafhne Aguirre; Hillary Clark; Valeria Culotta; Mak Saito. Metallomic Analysis of Metalloproteins within the Lyme Disease Pathogen *Borrelia burgdorferi.* American Society for Mass Spectrometry June 2014 Poster

Mak Saito; Matthew McIlvin; Dawn Moran; Tyler Goepfert; Giacomo DiTillio; Carl Lamborg. Multiple Nutrient Stresses at Intersecting Pacific Ocean Biomes Detected by Protein Biomarkers. American Society for Mass Spectrometry June 2014 Poster

Saito, M.A., McIlvin, M.; Moran, D. M.; Lamborg, C. H.; DiTullio, G. "Detection and Distribution of Metalloenzymes in Pacific Ocean Environments". ASLO Meeting, New Orleans. February 2013. Oral Presentation.

Noble, A.E.; Held, N.; Saito, M.A.: PROBING THE CHEMICAL SPECIATION OF COBALT: PRESERVATION ARTIFACTS AND REDOX SENSITIVE LIGANDS. Ocean Sciences Meeting Hawaii, 2014.

Mackey, K.; McIlvin, M.; Post, A.; Saito, M.: STRAIN-SPECIFIC RESPONSE OF MARINE SYNECHOCOCCUS TO IRON LIMITATION. Ocean Sciences Meeting Hawaii, 2014.

Hawco, N. J.; McIlvin, M.R.; Saito, M.A.: A MERIDIONAL COBALT SECTION FROM THE EQUATORIAL PACIFIC. Ocean Sciences Meeting Hawaii, 2014.

Ahlgren, N. A.; Noble, A.; Moore, L.; Saito, M.; Rocap, R.: THE UNIQUE TRACE METAL AND MACRONUTRIENT CONDITIONS OF THE COSTA RICA UPWELLING DOME UPWELLING SUPPORT A DISTINCT AND DENSE COMMUNITY OF SYNECHOCOCCUS. Ocean Sciences Meeting Hawaii, 2014.

Munson, K. M.; Lamborg, C. H.; Swarr, G. J.; Saito, M.A.: MERCURY SPECIES CONCENTRATIONS AND FLUXES IN THE TROPICAL AND EQUATORIAL CENTRAL PACIFIC OCEAN. Ocean Sciences Meeting Hawaii, 2014. Oral Presentation.

Santoro, A. E.; Dupont, C.L.; Saito, M.A.: THE GENOME AND PROTEOME OF AN AMMONIA-OXIDIZING ARCHAEON FROM THE OPEN OCEAN. Ocean Sciences Meeting Hawaii, 2014. Oral Presentation.

Distribution of Metalloenzymes in Pacific Ocean Environments as Detected by Proteomic Analysis. Goldschmidt Florence Italy August 27th 2013.

Discovery and Quantitation of the Marine Microbial Metaproteome in the Central Pacific Ocean. Mak Saito; Matthew McIlvin; Dawn Moran; Tyler Goepfert; Alyson Santoro, Carl Lamborg, Vlad Zabrouskov; Justin Blethrow. American Society of Mass Spectrometry. Minneapolis MN, June 12th 2013.

McIlvin, M., K. Waldron, D. Moran, N. Robinson, M. Saito. Metalloprotein Characterization of the Marine Cyanobacteria: Diving into Marine Microbial Metallomes and the Search for Novel Metalloproteins in the Oceans. American Society for Mass Spectrometry. Vancouver Canada June 2012.

M. Saito and E. Bertrand. Marine metalloprotein abundance patterns yield insight into the implications of metal scarcity for oceanic biogeochemical processes. ACS Meeting, Environmental Bioinorganic Session. San Diego, CA. March 29th, 2012.

Jenkins, B. D.; Rynearson, T. A.; Dyhrman, S. T.; Saito, M. A.; Chappell, P. D.; Whitney, L. P.; Alexander, H.; Bertrand, E. M.; From Lab To Launch: Integrating Biomarkers Derived From Genomics and Proteomics Approaches Into Remote Observing Platforms. ASLO meeting Salt Lake City, February 2012.

Noble, A. E.; Saito, M. A.; Insight Into The Chemical Speciation Of Cobalt In The North Atlantic. ASLO meeting Salt Lake City, February 2012.

Dyhrman, S. T.; Wurch, L. L.; Gobler, C. J.; Bertrand, E.; Saito, M.; Transcriptome And Proteome Profiling Identifies Pathways Of Nutrient Metabolism In Aureococcus Anophagefferens. ASLO meeting Salt Lake City, February 2012.

