

## JANET LOUISE SIEFERT

Department of Statistics PO Box 1892 Rice University, Houston, TX 77251-1892

Office: (713)348-3891 FAX: (713)348-5476 email: siefert@rice.edu

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### A. EDUCATION

1997- Ph.D. University of Houston, Biology  
1975 -B.S. University of Central Arkansas, General Science

### B. PROFESSIONAL POSITIONS

2009 – to present Senior Faculty Fellow, Rice University, Dept. of Statistics  
2011 – to present Adjunct Associate Professor, University of Houston, Dept. of  
Biology and Biochemistry  
2018 – to present Research Fellow, Lanier Theological Library, Houston, TX  
2002-2009 Faculty Fellow, Rice University  
2000-2002 NSF Postdoctoral Fellow Rice University w/M Kimmel  
1998-2000 Keck Postdoctoral Fellow w/M Kimmel

### C. SELECTED HONORS

2009 NAI's Director Discretionary Award  
2007 Rice President's International Travel Fund Award  
2004 NAI's Discretionary Research Award  
2004 NASA Education and Public Outreach Grant, \$15K, Astrobiology  
course in spring at Rice  
1999 ISSOL '99 Travel Grant Award Recipient  
1998 PostDoctoral Travel Award, Keystone Symposia, A2 Conference.  
1998 NASA/LPI/USRA Scientist-Teacher Cooperation Grant  
1996, 97 Graduate Student Challenge, 1st place winner,  
1996 UH NS&M Alumni Assoc-Outstanding Graduate Student  
1994 Ruth Satter Memorial Merit Citation, Assoc. Women in Science  
1994 Beohering Ingelheim Fonds Short Term Fellowship for study at the  
Gesellschaft fur Biotechnologische Forschung, 1994  
1971 ACT scholarship, undergraduate 4 yrs

### D. SYNERGISTIC ACTIVITIES

**(1) Reviewer for:** NSF, NASA, Nature, PNAS, J Molecular Evolution, Trends in  
Microbiology, J Theoretical Biology, Molecular Biology, Biology Direct – Editorial  
Board

**(2) Membership:** ISSOL, Virtual Planet Laboratory, Astrobiology, Penn State  
Astrobiology Research Center, Keck Center for Computational Biology, ASM, AGU

**(3) Government / Industry Service:** Co-convenor AbSciCon 2010, President ISSOL –  
2009 – 2011, National Research Council COEL Panelist; Keck Center for Computational  
Biology, Faculty/Mentor 1999 – present; Houston Science Café 2004-2008, co-director;  
Gordon Research Conference, Origin of Life, Vice Chair/Chair Elect, 2004-2006; Gordon  
Keenan Graduate Research Conference on Origin of Life, 2006, Initiated and organized first  
ever for GRC OOL conference; SOC – Astrobiology 2008; SOC ISSOL, Science Café – co-  
director, 2004 – 2008; EANA Astrobiology Workshop, 10/2006; Bioastronomy 2007,

Puerto Rico, Scientific Organizing Committee; Bioinformatics Symposium & Workshop, Guadalajara, Mexico, Speaker, 10/2003; Instructor - ESMTB School, Biology and Mathematics of Cells, Siquenza, Spain, 6/2001; NSF ISSOL Regional Representative, 2000-2002; Discussion leader, GRC Origin of Life 2000, 7/ 2000; Guest Lecturer and Organizer, Workshop on Molecular Evolution and Phylogenetic; Analysis, University of Mexico, Mexico City, 1997; Graduate Research Assistant - University of Houston, 1994-1997; Teaching Assistant -Summer Workshop on Molecular Evolution, Marine Biological Laboratories, 1995, '96; Maintained/operated DNA core synthesis facility- University of Houston, 1989-1993; Teaching Assistant - University of Houston, General Microbiology, Nursing Microbiology, and General Biology, 1989-1993 Ciénegas

