

## BIOGRAPHICAL SKETCH

### GARY L. ANDERSEN

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#### (a) Professional Training

Undergraduate Institution: Northwestern University, Evanston, Illinois,  
**B.A.** Biology 1978  
Graduate Institution: University of California, Berkeley, California  
**M.Sc.** Plant Pathology 1982  
**Ph.D.** Plant Pathology 1993

#### (b) Appointments:

2012 – Present Adjunct Professor, Department of Environmental Science, Policy, and Management,  
University of California, Berkeley, CA  
2011 – Present Senior Scientist, Ecology Department Head, Earth Sciences Division, Lawrence Berkeley  
National Laboratory, Berkeley, CA  
2003-2011 Staff Scientist and Group Leader, Molecular and Microbial Ecology, Earth Sciences,  
Lawrence Berkeley National Laboratory, Berkeley, CA  
1997-2002 Sr. Biomedical Scientist, Biology & Biotechnology Res. Prog., Lawrence Livermore  
National Laboratory, Livermore, CA  
1993-1996 Postdoctoral Fellow, Department of Infectious Diseases, Duke University Medical  
School, Durham, NC

#### (c) Peer-Reviewed Publications (h-index 49):

1. Wang, J., Sandoval, K., Ding, Y., Stoeckel, D., Minard-Smith, A., Andersen, G., Dubinsky, E. A., Atlas, R., Gardinali, P. (2016) Biodegradation of dispersed Macondo crude oil by indigenous Gulf of Mexico microbial communities. *Sci Total Environ.* 557-558:453-68. doi: 10.1016/j.scitotenv.2016.03.015.
2. Ling, F., Hwang, C., LeChevallier, M. W., Andersen, G. L., Liu, W.T. (2016) Core-satellite populations and seasonality of water meter biofilms in a metropolitan drinking water distribution system. *ISME J.* 10:582-95. doi: 10.1038/ismej.2015.136.
3. Hu, P., Tom, L., Singh, A., Thomas, B. C., Baker, B. J., Piceno, Y. M., Andersen, G. L., Banfield, J. F. (2016) Genome-Resolved Metagenomic Analysis Reveals Roles for Candidate Phyla and Other Microbial Community Members in Biogeochemical Transformations in Oil Reservoirs. *MBio.* 7:e01669-15. doi: 10.1128/mBio.01669-15.
4. Lowell, J. L., Antolin, M. F., Andersen, G. L., Hu, P., Stokowski, R. P., Gage, K. L. (2015) Single-Nucleotide Polymorphisms Reveal Spatial Diversity Among Clones of *Yersinia pestis* During Plague Outbreaks in Colorado and the Western United States. *Vector Borne Zoonotic Dis.* 15:291-302. doi: 10.1089/vbz.2014.1714.
5. Moissl-Eichinger, C., Auerbach, A. K., Probst, A. J., Mahnert, A., Tom, L., Piceno, Y., Andersen, G.L., Venkateswaran, K., Rettberg, P., Barczyk, S., Pukall, R., Berg, G. (2015) Quo vadis? Microbial profiling revealed strong effects of cleanroom maintenance and routes of contamination in indoor environments. *Sci Rep.* 5:9156. doi: 10.1038/srep09156.
6. Saxena G, Marzinelli EM, Naing NN, He Z, Liang Y, Tom L, Mitra S, Ping H, Joshi UM, Reuben S, Mynampati KC, Mishra S, Umashankar S, Zhou J, Andersen GL, Kjelleberg S,