M. A. Saito, E. M. Bertrand, V. Bulygin, A.D. Cox, T.J. Goepfert, D. Moran, The Potential for Colimitation of Marine Primary Productivity: Three Biochemical Definitions, Field Observations, Application of Proteomic Diagnostics, and Comments on the Future (*Invited*). AGU/ASLO Ocean Sciences Meeting Portland, February 2010.

E. M. Bertrand, V. Bulygin, M. A. Saito. Proteomics of Vitamin B_{12} and Iron Stress and Co-stress in Marine Diatoms. AGU/ASLO Ocean Sciences Meeting Portland, February 2010.

M.A. Saito, A.E. Noble, T.J. Goepfert. Trace Element Distributions and Phytoplankton Colimitations on a Full Depth Ocean Section in the South Atlantic Ocean. Goldschmidt Conference Davos Switzerland, June 2009.

M. A. Saito, E. M. Bertrand, V. Bulygin, D. Moran, J. B. Waterbury. Strategies for Economization of Cellular Iron in *Crocosphaera watsonii* as Revealed by Global Quantitative Proteomic Analysis. Goldschmidt Conference Davos Switzerland, June 2009.

A.E. Noble, T. Goepfert, M.A. Saito. Cobalt Biogeochemistry in the South Atlantic: An Ocean Section of Total Dissolved Cobalt, and Prospects for a High Throughput ICP-MS Method. AGU December 2008. Poster Presentation.

M. A. Saito, E. M. Bertrand, V. Bulygin, D. Moran, J. B. Waterbury. Proteomic Analysis of the marine cyanobacterium *Synechococcus* WH8102 and implications for estimates of the cellular iron content. 2008 AGU Fall Meeting, San Francisco.

M.A. Saito, E.M. Bertrand. A. Anber. 2008 Neoproterozoic Oxygenation of Earth's Surface Environments Reflected in the Late Evolution of the O_2-Dependent Vitamin B_{12} Biosynthesis Pathway. AGU Fall Meeting, San Francisco. Invited Speaker.

M. A. Saito, A.E. Noble, A.Cox, and T. J. Goepfert. Trace Element Distributions and Phytoplankton Colimitations on a Full Depth Ocean Section in the South Atlantic Ocean. Goldschmidt Conference Davos Switzerland June 2009. Keynote Talk.

M.A. Saito. The bioinorganic chemistry of the ancient ocean: the co-evolution of cyanobacterial metal requirements and biogeochemical cycles at the Archean-Proterozoic boundary? Goldschmidt Conference Melbourne Australia August 2006. Invited Talk.

M.A. Saito, A.E. Noble, M.B. Westley, B.N. Popp. Evidence of Redox Cycling of Cobalt in the Costa Rica Dome and Central Pacific: Similarities to Nitrite and Nitrous Oxide Distributions. ALSO Meeting, Victoria Canada June 2006. Oral Presentation and Co-Session Chair.

S.G. John, B.A. Bergquist, M.A. Saito, E.A. Boyle. The Marine Biological Cycling of Zn Isotopes. ALSO Meeting, Victoria Canada June 2006. Oral Presentation.

A.W. Thompson, M.A. Saito, S.W. Chisholm. *Prochlorococcus* Iron Requirements and Whole Genome Response to Iron Starvation. ALSO Meeting, Victoria Canada June 2006. Oral Presentation.

A.D. Cox, A.E. Noble, M.A. Saito. Cadmium Stable Isotope Uptake by Phytoplankton, Speciation, and Toxicity Experiments in the Costa Rica Upwelling Dome. ALSO Meeting, Victoria Canada June 2006. Poster Presentation.

E.M. Bertrand, A.E. Noble, D.J. Repeta, E.A. Webb, M.A. Saito. Contrasting vitamin B_{12} and cobalt uptake in phytoplankton populations in the Costa Rica Upwelling Dome. ALSO Meeting, Victoria Canada June 2006. Poster Presentation.

T.J. Goepfert, M.A. Saito. Cobalt substitution of the zinc requirement in *Phaeocystis antarctica* and thoughts on the concept of co-limitation. ALSO Meeting, Victoria Canada June 2006. Poster Presentation.

