

## FELISA WOLFE-SIMON

### CURRICULUM VITAE

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### EDUCATION

Ph.D.	2006	Rutgers University	Oceanography
		Dissertation title: <i>The Role and Evolution of Superoxide Dismutases in Algae</i>	
B.A.	2000	Oberlin College	Biology (Chemistry)
B.M.	2000	Oberlin Conservatory of Music	Oboe Performance (Ethnomusicology)

### PROFESSIONAL EXPERIENCE

2010-present	NASA Astrobiology Research Fellow
2006-2009	NSF Postdoctoral Research Fellow in Biology
2000-2006	Graduate Fellow, Grad. Assistant and Teaching Assistant, Dept. of Oceanography, Rutgers University

### PUBLICATIONS

- F. Wolfe-Simon**, J. Switzer Blum, T.R. Kulp, G.W. Gordon, S.E. Hoefft, J. Pett-Ridge, J.F. Stolz, S.M. Webb, P.K. Weber, P.C.W. Davies, A.D. Anbar and R.S. Oremland (2011). Response to comments on "A bacterium that can grow by using arsenic instead of phosphorus". *Science*. **332**: 1149.
- M.B. Higgins, **F. Wolfe-Simon**, R.S. Robinson, Y. Qin, M.A. Saito and A. Pearson (2011). Paleoenvironmental implications of taxonomic variation among  $\delta^{15}\text{N}$  values of chloropigments. *Geochimica et Cosmochimica Acta*. in press.
- D. Chauhan, I.M. Folea, C. Jolley, R. Kouřil, C. Lubner, S. Lin, D. Kolber, **F. Wolfe-Simon**, J. Golbeck, E.J. Boekema & P. Fromme (2011). A novel photosynthetic strategy for adaptation to low iron aquatic environments. *Biochemistry*. **50**: 686-692
- F. Wolfe-Simon**, J. Switzer Blum, T.R. Kulp, G.W. Gordon, S.E. Hoefft, J. Pett-Ridge, J.F. Stolz, S.M. Webb, P.K. Weber, P.C.W. Davies, A.D. Anbar and R.S. Oremland (2011). A bacterium that can grow by using arsenic instead of phosphorus. *Science*. **332**: 1163-1166.
- J.B. Glass, **F. Wolfe-Simon**, J.J. Elser and A.D. Anbar (2010). Molybdenum–nitrogen colimitation in heterocystous cyanobacteria. *Limnology and Oceanography*. **55**: 667–676.
- D.T. Johnston, **F. Wolfe-Simon**, A. Pearson, and A.H. Knoll (2009). Anoxygenic photosynthesis modulated Proterozoic oxygen and sustained Earth's middle age. *Proceedings of the National Academy of Sciences*. **106**: 16925-16929
- R.S. Oremland, C. Saltikov, **F. Wolfe-Simon**, and J.F. Stolz (2009). Arsenic in the evolution of Earth and extraterrestrial ecosystems. *Geomicrobiology Journal*. **26**: 522-536.
- F. Wolfe-Simon**, P.C.W. Davies and A.D. Anbar (2009). Did nature also choose Arsenic? *International Journal of Astrobiology*. **8**: 69-74.
- J.B. Glass, **F. Wolfe-Simon**, and A.D. Anbar (2009). Coevolution of marine metal availability and photoautotrophic nitrogen assimilation. *Geobiology*. **7**: 100-123.
- P.C.W. Davies, S.A. Benner, C.E. Cleland, C.H. Lineweaver, C.P. McKay and **F. Wolfe-Simon** (2009). Signatures of a shadow biosphere. *Astrobiology*. **9**: 241-249.
- F. Wolfe-Simon**, V. Starovoytov, J.R. Reinfelder, O. Schofield, and P. G. Falkowski (2006). Localization and role of manganese superoxide dismutase in a marine diatom. *Plant Physiology*. **142**: 1701-1709.
- F. Wolfe-Simon** (2006). The role and evolution of superoxide dismutases in algae. Ph.D. Dissertation. Rutgers Graduate Program in Oceanography.
- F. Wolfe-Simon**, D. Grzebyk, O. Schofield, and P. G. Falkowski (2005). The role and evolution of superoxide dismutase in algae. *Journal of Phycology*. **41**: 453-465.
- F. Wolfe**, K. Kroeger and I. Valiela (1999). Increased lability of estuarine dissolved organic nitrogen from urbanized watersheds. *Biological Bulletin*. **197**:290-292.