#### **E. PEER REVIEW OR REFEREED PUBLICATIONS**

Jordan G. Okie, Amisha T. Poret-Peterson, Zarraz M.P. Lee, Alexander Richter, Luis D. Alcaraz, Luis E. Eguiarte, Janet L. Siefert, Valeria Souza, Chris L. Dupont, James J. Elser (2019) Genomic adaptations in information processing underpin trophic strategy in a whole-ecosystem nutrient enrichment experiment  
bioRxiv 724484; doi: <https://doi.org/10.1101/724484>

Okie J., Poret-Peterson, A., Zarraz, L., Richter, A., Alcaraz, L., Eguiarte, L., Siefert, J., Souza, V., Dupont, C., and Elser J., Metagenomic signatures of microbial growth and trophic strategy in a whole-ecosystem nutrient enrichment experiment. In Review at ELife.

Siefert, J.L., Gonzales, S., Larios-Sanz, M., Hill, P., Boddy, C., Lanier, M., and Ortiz, S. Soil Memory: Microbial Populations as Biosignatures for Evaluating Long Term Effects of Urbanization. In preparation.

M-P Lee, Z., Poret-Peterson, A.T., Siefert, J.L., Kaul, D., Moustafa, A., Allen, A.E., Dupont, C.L., Eguiarte, L.E., Souza, V., and Elser, J.J. (2017) Nutrient stoichiometry shapes microbial community structure in evaporitic shallow pond. *Frontiers in Microbiology* 8, 949

Siefert, J.L. (2012) Man and his spaceships: Vehicles for extraterrestrial colonization? *Mobile Genetic Elements* 2, 6-12.

Siefert, J.L., Souza, V., Eguiarte, L. & Olmedo-Alvarez, G. (2012) Microbial Stowaways: Inimitable Survivors or Hopeless Pioneers? *Astrobiology* 12, 710-715.

Souza, V., Eguiarte, L. E., Travisano, M., Elser, J. J., Rooks, C. & Siefert, J. L. (2012) Travel, Sex, and Food: What's Speciation Got to Do with It? *Astrobiology* 12, 634-640.

Souza, V., Siefert, J. L., Escalante, A. E., Elser, J. J. & Eguiarte, L. E. (2012) The Cuatro Ciénegas Basin in Coahuila, Mexico: An Astrobiological Precambrian Park. *Astrobiology* 12, 641-647.

- Nitti,A., Daniels, C. A., Siefert, J., Souza, V., Hollander, D. & Breitbart, M. (2012) Spatially Resolved Genomic, Stable Isotopic, and Lipid Analyses of a Modern Freshwater Microbialite from Cuatro Ciénegas, Mexico. *Astrobiology* **12**, 685-698.
- Siefert, J.L. (2011) Astrobiology Pioneers: How a Real Housewife Became an Astrobiologist, *Astrobiology*, **11**, 193-195
- Breitbart,M., Hoare,A., Nitti,A., Siefert,J., Haynes,M., Dinsdale,E., Edwards,R., Souza,V., Rohwer,F., & Hollander,D. (2009) Metagenomic and Stable Isotopic Analyses of Modern Freshwater Microbialites in Cuatro Ciénegas, Mexico. *Environmental Microbiology* **11**, 16-34.
- Souza,V., Eguiarte,L.E., Siefert,J., & Elser,J.J. (2008) Microbial endemism: does phosphorus limitation enhance speciation? *Nat Rev Microbiol.* **6**, 559-564.
- Alcaraz,L.D., Olmedo,G., Bonilla,G., Cerritos,R., Hernandez,G., Cruz,A., Ramirez,E., Putonti,C., Jimenez,B., Martinez,E., Lopez,V., Arvizu,J.L., Ayala,F., Razo,F., Caballero,J., Siefert,J., Eguiarte,L., Vielle,J.P., Martinez,O., Souza,V., Herrera-Estrella,A., & Herrera-Estrella,L. (2008) The genome of *Bacillus coahuilensis* reveals adaptations essential for survival in the relic of an ancient marine environment. *Proc. Natl. Acad. Sci. U. S. A.* **105**, 5803-5808.
- Cerritos,R., Vinuesa,P., Eguiarte,L., Herrera,L., Alcaraz,L., Olmedo,G., Siefert,J., & Souza,V. (2008) *Bacillus coahuilensis* sp. nov. a new moderately halophilic species from different pozas in the Cuatro Ciénegas Valley in Coahuila, México. *IJSB.* **58**, 919-23.
- Cerritos,R., Eguiarte,L., Avitia,M., Siefert,J., & Souza,V. (2008) High diversity of previously unknown cultivable species in an oasis of biodiversity in Cuatro Ciénegas, Coahuila, Mexico. *FEMS Microbiol Ecol.*
- Desnues,C.M., Rodriguez-Brito,B., Rayhawk,S., Kelley,S., Tran,T., Haynes,M., Liu,H., Angly,F.E., Edwards,R.A., Thurber,R.V., Breitbart,M., Siefert,J.L., Souza,V., & Rohwer,F. (2008) Diversity and evolution of viruses in modern stromatolites and thrombolites. *Nature.* **452**, 340-343.
- Kiang,N.Y., Siefert,J.L., Govindjee, & Blankenship,R.E. (2007) Spectral Signatures of Photosynthesis. I. A Review of Earth Organisms. *Astrobiology* **7**, 222-251.
- Kiang,N.Y., Segura,A., Tinetti,G., Govindjee, Blankenship,R.E., Cohen,M., Siefert,J.L., Crisp,D., & Meadows,V.S. (2007) Spectral Signatures of Photosynthesis. II. Coevolution with Other Stars and the Atmosphere on Extrasolar Worlds. *Astrobiology* **7**, 252-274.
- Kharecha,P.A., Kasting,J.F., & Siefert,J.L. (2005) A coupled atmosphere-ecosystem model of the early Archean Earth. *Geobiology* **3**, 53-76.
- Raymond,J., Siefert,J.L., Staples,C.R., & Blankenship,R.E. (2004) The Natural History of Nitrogen Fixation. *Mol. Biol. Evol.* **21**, 541-554.