A.E. Noble, K. Maita, C. Benitez-Nelson, M.A. Saito. Cobalt, manganese, cadmium, and iron among the Hawaiian Islands: The influence of cyclonic eddies and hydrothermal signals. ALSO Meeting, Victoria Canada June 2006. Poster Presentation.

Saito, M.A. Cobalt, iron, and manganese biogeochemistry in the Equatorial Pacific and recovery experiments using the MgOH2 precipitation ICP-MS method. American Chemical Society Geochemical Division. March 16, 2005. San Diego, Oral Presentation and Co-Session Chair.

Saito, M.A. Cobalt, iron, and manganese biogeochemistry in the Equatorial Pacific: Cobalt Scavenging in the Oxygen Minimum Zones. ASLO meeting February 2005. Oral Presentation and Co-Session Chair.

Saito, M.A., D.M. Sigman, F.M.M. Morel. The Bioinorganic Chemistry of the Ancient Ocean: The Co-Evolution of Cyanobacterial Metal Requirements and Biogeochemical Cycles at the Archean-Proterozoic Boundary? Environmental Bioinorganic Chemistry Gordon Conference. Maine, 2004.

Saito, M.A. Y. Xu, R. Wisniewski, J.W. Moffett. Cobalt Biogeochemistry in the North and Equatorial Pacific: Observations of Cobalt Limitation, and Cobalt Scavenging in Oxygen Minimum Zones. Environmental Bioinorganic Chemistry Gordon Conference. Maine, 2004.

V.P. Edgcomb, S.J. Molyneaux, M.A. Saito, K. Lloyd, S. Böer, C.O. Wirsen, M.S. Atkins, A. Teske. Sulfide Ameliorates Metal Toxicity for Deep-Sea Hydrothermal Vent Archaea. Environmental Bioinorganic Chemistry Gordon Conference. Maine, 2004.

M.A. Saito, Y. Xu, R. Wisniewski, R.J. Wallsgrove, J.W. Moffett, B.N. Popp. Iron and Cobalt Co-Limitation in the Central North Pacific and Bering Sea. ASLO-TOS, February 2004, Hawaii.

M. Castruita, ; M.A. Saito, P.C. Schottel, E.I. Stiefel, F.M.M. Morel. Cloning and Overexpression of an Iron Storage Protein in *Trichodesmium erythrae*, ASLO-TOS, February 2004, Hawaii.

M.A. Saito, G. DiTullio, J.W. Moffett. Depletion of Cobalt as a Micronutrient in the Eastern Equatorial Pacific. Goldschmidt Conference, Kurashiki Japan. September 2003.

M. Castruita, M.A. Saito, P.C. Schottel, M.J. Grossman, M.K. Cody, F.M.M. Morel, E.I. Stiefel. Nature's Iron Controllers: Ferritin-Family Proteins in Bacteria. Departments of Chemistry and Geosciences, Princeton University, Princeton. ACS MARM (Middle Atlantic Regional Meeting), 2003, Princeton NJ.

M.A. Saito, T-Y Ho, F.M.M. Morel. Cadmium Toxicity to Marine Cadmium Toxicity to Marine *Synechococcus* at Picomolar Concentrations: Vestigial Interactions Indicative of Ancient Ocean Chemistry. ASLO Aquatic Sciences Meeting. Salt Lake City, Utah. 2003.

M.A. Saito, T.W. Lane, G. Taroncher-Oldenburg, F.M. M. Morel, B.B. Ward. A Search for Cobalt Proteins in *Synechococcus*: Overexpression of the Gamma Carbonic Anhydrase Enzyme and a Genome Wide Analysis of Cobalt Limited Cells. ASLO/AGU Ocean Sciences Meeting. Honolulu, Hawaii, USA 2002.

M.A. Saito, J.W. Moffett. Temporal and Spatial Variability of Cobalt in the Atlantic Ocean. AGU/ASLO Ocean Sciences Meeting. Honolulu, Hawaii. February 2002.

M.A. Saito. The Coupling of the Biogeochemistry of Cobalt and the Bioinorganic Chemistry of Cobalt Carbonic Anhydrases. Gordon Conference on Environmental Bioinorganic Chemistry. June, 2002.

Edgcomb, V.P., S. Boer, S. Molyneaux, K. Lloyd, C. Wirsen, J. Erickson, M.A. Saito, M. Atkins, A. Teske. Hyperthermophiles of the Hydrothermal Vent Subsurfaces: Limits of Life and extraterrestrial analogs. 2nd Astrobiology Science Conference, NASA-Ames, 2002.