**PUBLICATIONS IN PREPARATION**

**F. Wolfe-Simon**, S.E. Hoefft, and R.S. Oremland (2011). Facultative anoxygenic photosynthesis by Cyanobacteria driven by arsenite. *in prep. for Geobiology*.

**F. Wolfe-Simon** and A.D. Anbar (2011). Metalloproteomic evolutionary advantages of eukaryotic photoautotrophs. *in prep. for Metallomics*.

**HONORS, AWARDS, AND FUNDING**

Kavli Fellow, National Academy of Sciences, 2010

NASA Astrobiology Research Fellowship (NPP), 2010-2013

NASA NAI DDF award, 2009-2010

National Science Foundation Postdoctoral Fellowship in Biology, 2006-2009

ISM2007 Young Scientist Award, 2007

Honorable mention NSF Graduate Student Fellowship, 2001

Excellence Graduate Fellowship (Rutgers University), 2000

Sigma Xi, Associate Member, 2000

National Science Foundation- Research Experience for Undergraduates (REU), 1999

Hope Hibbard Scholarship in Biology (Oberlin College), 1999

Leo S. Millar Prize in Biological Scholarship (Oberlin College), 1998

**INVITED LECTURES**

- 2011 Microbial biochemistry and the flexibility of the life we do know. *Pacific Northwest National Laboratory*. Richland, WA.
- 2011 Microbes and the four strategies of life on Earth. *National Academy of Sciences*. Washington, D.C.
- 2011 Microbes and the four basic strategies for Life on Earth: What we can learn from what we know (and how to look for what we don't know). Director's Colloquium. *NASA Ames Research Center*. Moffett Field, CA.
- 2010 Arsenic and other thoughts on alternative life. *The Royal Society*. London, UNITED KINGDOM.
- 2010 Geomicrobiology and alternative life on Earth. The chemistry of early life. International Geobiology Summer Course. *Colorado School of Mines*. Golden, CO.
- 2010 They eat what!? Biogeochemical cycles and life on Earth. *NASA AbSciCon*. League City, TX.
- 2010 Geobiochemistry: The Biochemical Consequences of Earth History for the Evolution of Life (or: how I learned to stop worrying and love arsenic and astrobiology....). *U.S. Geological Survey*. Menlo Park, CA.
- 2009 Geomicrobiology and alternative life on Earth. *Pomona College*. Claremont, CA.
- 2009 Microbes and the four basic strategies for Life on Earth: What we can learn from what we know (and how to look for what we don't know). *2<sup>nd</sup> Iberoamerican School of Astrobiology*. Montevideo, URUGUAY.
- 2009 The origins of life, geobiochemistry and evolutionary metallomics. *Swiss Federal Institute of Technology Zürich (ETH Zürich) and University of Zürich*. Zürich, SWITZERLAND.
- 2009 Geobiochemistry and Evolutionary Metallomics: Evolution of Life and the Biochemical Consequences of Earth History. *University of Washington*. Seattle, WA.
- 2009 Geobiochemistry: The Evolution of Life and the Biochemical Consequences of Earth History. *Amherst College*. Amherst, MA.
- 2009 Geobiochemistry and Metallomic Evolution: the Differential Responses of Prokaryotes and Eukaryotes to Fe-stress and Possible Evolutionary Implications. *Metals in Biology Gordon Research Conference*. Ventura, CA.
- 2009 Geobiochemistry: The Evolution of Life and the Biochemical Consequences of Earth History. *Bryn Mawr College*. Bryn Mawr, PA.
- 2008 Geobiochemistry and Evolutionary Metallomics. Symposium on Marine Geochemistry. Institute for the Chemistry and Biology of Marine Environment. *Carl von Ossietzky University of Oldenburg & The Max Planck Institute for Marine Microbiology (Bremen)*. Oldenburg, GERMANY.
- 2008 Biogeochemical Evolution of the Metalloproteome: From Prokaryotes to Eukaryotes and beyond. *ICREA Conference on the Origin and Early Evolution of Metazoans*. Barcelona, SPAIN.
- 2008 Geobiochemical evolution of the Photosynthetic metalloproteome. *Photosynthesis Gordon Research Conference*. South Hadley, MA.