- Martin, K.A., Siefert, J.L., Yerrapragada, S., Lu, Y., McNeill, T.Z., Moreno, P.A., Weinstock, G.M., Widger, W.R., & Fox, G.E. (2003) Cyanobacterial signature genes. *Photosynth. Res* **75**, 211-221.
- Kharecha, P.A., Kasting, J.F., & Siefert, J.L. (2002) Predicting the biogenic methane concentration in the Archean atmosphere using numerical modeling. *Astrobiology* **4**, 528-529.
- Kasting, J.F. & Siefert, J.L. (2002) Life and the evolution of Earth's atmosphere. *Science* **296**, 1066-1068.
- Raymond, J., Blankenship, R.E., & Siefert, J.L. (2002) Horizontal gene transfer in the evolution of nitrogen fixation. *Astrobiology* **4**, 499.
- Siefert, J.L. & Kasting, J.F. (2002) Evidence for an ancient operon of redox biochemistry. *Astrobiology* **4**, 441.
- Kasting, J.F., Pavlov, A.A., & Siefert, J.L. (2001) A coupled ecosystem-climate model for predicting the methane concentration in the Archean atmosphere. *Orig. Life Evol Biosph.* **31**, 271-285.
- Kasting, J.F. & Siefert, J.L. (2001) Biogeochemistry. The nitrogen fix. *Nature* **412**, 26-27.
- Siefert, J.L., Larios-Sanz, M., Nakamura, L.K., Slepecky, R.A., Paul, J.H., Moore, E.R., Fox, G.E., & Jurtshuk, P., Jr. (2000) Phylogeny of marine Bacillus isolates from the Gulf of Mexico. *Curr. Microbiol.* **41**, 84-88.
- Hedenstierna, K.O., Siefert, J.L., Fox, G.E., & Murgola, E.J. (2000) Co-conservation of rRNA tetraloop sequences and helix length suggests involvement of the tetraloops in higher-order interactions. *Biochimie* **82**, 221-227.
- Siefert, J.L. & Fox, G.E. (1998) Phylogenetic mapping of bacterial morphology. *Microbiology* **144**, 2803-2808.
- Siefert, J.L., Martin, K.A., Abdi, F., Widger, W.R., & Fox, G.E. (1997) Conserved gene clusters in bacterial genomes provide further support for the primacy of RNA. *J. Mol Evol* **45**, 467-472.
- Pitulle, C., Yang, Y., Marchiani, M., Moore, E.R., Siefert, J.L., Aragno, M., Jurtshuk, P., Jr., & Fox, G.E. (1994) Phylogenetic position of the genus Hydrogenobacter. *Int. J. Syst. Bacteriol.* **44**, 620-626.