Edgcomb, V.P., S. Boer, S. Molyneaux, K. Lloyd, C. Wirsen, J. Erickson, M.A. Saito, M. Atkins, A. Teske. Hyperthermophiles of the hydrothermal vent subsurface: limits of life and extraterrestrial analogs (Poster Presentation). Eos, Transactions, American Geophysical Union, 83(4), Ocean Sciences Meet. Suppl., Abstract OS32B-130, 2002.

Castruita, M., Stiefel, I. E., Morel M. F., Saito M.A., Taroncher-Oldenberg G. Iron, Bacterioferritin, and the Marine Cyanobacterium Synechococcus WH8102. Presented at the 2002 Gordon Research Conference on Environmental Bioinorganic Chemistry, Andover, NH. June, 2002.

M.A. Saito, F.M.M. Morel. Cobalt and Cadmium Carbonic Anhydrases in Marine Phytoplankton. American Chemical Society, Environmental Bioinorganic Chemistry Session. Orlando, 2002.

M.A. Saito, T-Y Ho, F.M.M. Morel. An unexpected turn in the trace metal trio story (Co,Cd, Zn): Cadmium toxicity to *Synechococcus* WH8102 at picomolar levels. Chemical Oceanography Gordon Conference, Oxford England, 2002.

M.A. Saito. Cobalt and Cadmium Carbonic Anhydrases in Marine Phytoplankton: Biogeochemical and Genomic Analyses. Gordon Conference on Environmental Bioinorganic Chemistry, June 2002.

M.A. Saito, J.W. Moffett. Cobalt Speciation in the Equatorial Pacific and Peru Upwelling Region: Sources and Chemical Properties of Natural Cobalt Ligands. American Society for Limnology and Oceanography. February, 2001 New Mexico.

M.A. Saito, J. W. Moffett. Cobalt Speciation in the Equatorial Pacific and Peru Upwelling Region: Sources and Chemical Properties of Natural Cobalt Ligands. August, 2001 Gordon Conference New Hampshire.

M.A. Saito, F.M.M Morel. Metal Substitution in the Cyanobacteria. Center for Bioinorganic Chemistry Annual Meeting, Princeton. June, 2001.

M.A. Saito. The Influence of Cyanobacteria on the Marine Biogeochemistry of Cobalt. 2001 DIALOG ASLO Recent Dissertations.

M.A. Saito. The Biogeochemistry of Cobalt in the Sargasso Sea. 2000 DISCO Dissertations in Chemical Oceanography Conference. October, Honolulu, Hawaii.

M.A. Saito, S.W. Chisholm, J.W. Moffett. Cobalt Uptake Mechanisms in *Prochlorococcus*: "Cobalophores" Versus the Free-Ion Model. American Society for Limnology and Oceanography. February, 2000. San Antonio, Texas

M.A. Saito, J.W. Moffett, S.W. Chisholm. Are Cobalt Ligands Produced by *Prochlorococcus*? American Society for Limnology and Oceanography. February, 1999. Santa Fe, New Mexico.

J.W. Moffett, M.A. Saito. Organic Complexation of Cobalt in the Sargasso Sea. American Society for Limnology and Oceanography. February, 1999. Santa Fe, New Mexico.

Saito, M.A., M.R. Twiss. Total cobalt and copper concentrations in Lake Erie surface waters. Proceedings of the 41st Conference of the International Association for Great Lakes Research, 1998.

PAPERS PRESENTED AT MEETINGS AND INVITED LECTURES

Congresso Brasileiro De Oceanografia (Brazilian Congress of Oceanography). October 2014. Keynote Speaker.

9th International Copper Meeting: Copper in Biology. October, 2014. Invited Speaker.

Biometals. Duke University. July 2014. Invited Speaker.

Ocean Global Change Biology Gordon Research Conference. July 2014. Invited Speaker.

Mak Saito; Matthew McIlvin; Dawn Moran; Tyler Goepfert; Giacomo DiTillio; Carl Lamborg. Multiple Nutrient Stresses at Intersecting Pacific Ocean Biomes Detected by Protein Biomarkers. American Society for Mass Spectrometry June 2014 Poster

Environmental Geochemistry and Geophysics Seminar, Princeton University, March 27th 2014. Invited Speaker.