- 2008 Oxygen, Metals, and the Evolutionary Drive Towards Eukaryotic Life. *Environmental Bioinorganic Chemistry Gordon Research Conference*. Waterville Valley, NH.
- 2008 Geobiochemical Evolution of the Metalloproteome: Physiological Proxies and Biochemical Inertia. *Geophysical Laboratory. The Carnegie Institution of Washington*. Washington, D.C.
- 2008 The Bioinorganic Bridge Between Life and Environment. *AGU Fall Meeting*. San Francisco, CA (*note: given by Ariel Anbar as invited speaker*)
- 2008 Biogeochemical evolution of life. Dept. of Geological and Planetary Sciences. *California Institute of Technology*. Pasadena, CA.
- 2008 Oxygen, Metals, and the Evolutionary Drive Towards Eukaryotic Life. Dept. of Earth, Atmospheric and Planetary Sciences. *Massachusetts Institute of Technology*. Cambridge, MA.
- 2008 Arsenic and Phosphorus. *Origin of Life Gordon Research Conference*. Ventura, CA.
- 2007 Geobiochemical evolution of the metalloproteome. *IFREE. JAMSTEC*. Yokosuka, JAPAN.
- 2007 Geo-evolutionary Significant Aspects of the Metalloproteome. *International Symposium on Metallomics*. Nagoya Congress Center. Nagoya, JAPAN.
- 2006 Biogeochemical Evolution of the Metalloproteome. Earth History and Paleobiology Seminar Series. Dept. of Earth and Planetary Sciences. *Harvard University*. Cambridge, MA.
- 2006 Tree or Forest? Searching for Alternative Forms of Life on Earth. *Arizona State University*. Environmental Signatures of Alternative Biochemistry. Tempe, AZ
- 2003 The Molecular Evolution and Selection of Superoxide Dismutase in Marine Phytoplankton. *CEBIC Summer Conference*. Center for Environmental Bioinorganic Chemistry. Princeton University. Princeton, NJ.
- 2003 Tutorial: Hickory Dickory Dock- Understanding the Molecular Clock. Biocomplexity Seminar. Dept. of Geological Sciences. *Rutgers University*. New Brunswick, NJ.

#### CONTRIBUTED PRESENTATIONS AND POSTERS

- F. Wolfe-Simon**, S.E. Hoefft, S.M. Baesman and R.S. Oremland (2010). Facultative anoxygenic photosynthesis by cyanobacteria driven by arsenite and sulfide (with evidence for the support of nitrogen fixation). *AGU Fall Meeting*. San Francisco, CA
- F. Wolfe-Simon**, S.E. Hoefft, and R.S. Oremland (2010). Facultative anoxygenic photosynthesis by cyanobacteria driven by arsenite. *Gordon Research Conference: Environmental Bioinorganic Chemistry*. Newport, RI.
- F. Wolfe-Simon**, J. Switzer Blum, T.R. Kulp, G.W. Gordon, S.E. Hoefft, S.M. Webb, P.C.W. Davies, A.D. Anbar and R.S. Oremland (2010). As as a substitute for P: Evidence of a shadow biosphere from Mono Lake, CA? *Gordon Research Conference: Environmental Bioinorganic Chemistry*. Newport, RI.
- F. Wolfe-Simon**, S.E. Hoefft, and R.S. Oremland (2010). Facultative anoxygenic photosynthesis by cyanobacteria driven by arsenite. *ACS National Meeting*. San Francisco, CA
- F. Wolfe-Simon**, D.T. Johnston, P.R. Girguis, A. Pearson and A.H. Knoll (2009). Iron, Sulfur, Arsenic, and Water: Geochemical implications of facultative anoxygenic photosynthesis in cyanobacteria and the slow rise of Oxygen. *Boston Bacteria Meeting*. Cambridge, MA
- F. Wolfe-Simon**, D.T. Johnston, P.R. Girguis, A. Pearson and A.H. Knoll (2008). Iron, Sulfur, Arsenic, and Water: Geochemical implications of facultative anoxygenic photosynthesis in cyanobacteria and the slow rise of Oxygen. *AGU Fall Meeting*. San Francisco, CA
- F. Wolfe-Simon**, P.C.W. Davies and A.D. Anbar (2008). Did nature also choose Arsenic? *NASA AbSciCon*. Santa Clara, CA.
- F. Wolfe-Simon**, P. Fromme, W.F.J. Vermaas, J.J. Elser, and A. D. Anbar (2007). Evolutionary Geobiochemistry: Fe-deficient photosynthetic eukaryotes' Cu demand suggests ecological success stalled until widespread oxic conditions. *CEBIC Summer Conference*. Princeton University. Princeton, NJ
- F. Wolfe-Simon**, J. Morgan, J.J. Elser, and A. D. Anbar (2007). Evolutionarily significant differences between prokaryotic and eukaryotic responses to Fe stress. *ASLO Aquatic Sciences Meeting*, Santa Fe, NM
- F. Wolfe-Simon**, J. Morgan, J.J. Elser, and A. D. Anbar (2006). Metallomic plasticity of cyanobacteria induced by iron availability. *Gordon Research Conference: Environmental Bioinorganic Chemistry*. Andover, NH.
- F. Wolfe-Simon**, V. Starovoytov, J.R. Reinfelder, O. Schofield, and P. G. Falkowski (2006). Localization and role of manganese superoxide dismutase in a marine diatom. *NASA AbSciCon*. Washington, D.C.
- F. Wolfe-Simon**, O. Schofield, and P. G. Falkowski (2006) The Metalloenzyme SOD and Its Role in Photoautotroph Evolution and Regulation. *Symposium on The Evolution of Aquatic Photoautotrophs*. New Brunswick, NJ