## **F. BOOK CHAPTERS AND BOOKS**

Faith and Science in dialogue, an astrobiologist and an Egyptologist talk. Co-author Jim Hoffmeier. Sending to publisher in late December.

Siefert, J.L. Defining the mobilome. *Methods Mol Biol.* **532**:13-27., 13-27 (2009).

Yerrapragada,S., Siefert,J.L. & Fox,G.E. Horizontal gene transfer in cyanobacterial signature genes. *Methods Mol Biol.* **532:339-66.**, 339-366 (2009).

The phylogeny of Bacterial Shape in *Molecules in time and space: Bacterial shape, division and phylogeny*, Siefert, J.L., Editor: Jesus Mingorance Cruz, published by Kluwer/Plenus, 2004.

#### **G. GENOME OR METAGENOME SEQUENCING:**

3 Bacillus genomes are in the pipeline for geographical analysis with B. coahuilensis: Bacillus sp. PL-21; Bacillus sp. Mali 14; Bacillus vietnamensis NRRL B-14850

DOE- JGI Microorganisms and Chemical Processes Associated with Carbonate Biomineralization in Modern Freshwater Microbialites, June 2009

Fremyella diplosiphon UTEX481, member of annotation group with George Weinstock, Baylor.

Bacillus NRRL B 14911, Sequenced through the Moore Marine Foundation, 2004-2005.

Metagenome, viral and bacteria, for two microbialites from Cuatro Ciénegas, Mexico, in collaboration with Forest Rohwer, SDSU and Mya Breitbart, USF

#### **H. COMMUNITY SERVICE AND ENGAGEMENT**

Member of the NASA Astrobiology Institute's Virtual Planet Laboratory, U. of Washington, Vikki Meadows, lead, 2009 – present <http://depts.washington.edu/naivpl/>

Dabar Conference, the Creation Project, 2018, 2019, Invited Participant, Chicago, Illinois.

“Wisdom Wednesday” – a series of short, educational, entertaining multi-resourced videos in collaboration with Mark Lanier , focused on providing literacy to Christian scripture, accuracy in fact, and ethics. Hosted on YouTube  
<https://www.youtube.com/playlist?list=PLRJZ8-ohk26uwLFTMcmByYVTz9wQINJ5T>

Member of the Religion and Civic Leaders ,in association with the Religion and Public Life Program, Rice University, directed by Dr. Elaine Ecklund.

Meeting at Memorial Women's Club, Houston, TX “Are We Alone and Why Do We Care?” June, 2018

Science and Faith: a panel discussion, Lanier Theological Library, with Aljster McGrath, February 3, 2018, <https://www.youtube.com/watch?v=EF7oSMpuYFc>

University of Hull, Siefert, Janet "Cross Examined Series: Science, Faith and the Origin of Life - A Christian Astrobiologist gives her perspective". 30 November 2014. St John Newland Channel on YouTube. <https://www.youtube.com/watch?v=Wv9Bs3B72uc>

Meeting of the Willowbrook Rotarian, February 22, 2013, Guest Speaker, Title: Man and His Spaceships: Vehicles for Extraterrestrial Colonization. May 30, 2014, Cuatro Ciénegas: A Living Laboratory

Peckerwood Garden, Board of Directors, vice president, 2008 – 2010.

The Planetarium Experience at Cuatro Ciénegas- beginning in 2005, Siefert has collaborated with Carolyn Summers, Houston Museum of Natural Science and Dr. Pat Reiff, Rice University, to create and distribute planetarium shows in English and Spanish. Siefert regularly takes the portable planetarium to Cuatro Ciénegas and surrounding communities in Mexico, where over 500 students and townspeople experience the full dome planetarium through viewing of at least two shows. Previous shows: Fantasy Worlds and Earth's Wild Ride. New shows are added annually.