Saito, M. A.; McIlvin, M.; Moran, D. M.; Lamborg, C. H.; DiTullio, G.; INTERSECTION OF NUTRIENT LIMITATION BIOMES IN THE EQUATORIAL PACIFIC OCEAN AS DETECTED BY QUANTITATION OF PROTEOMIC BIOMARKERS (Abstract ID: 16377). Ocean Sciences Meeting Hawaii February 2014.

University of Rochester Biology Department Invited Lecture, January 27th 2014.

University of Victoria, School of Earth and Ocean Sciences. Invited Lecture, January 21st 2014.

University of Santa Cruz, Department of Ocean Sciences. October 4th 2013. *Student-Selected Invited Speaker.*

WHOI Ocean Science Journalism Symposium. September 12, 2013. *Invited Speaker.*

"Distribution of Metalloenzymes in Pacific Ocean Environments as Detected by Proteomic Analysis" Goldschmidt Florence Italy August 27th 2013. *Keynote Speaker*

Evening Presentation for the Woods Hole Children's School of Science on Antarctica and Vitamins, July 2013.

"Distribution of nutrient stress biomarkers and metalloenzymes in the Pacific Ocean". Ocean Carbon and Biogeochemistry Summer Workshop. Woods Hole MA, July 23 2013.

Discovery and Quantitation of the Marine Microbial Metaproteome in the Central Pacific Ocean. Mak Saito; Matthew McIlvin; Dawn Moran; Tyler Goepfert; Alyson Santoro, Carl Lamborg, Vlad Zabrouskov; Justin Blethrow. American Society of Mass Spectrometry. Minneapolis MN, June 12th 2013. *Poster.*

Microbial ecology and biogeochemistry of oxygen-deficient marine waters, 18-22 March 2013, Santa Cruz, Chile. Invited Speaker.

"Detection and Distribution of Metalloenzymes in Pacific Ocean Environments". ASLO Meeting, New Orleans. February 2013. Oral Presentation.

"Metalloproteins in the Ocean: Strategies for Coping with Extreme Metal Scarcity". Metals in Biology Gordon Research Conference. Ventura California January 2013. *Invited Speaker*.

"Metalloenzymes from Marine Microbes of the Pacific Ocean Oxygen Minimum Zones". 8th International Copper Meeting: Copper in Biology. Sardinia Italy. October 4th, 2012. *Invited Speaker*.

WHOI Ocean Science Journalism Symposium Invited Speaker. September 13, 2012.
"Proteomic Investigations of Key Biogeochemical Marine Metalloenzymes". Marine Microbes Gordon Research Conference, June 25th 2012. Il Ciocco Tuscany Italy. *Invited Speaker.*
American Chemical Society San Diego CA. March 29th 2012. *Invited Speaker*.
Forsythe Institute, Boston MA, January 31st, 2012. *Invited Speaker*.
Chemical Oceanography Gordon Research Conference, August 16th 2011, *Invited Speaker*.
Ocean Carbon and Biology Global Biogeochemical Flux – Ocean Observing Initiative Scoping Workshop May 2011, *Invited Speaker.*
Polar Marine Science Gordon Research Conference, March 2011. *Invited speaker*.
Upper-Ocean Nutrient Limitation IGBP workshop, Southampton UK. November 2010, *Invited Speaker*.
Biogeotraces Workshop Los Angeles, November 2010, *Invited Speaker*.
Society for General Microbiology, Metals and Microbes Session, Nottingham UK. September 8, 2010. *Invited speaker*.
EU COST Speciation Database Workshop, Kiel Germany, August 2010, *Invited speaker*.
Organic Geochemistry Gordon Conference, August 3, 2010. *Invited speaker*.
Environmental Bioinorganic Chemistry Gordon Conference, June 2010. *Invited speaker*.
Caltech, May 5, 2010. *Invited speaker*.
Massachusetts Institute of Technology, EAPS March 5, 2010, *Invited speaker*.
Goldschmidt Conference, Davos Switzerland June 2009, *Keynote Lecture*.
U. Mass Boston, April 29th 2009. *Invited speaker*.
Stanford University February 2009. *Invited speaker*.
Marine Chemistry and Geochemistry Department Lecture WHOI, February 2009.
AGU Fall Meeting, San Francisco, December 2008.
AGU Fall Meeting, San Francisco, December 2008. *Invited Speaker*.
Rutgers University, October 6, 2008. *Invited speaker*.
GEOTRACES Pacific Cruise Planning Meeting, U. Southern California October 1-3 2008, *Plenary Speaker*.
Environmental Bioinorganic Chemistry Gordon Conference June 2008, *Invited Speaker*.
Medical University of South Carolina, Student Open House, June 2008, *Keynote Speaker*.
Environmental Bioinorganic Chemistry Gordon Conference June 2008, *Invited Speaker*.
Stanford University, Oceans Seminar, May 2008. *Invited Speaker*.
WHOI Summer Student Fellow Lecture Series. July 2008.
Children's School of Science. Presentation to Global Sustainability and Experiments Class. July 2008.
GEOTRACES, Atlantic Basin Planning Meeting. September 2007, Oxford University. *Invited Speaker*.
Ocean Carbon Biogeochemistry Workshop, July 2007. *Invited Speaker*.
University of Kyoto, June 2007. *Invited Speaker*.
Stonybrook University, May 2006. *Invited Speaker*.
Harvard University, October 2006, Microbial Science Initiative *Invited Speaker*.
U. Rhode Island. September 2006. *Invited Speaker*.
Oregon Graduate Institute. September 2006. *Invited Speaker*.
Old Dominion University. September 2006. *Invited Speaker*.
Goldschmidt August 2006. *Invited Speaker*.
ASLO June 2006. Oral Presentation and Co-Session Chair.
American Chemical Society Meeting, March 16, 2005. Oral Presentation and Co-Session Chair
ASLO February 2005. Oral Presentation and Co-Session Chair.
Earth Atmospheric Planetary Sciences Department, MIT. December 3, 2004. *Invited Speaker*.
Summer Lecture Series. Woods Hole Oceanographic Institution. July 8, 2004.
American Society for Limnology and Oceanography –TOS meeting, February 2004, Hawaii. Presentation
Goldschmidt Conference, Kurashiki Japan. September 2003. Oral Presentation.