- Swarup S. (2015) Ecogenomics Reveals Metals and Land-Use Pressures on Microbial Communities in the Waterways of a Megacity. *Environ Sci Technol.* **49**:1462-71. doi: 10.1021/es504531s.
7. Priester JH, Van De Werfhorst LC, Ge Y, Adeleye AS, Tomar S, Tom LM, Piceno YM, Andersen GL, Holden PA. (2014) Effects of TiO<sub>2</sub> and Ag Nanoparticles on Polyhydroxybutyrate Biosynthesis By Activated Sludge Bacteria. *Environ Sci Technol.* **48**:14712-20. doi: 10.1021/es504117x.
  8. Kellogg, C. A., Piceno, Y. M., Tom, L. M., DeSantis, T. Z., Gray, M. A., Andersen, G. L. (2014) Comparing bacterial community composition of healthy and dark spot-affected *Siderastrea siderea* in Florida and the Caribbean. *PLoS One.* **9**:e108767. doi: 10.1371/journal.pone.0108767.
  9. Piceno, Y. M., Reid, F. C., Tom, L. M., Conrad, M. E., Bill, M., Hubbard, C. G., Fouke, B. W., Graff, C. J., Han, J., Stringfellow, W. T., Hanlon, J. S., Hu, P., Hazen, T. C., Andersen, G. L. (2014) Temperature and injection water source influence microbial community structure in four Alaskan North Slope hydrocarbon reservoirs. *Front Microbiol.* **5**:409. doi: 10.3389/fmicb.2014.00409.
  10. Probst, A. J., Birarda, G., Holman, H. Y., DeSantis, T. Z., Wanner, G., Andersen, G. L., Perras, A. K., Meck, S., Völkl, J., Bechtel, H. A., Wirth, R., Moissl-Eichinger, C. (2014) Coupling Genetic and Chemical Microbiome Profiling Reveals Heterogeneity of Archaeome and Bacteriome in Subsurface Biofilms That Are Dominated by the Same Archaeal Species. *PLoS One.* **9**:e99801. doi: 10.1371/journal.pone.0099801.
  11. Martinez, R. J., Wu, C. H., Beazley, M. J., Andersen, G. L., Conrad, M. E., Hazen, T. C., Taillefert, M., Sobecky, P. A. (2014) Microbial Community Responses to Organophosphate Substrate Additions in Contaminated Subsurface Sediments. *PLoS One.* **9**:e100383. doi: 10.1371/journal.pone.0100383.
  12. Closek C. J., Sunagawa, S., DeSalvo, M. K., Piceno, Y. M., DeSantis, T. Z., Brodie, E. L., Weber, M. X., Voolstra, C. R., Andersen, G. L., Medina, M. (2014) Coral transcriptome and bacterial community profiles reveal distinct Yellow Band Disease states in *Orbicella faveolata*. *ISME J.* **8**:2411-22. doi: 10.1038/ismej.2014.85.
  13. Krebs, J. E., Vaishampayan, P., Probst, A. J., Tom, L. M., Marteinsson, V. T., Andersen, G. L., Venkateswaran, K. (2014) Microbial Community Structures of Novel Icelandic Hot Spring Systems Revealed by PhyloChip G3 Analysis. *Astrobiology.* **14**:229-240. PMID: 24588539
  14. Wells, G. F., Wu, C. H., Piceno, Y. M., Eggleston, B., Brodie, E. L., Desantis, T. Z., Andersen, G. L., Hazen, T. C., Francis, C. A., Criddle, C. S. (2014) Microbial biogeography across a full-scale wastewater treatment plant transect: evidence for immigration between coupled processes. *Appl Microbiol Biotechnol.* **98**:4723-4736. PMID: 24553968
  15. Ceja-Navarro, J. A., Nguyen, N. H., Karaoz, U., Gross, S. R., Herman, D. J., Andersen, G. L., Bruns, T. D., Pett-Ridge, J., Blackwell, M., Brodie, E. L. (2014) Compartmentalized microbial composition, oxygen gradients and nitrogen fixation in the gut of *Odontotaenius disjunctus*. *ISME J.* **8**:6-18. PMID: 23985746
  16. Kellogg, C. A., Piceno, Y. M., Tom, L. M., DeSantis, T. Z., Gray, M. A., Zawada, D. G., Andersen, G. L. (2013) Comparing bacterial community composition between healthy and White Plague-Like disease states in *Orbicella annularis* using PhyloChip™ G3 microarrays. *PLoS One.* **8**:e79801 PMID: 24278181
  17. Dubinsky, E. A., Conrad, M. E., Chakraborty, R., Bill, M., Borglin, S. E., Hollibaugh, J. T., Mason, O. U., Piceno, Y., Reid, F. C., Stringfellow, W. T., Tom, L. M., Hazen, T. C., Andersen, G. L. (2013) Succession of Hydrocarbon-Degrading Bacteria in the Aftermath of the Deepwater Horizon Oil Spill in the Gulf of Mexico. *Environ. Sci. Technol.* **47**:10860-10867 PMID: 23937111
  18. Cao, Y., Van De Werfhorst, L. C., Dubinsky, E. A., Badgley, B. D., Sadowsky, M. J., Andersen, G. L., Griffith, J. F., Holden, P. A. (2013) Evaluation of molecular community analysis methods for discerning fecal sources and human waste. *Water Res.* **47**:6862-72. PMID: 23880215