Donation of used bicycles and computers for the Cuatro Ciénegas region, ongoing but to date over 30 bicycles and 60 computers have been brought to the local schools for distribution.

Astrobiology General Meeting 2002, Student Poster Judge 4/2002

Lead-Organizer of the 1999-2000 Houston Astrobiology Seminar Series, a schedule of scientific and community talks concerned with bringing science, astrobiology specifically, into the community.

NASA Teacher/Scientist Cooperative Grant. 12/1998. In collaboration with Westfield High School, Houston, TX, Ms. Leyla Morrison and 11<sup>th</sup> Grade English and Second Language Science Classes, Spring IDS.

Scientist Project Supervisor for the Science Engineering Fair of Houston, T.H. Rogers School, Houston I.S.D., 1997, 1998.

Speaker, Grades 3-5, Career Day, Houston ISD, 1995.

Volunteer-Advisory Board for Mercer Arboretum, Houston, Texas, 1980-1988

Due to the nature of the research and the necessity to keep bioinformatics data sets in the public, Siefert keeps extensive public and team-designated web pages. These can be viewed at <http://www.stat.rice.edu/~siefert/Research/Evolutionindex.html>

#### **I. NON-TECHNICAL PUBLICATIONS**

A Look Back in Time: Discovering the First Bacterium, J. L. Siefert. Focus on Microbiology Education, Spring 2000.

The Joining of Two Fossils, State Lines, Texas Magazine, Houston, Chronicle, 4/99

My Railroad Song, State Lines, Texas Magazine, Houston Chronicle, 6/96

Not So Common After All, State Lines, Texas Magazine, Houston Chronicle, 12/95

#### **J. RESEARCH IN THE NEWS**

Discovery News, Have We Already Colonized Mars? Aug, 31, 2012,  
<http://news.discovery.com/space/we-may-have-already-colonized-mars-120831.html>  
History Channel: How the Earth was Made: Birth of the Earth, premiered December, 2009  
Discovery Channel, Catastrophe: Birth of a Planet, premiered November 2008.  
National Geographic, Naked Earth series: Our Atmosphere, debuted April, 2008.  
Sallyport, Winter 2007, Vol. 63, No. 2, *The Debate that Shouldn't Happen and Evolutionary Thinking*, by Deborah J. Aussman.  
BBC, Radio 4, with Molly Bentley and online at  
[http://www.bbc.co.uk/radio4/science/leadingedge\\_20070322.shtml](http://www.bbc.co.uk/radio4/science/leadingedge_20070322.shtml)  
Astrobiology Magazine, Stromatolites in Mexico, Analogues for Other Worlds, in January, 2007  
New Scientist, Primeval life reflected in present-day pools, Karen Schmidt, July 2, 2005, Magazine issue 2006  
Segnuda-feira, 06 de de 2006 no mimino Reportagem, Marina Lemle, 02.03.2006, **Sós, mas por pouco tempo**. Radio report on the first Brazilian Astrobiology Workshop.  
Numerous interviews with Mexican media, broadcast in Mexico and on Spanish TV in Southwest US  
Sallyport, Living Laboratory, Deborah Aussman, Summer 2005  
American Museum of Natural History Special Exhibit, week of June 24<sup>th</sup>, 2005, **CUATRO CIÉNEGAS: ANCIENT MICROBES, ALIEN LIFE?**

**K. COLLABORATORS** (past 4 years) G.E. Fox, (University of Houston), M. Travisano, (U of Minnesota), J.J. Elser (ASU), M. Deem (Rice University), F. Rohwer (SDSU), D. Hollander (USF), Mya Breitbart (USF)

**L. GRADUATE AND POSTDOCTORAL ADVISORS** Dr. Peter Jurtshuk Jr. (Doctoral), Dr. Marek Kimmel (Postdoc)

### **M. ORAL AND POSTER PRESENTATIONS**

2019 Astrobiology in Brazil, October, 2019, Rio Janeiro, Brazil. Invited keynote. Sociedade Brasileira de Astrobiologia, Is Anyone (or Anything) Out There? Earth is Asking. (oral)