- F. L. Wolfe**, V. Starovoytov, O. Schofield and P. Falkowski. (2005). Diatoms express a novel MnSOD in the chloroplast that responds to light stress. ASLO Aquatic Sciences Meeting, Salt Lake City, UT
- F. L. Wolfe**, O. Schofield, and P. Falkowski. (2004). The Metalloenzyme SOD and its role in photoautotroph evolution and regulation. Gordon Research Conference: Environmental Bioinorganic Chemistry. Lewiston, ME
- F. L. Wolfe**, O. Schofield and P. Falkowski. (2004). The comparative molecular evolution of iron and manganese superoxide dismutase in oxygenic photoautotrophs. ASLO Ocean Research Conference, Honolulu, HI
- F. L. Wolfe**, I. Berman-Frank, L. Haramaty, and P. Falkowski. (2003). The metallic shield of *Trichodesmium*: Fighting oxidative damage. ASLO Aquatic Sciences Meeting, Salt Lake City, UT
- F. L. Wolfe**, I. Berman-Frank, L. Haramaty, and P. Falkowski. (2002). The metallic shield of *Trichodesmium*: Fighting oxidative damage. Gordon Research Conference: Environmental Bioinorganic Chemistry. Andover, NH
- F. Wolfe**, K. Kroeger and I. Valiela (2000). Increased lability of estuarine dissolved organic nitrogen from urbanized watersheds. ASLO/AGU Ocean Sciences Meeting, San Antonio, TX
- F. Wolfe**, K. Kroeger and I. Valiela (1999). Increased lability of estuarine dissolved organic nitrogen from urbanized watersheds. General Scientific Meeting, Marine Biological Laboratory, Woods Hole, MA
- F. L. Wolfe** and D. Coats (1997). Host specificity of the parasitic dinoflagellate *Amoebophrya ceratii*. 7<sup>th</sup> Annual East Coast Protist Meeting, Narragansett, RI

#### PROFESSIONAL SERVICE

*Acting Reviewer.* Aquatic Microbial Ecology; Astrobiology; Australian Journal of Botany; Environmental Microbiology; Eukaryotic Cell; Geobiology; International Journal of Astrobiology; Israeli Science Foundation; Journal of Phycology; Limnology and Oceanography; U.S. National Science Foundation; Plant Physiology; Water Research.

*Session Co-Convener.* Elements and Evolution. AGU Fall Meeting, San Francisco, CA. December 2008

*Session Convener and Co-Chair.* Trace metals, microbial processes, and biogeochemical cycles through space and time. ASLO Aquatic Sciences Meeting, Santa Fe, NM. February 2007

*President.* Oceanography Graduate Student Association. 2003-2004

#### PROFESSIONAL AFFILIATIONS

American Chemical Society  
 American Geophysical Union  
 American Society of Limnology and Oceanography  
 American Society of Plant Biologists  
 International Society for Study of the Origin of Life  
 Sigma Xi, The Scientific Research Society  
 Society for Molecular Biology and Evolution  
 Society of Bio-inorganic Chemistry

#### TEACHING EXPERIENCE

Spring	2011	Guest Lecturer: CHEM181 Biochemistry (Stanford)
Spring	2009	Teaching Fellow: LS110 Microbial World (Harvard)
Spring	2008	Guest Moderator: EPS137 Biogeochemistry (Harvard)
Fall	2006	Guest Lecturer: PHYS598 Topics in Biophysics: An Overview of Modern Biology for Physicists (ASU)
Spring	2005	Lead Instructor and Coordinator: MS 303 Oceanographic Scientific Inquiry: From biogeochemistry to genomes: Explorations at aquatic interfaces. (Rutgers Univ.)
Fall	2001, 2002	Teaching Assistant: OCN 540 Chemical Oceanography. (Rutgers Univ. graduate course; problem solving section)