19. Zhang, R., Wu, Q., Piceno, Y. M., DeSantis, T. Z., Saunders, F. M., Andersen, G. L., Liu, W. T. (2013) Diversity of bacterioplankton in contrasting Tibetan lakes revealed by high-density microarray and clone library analysis. *FEMS Microbiol Ecol.* **86**:277-87 PMID: 23837564
20. Ding, G. C., Piceno, Y. M., Heuer, H., Weinert, N., Dohrmann, A. B., Carrillo, A., Andersen, G. L., Castellanos, T., Tebbe, C. C., Smalla, K. (2013) Changes of soil bacterial diversity as a consequence of agricultural land use in a semi-arid ecosystem. *PLoS One.* **8**:e59497 PMID: 23527207
21. Closek, C. J., Sunagawa, S., Desalvo, M. K., Piceno, Y. M., DeSantis, T. Z., Brodie, E. L., Voolstra, C. R., Andersen, G. L., Medina, M. (2013) How Bacteria and Genes Reflect the Health States of Corals. *Integrative and Comparative Biology* **53**: Supplement 1, E267.
22. Mello, A., Ding, G. C., Piceno, Y. M., Napoli, C., Tom, L. M., DeSantis, T. Z., Andersen, G. L., Smalla, K., Bonfante, P. (2013) Truffle brûlés have an impact on the diversity of soil bacterial communities. *PLoS One.* **8**: e61945. PMID: 23667413
23. Probst, A. J., Holman, H. Y., DeSantis, T. Z., Andersen, G. L., Birarda, G., Bechtel, H. A., Piceno, Y. M., Sonnleitner, M., Venkateswaran, K., Moissl-Eichinger, C. (2013) Tackling the minority: sulfate-reducing bacteria in an archaea-dominated subsurface biofilm. *ISME J.* **7**: 635-51. PMID: 23178669
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27. Vaishampayan, P., Probst, A. J., La Duc, M. T., Bargoma, E., Benardini, J. N., Andersen, G. L., Venkateswaran, K. (2012) New perspectives on viable microbial communities in low-biomass cleanroom environments. *ISME J.* **7**: 312-24. PMID:23051695
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29. Hwang, C., Ling, F., Andersen, G. L., LeChevallier, M. W., Liu, W. T. (2012) Microbial community dynamics of an urban drinking water distribution system subjected to phases of chloramination and chlorination treatments. *Appl Environ Microbiol.* **78**:7856-65. PMID: 22941076
30. Vaziri, N. D., Wong, J., Pahl, M., Piceno, Y. M., Yuan, J., DeSantis, T. Z., Ni, Z., Nguyen, T. H., and G. L. Andersen (2012) Chronic kidney disease alters intestinal microbial flora. *Kidney Int.* **83**:308-15. PMID: 22992469
31. Cruz-Martínez K, Rosling A, Zhang Y, Song M, Andersen GL, Banfield JF. (2012) Effect of rainfall-induced soil geochemistry dynamics on grassland soil microbial communities. *Appl Environ Microbiol.* **78**:7587-95 PMID: 22904056
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35. Human Microbiome Consortium. (2012) A framework for human microbiome research. *Nature* **486**:215-221. PMID: 22699610
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37. Reith, F., Brugger, J., Zammit, C. M., Gregg, A. L., Goldfarb, K. C., Andersen, G. L., DeSantis, T. Z., Piceno, Y. M., Brodie, E. L., Lu, Z., He, Z., Zhou, J., Wakelin, S. A. (2012) Influence of geogenic factors on microbial communities in metallogenic Australian soils. *ISME J.* **6**:2107-18 PMID: 22673626
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41. Lee, P. K., Dill, B. D., Louie, T. S., Shah, M., Verberkmoes, N. C., Andersen, G. L., Zinder, S. H., Alvarez-Cohen, L. (2012) Global Transcriptomic and Proteomic Responses of *Dehalococcoides ethenogenes* Strain 195 to Fixed Nitrogen Limitation. *Appl Environ Microbiol.* **78**:1424-1436. PMID: 22179257
42. McDonald, D., Price, M. N., Goodrich, J., Nawrocki, E. P., DeSantis, T. Z., Probst, A., Andersen, G. L., Knight, R., Hugenholtz, P. (2012) An improved Greengenes taxonomy with explicit ranks for ecological and evolutionary analyses of bacteria and archaea. *ISME J.* **6**:610-618. PMID: 22134646
43. He, Z., Piceno, Y., Deng, Y., Xu, M., Lu, Z., DeSantis, T., Andersen, G., Hobbie, S. E., Reich, P. B., Zhou J. (2012) The phylogenetic composition and structure of soil microbial communities shifts in response to elevated carbon dioxide. *ISME J.* **6**:259-27. PMID: 21796217
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**(d) Book chapters:**