2016 ASOR Annual Meeting, Nov. 16-19, 2016 San Antonio, TX. Soil Memory: Microbial Populations as Biosignatures for Evaluating Long Term Effects of Urbanization. Gonzales, S, Larios-Sanz, M, Siefert, JL, Hill, P, Boddy, C, Hartshorn, A, Lanier, M, and Ortiz, S. (poster)

2016 ASLO Summer Meeting, 5-10 June 2016, Santa Fe, New Mexico. Nutrients, Ribosomes, and Genomes: A Desert Survival Test for the Growth Rate Hypothesis.

Elser, JJ, Lee, Z, Poret-Peterson, A, Okie, J, Steger, L, Learned, J, Dupont, C, Siefert, JL, and Souza, V (invited oral)

2014 Joint Aquatic Sciences Meeting, Portland, Oregon, USA, May 2014.  
Life on Floating Pumice. Elser, JJ Corman, JR, Lee, Z, Siefert, JL, Bastidas, M, Cuassolo, F, Laspoumaderes, C, Sol Souza, M, Modenutti, B, and Balseiro, E. (oral)

2012 Astrobiology Science Conference 2012, April 15-20, 2012, Atlanta, GA. Life on Floating Pumice. Elser, JJ, Lee, Z, Corman, J, Siefert, JL, Bastidas, M, Cuassolo, F, Laspoumaderes, C, Souza, M, Modenutti, B, and Balseiro, E. (poster)

2013 Princeton Center For Theoretical Science Origin of Life 21-24 January 2013, Princeton, Massachusetts, Phylogeny of cell shape: A window into origins or adaptive dead end? Siefert, JL (oral presentation)

2012 ASLO Aquatic Sciences Meeting, 8-13 July 2012, Lake Biwa, Otsu, Shiga, Japan. What Could a Whole Earth Stromatolite Catalogue Tell Us? Siefert, JL, Souza, V., Eguiarte, L., and Meadows, V. (oral presentation)

2012 ASLO Aquatic Sciences Meeting, 8-13 July 2012 in Lake Biwa, Otsu, Shiga, Japan. Life on Floating Pumice, Elser, JJ, Corman, JR, Lee, Z., Siefert, JL, Bastidas, M, Cuassolo, F., Laspoumaderes, C., Souza, MS, Balseiro, EG, Modenutti, BE. (oral presentation)

2011 Souza, V., J. Siefert, J.J. Elser, and L. Eguiarte. 2011. "The Cuatro Ciénegas Bolson in Coahuila, Mexico: an astrobiological Precambrian park," Origins 2011, conference of the International Society for the Study of the Origin of Life and Astrobiology Society (poster), Montpellier, France.

2011 The III International conference Biosphere Origin and Evolution, Crete, Greece, October 16-20, 201 Cuatro Ciénegas: a Precambrian Astrobiology Park. Siefert, JL

2011 The First International Earth Microbiome Project Conference, Shenzhen, China, June 13-15, 2011. What Could a 'Whole Earth Stromatolite Catalogue' Tell Us? (oral presentation)

2011 Workshop and Fieldtrip: Geobiology in Space Exploration, Feb 7 – 14, 2011, Marrakesh Morocco. Cuatro Cienegas: A Precambrian Park. Siefert, JL. (oral presentation)

2010 VBC-PhD-Symposium 2010, Origin of Life, Vienna, Austria. November 18-19, 2010. Keynote speaker, Microbial Evolution

2009 Montana State University, Thermal Biology Institute, November



16, 2009, Cuatro Ciénegas, a desert oasis: what can it tell us about microbial evolution?  
Seminar speaker

2009 University of Alaska, Emergence of Chemical Systems Symposium, June 22-26,  
2009, Building a Genome: From the RNA World to Now. Invited Speaker

2009 Space Telescope Science Institute, May 4-7, 2009, LUCA (Last Universal Cellular  
Ancestor) and the 3 Domains of Life. Invited speaker