McGill University, November 12, 2003. *Invited Speaker*.
Stanford University, Geosciences Department. October 23,2003. *Invited Speaker*.
University of South Carolina, Columbia. April 2003. *Invited Speaker*.
Gordon Research Conference on Environmental Bioinorganic Chemistry. June 18, 2002. *Invited Speaker*.
Gordon Research Conference on Environmental Bioinorganic Chemistry, Andover, NH, June 16-21, 2002. Poster
AGU/ASLO Ocean Sciences Meeting. Honolulu, Hawaii. February 2002. Oral Presentation.
Environmental Geochemistry and Geophysics Seminar. Princeton University. 2002
American Chemical Society, Environmental Bioinorganic Chemistry Session. Orlando, 2002. *Invited Speaker*.
Chemical Oceanography Gordon Conference, Oxford England. 2002. Poster.
Princeton Bioinorganic Chemistry Supergroup, Department of Chemistry. December 4, 2002.
Wesleyan University. February 2002. *Invited Speaker*.
Marine Chemistry and Geochemistry Department Seminar. April 3, 2002. *Invited Speaker*.
American Chemical Society, Environmental Bioinorganic Chemistry Session. Orlando, 2002. *Invited Speaker*.
American Society for Limnology and Oceanography. February 2001 New Mexico. Oral Presentation.
American Society for Limnology and Oceanography. February 13. 2001 New Mexico.
Center for Bioinorganic Chemistry Annual Meeting, Princeton. June 20, 2001. *Invited Speaker*.
College of Marine Studies Seminar Series, University of Delaware in Lewes. November 6, 2001. *Invited Speaker*.
2001 DIALOG ASLO Recent Dissertations Conference, BBSR, Bermuda.
Woods Hole Oceanographic Institution. Summer Student Lecture Series. June 23, 2000.
Marine Chemistry and Geochemistry Seminar, Woods Hole Oceanographic Institution. June 12, 2000.
Dissertations in Chemical Oceanography Conference. October 24, 2000. Honolulu, Hawaii.
American Society for Limnology and Oceanography. 2000. San Antonio, Texas. Oral Presentation.
Office of Naval Research History of Oceanography Conference. WHOI. March 2000. Poster.
American Society for Limnology and Oceanography. February 3, 1999. Santa Fe, New Mexico. Oral Presentation.
American Society for Limnology and Oceanography. February 4, 1999. Santa Fe, New Mexico. Oral Presentation.
Aquatic Sciences Seminar. Civil and Environmental Engineering MIT. November 1999.
MIT Environmental Biology Seminar. April 30, 1999. *Invited Speaker*.