1. **Andersen, G. L.**, He, Z., DeSantis, T. Z., Brodie, E. L., and Zhou, J. (2010) The Use of Microarrays in Microbial Ecology, pp 87-110. In Liu, W.T. and Jansson J. K. (ed), *Environmental Molecular Microbiology*. Caister Academic Press (January, 2010). ISBN 978-1-904455-52-3
2. **Andersen, G. L.**, Frisch, A.S., Kellogg, C.A., Levetin, E., Lighthart, B., Paterno, D. (2009) Aeromicrobiology/Air Quality. In Schaechter, M (editor-in-chief) *Encyclopedia of Microbiology, Third Edition*. Academic Press (May 15, 2009). ISBN 978-0-12-373939-1
3. Brodie, E. L., DeSantis, T.Z., Piceno, Y. M. and **Andersen, G. L.** (2009) High density DNA microarray analysis for monitoring microbial community composition and dynamics. In Kowalchuck, G.A. (ed), *Molecular Microbial Ecology Manual*. Kluwer Academic Publishers. (In press.)
4. **Andersen, G.L.**, Piceno, Y. M., DeSantis, T. Z. and Brodie, E. L. (2006) What DNA Microarrays Can Tell Us About Bacterial Diversity: A New Light on an Old Question. In Bailey, M.J. (ed), *Microbial Ecology of Aerial Plant Surfaces* Oxford University Press, pp. 251-267. ISBN 978-1845930-61-5

**(e) Research interests and experience:**

I am interested in using molecular approaches to study the dynamics of microbial community structure in the environment. This includes the development of new techniques to dissect the microbial diversity of complex ecosystems. The long-term goal of this research is to integrate different fields of biology (i.e., genomics, ecology, molecular biology, proteomics and bioinformatics) to provide insight into the interactions of environmental microorganisms under stressful conditions. My current research focuses on the microbial ecology of airborne and aquatic bacteria with an emphasis on the natural distribution of pathogens in the environment. I have developed numerous microarray systems for the measurement of microbial diversity and the identification of bacterial communities by 16S and other gene sequences. I have also used microarrays for whole genome expression of genes in response to environmental stimuli.

**(f) Professional Service and Activities:**

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| 1999-     | Ad hoc reviewer for the following journals; PNAS, Nature Biotechnology, FEMS Microbiology Ecology, FEMS Microbiology Letters, Environmental Microbiology, Anaerobe, Journal of Bacteriology, Journal of Clinical Microbiology, Microbial Ecology, Atmospheric Chemistry and Physics. |
| 2000-2003 | Member, Joint DOE-DTRA Task Force on Microbial Backgrounds. Washington D.C.  |
| 2001-     | Science Advisor to the Einstein Institute for Science, Health & the Courts (EINSHAC), Washington, D.C.   |
| 2001-2003 | Advisory Committee for Air Force Technical Applications Center, Patrick AFB, FL  |
| 2003-2004 | Member, LBNL Institutional Biosafety Committee.  |
| 2004-     | Editorial Board of Applied and Environmental Microbiology  |
| 2006-     | Genomic Aerobiology Working Group, Alfred P. Sloan Foundation.   |
| 2008-     | Co-founder and member of Scientific Advisory Board, Second Genome Inc.   |
| 2009-     | Alfred P. Sloan Foundation Scientific Advisory Board Microbiology of the Built Environment.  |
| 2010-     | Editorial Board of ISME Journal.   |
| 2011-     | Head, LBNL Institutional Biosafety Committee.  |

**(g) Honors:**

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| 1993 | Teaching Effectiveness Award. University of California, Berkeley, CA, 1993 |
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2000	NAI Directorate Award, LLNL, Livermore, CA.
2002	Directors Award, LLNL, Livermore, CA.
2008	R&D 100 Award for Berkeley PhyloChip.
2008	Overall Bronze Medal winner, and Environment category winner, Wall Street Journal Technology Innovation Awards.
2012	Directors Award for Exceptional Achievement, Lawrence Berkeley Lab.

**(h) Research Supervision:***Graduate Committees:*

Feng Ju, University of Hong Kong  
 Shailendra Mishra, National University of Singapore  
 Fotis Bekris, University of Crete  
 Alex Probst, University of Regensburg  
 Collin Closek, UC Merced  
 Mareike Viebahn, Utrecht University  
 Shini Sunagawa, UC Merced  
 Rebecca Daly, UC Berkeley,  
 Pei-Ying Hong, National University of Singapore

*Post Doctoral Associates:*

Cinta Gomez-Sylvan, May 2014 – present  
 Eric Dubinsky, January 2010 – January 2014  
 Kristen DeAngelis, October 2011– June 2013  
 Cindy Wu, April 2009 – May 2012  
 Stéphanie Bernard September 2006 – June 2009  
 Eoin Brodie, March 2004 – November 2005  
 Peter Agron, October 1999 – December 2002  
 Lyndsay Radnedge, November 1997 – May 1999

**(j) Patents:**

- Using phylogenetic probes for quantification of stable isotope labeling and microbial community analysis US Patent **8,906,610** awarded December 9, 2014
- Array for detecting microbes. US Patent **8,771,940** awarded July 8, 2014
- Heavy metal biosensor, US Patent **8,697,388** awarded April 15, 2014
- Nucleotide sequences specific to Francisella tularensis and methods for the detection of Francisella tularensis, **7,494,778** awarded February 24, 2009
- Nucleotide sequences specific to Brucella and methods for the detection of Brucella, US Patent **7,494,773** awarded February 24, 2009
- Nucleotide sequences specific to Yersinia pestis and methods for the detection of Yersinia pestis, US Patent **7,494,772**, awarded February 24, 2009
- Method for the detection of Salmonella enterica serovar Enteritidis, US Patent **7,442,517**, awarded October 28, 2008
- Nucleotide sequences specific to Francisella tularensis and methods for the detection of Francisella tularensis, US Patent **7,172,868**, awarded February 6, 2007