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:

2003-present	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 = 23 Total citations ~ 1,450

1. Caporaso, J. G., Bittinger, K.,, Bushman, F. D., Desantis, T. Z., Andersen, G. L., and Knight, R. (2009) PyNAST: A flexible tool for aligning sequences to a template alignment. *Bioinformatics* 2009 Nov 13 [Epub ahead of print]
2. Rastogi, G., Osman, S., Vaishampayan, P. A., Andersen, G. L., Stetler, L.D., and Sani, R.K. (2009) Microbial Diversity in Uranium Mining-Impacted Soils as Revealed by High-Density 16S Microarray and Clone Library. *Microb Ecol*. 2009 Nov 4. [Epub ahead of print]
3. Fan, C., Lee, P. K, Ng, W. J., Alvarez-Cohen, L., Brodie, E. L., Andersen, G. L., and He, J. (2009) Influence of trace erythromycin and eryhthromycin-H2O on carbon and nutrients removal and on resistance selection in sequencing batch reactors (SBRs). *Appl Microbiol Biotechnol*. **85:**185-95.
4. Wu, C. H., Bernard, S. M., Andersen, G. L., Chen, W. (2009) Developing microbe-plant interactions as biotechnological tools. *Microbial Biotechnology* **2:**428-440.
5. Johnson, D. R., Nemir, A., Andersen, G. L., Zinder, S. H., Alvarez-Cohen L. (2009) Transcriptomic microarray analysis of corrinoid responsive genes in *Dehalococcoides ethenogenes* strain 195. *FEMS Microbiol. Lett.* **294:**198-206.
6. Cruz-Martínez, K., Suttle, K. B., Brodie, E. L., Power, M. E., Andersen, G. L., Banfield, J. F. (2009) Despite strong seasonal responses, soil microbial consortia are more resilient to long-term changes in rainfall than overlying grassland. *ISME J.* **3:** 738-744.
7. Sagaram, U. S., DeAngelis, K. M., Trivedi, P., Andersen, G.L., Lu, S. E., Wang, N. (2009) Bacterial diversity analysis of Huanglongbing pathogen-infected citrus using PhyloChips and 16S rDNA clone library sequencing. *Appl. Env. Micro*. **75:**1566-1574.
8. Sunagawa, S., DeSantis, T. Z., Piceno, Y. M., Brodie, E. L., DeSalvo, M. K., Voolstra, C. R., Weil, E., Andersen, G. L., Medina, M. (2009) Bacterial diversity and White Plague Disease-associated community changes in the Caribbean coral *Montastraea faveolata. ISME J.* **3:**512-521.
9. Yergeau, E., Schoondermark-Stolk, S. A., Brodie, E. L., Déjean, S., DeSantis, T. Z., Gonçalves, O., Piceno, Y. M., Andersen, G. L., Kowalchuk, G.A. (2008) Environmental microarray analyses of Antarctic soil microbial communities. *ISME J.* **3:**340-351.

10. DeAngelis, K. M., Brodie, E. L., DeSantis, T. Z., Andersen, G. L., Lindow, S. E., Firestone, M. K. (2008) Selective progressive response of soil microbial community to wild oat roots. *ISME J*. 2008 Nov 13. [Epub ahead of print]
11. Tsiamis, G., Katsaveli, K., Ntougias, S., Kyrpides, N., Andersen, G., Piceno, Y., Bourtzis, K. (2008) Prokaryotic community profiles at different operational stages of a Greek solar saltern. *Research in Microbiology* **159:**609-627
12. Chivian, D., Brodie, E. L., Alm, E. J., Culley, D. E., Dehal, P. S., DeSantis, T. Z., Gihring, T. M., Lapidus A, Lin, L. H., Lowry, S. R., Moser, D. P., Richardson, P. M., Southam, G., Wanger, G., Pratt, L. M, Andersen, G. L., Hazen, T. C., Brockman, F. J., Arkin, A. P., Onstott, T. C. (2008) Environmental genomics reveals a single-species ecosystem deep within Earth. *Science* **322:**275-278.
13. Wrighton, K. C., Agbo, P., Warnecke F., Weber, K. A., Brodie, E. L., Desantis, T. Z., Hugenholtz, P., Andersen, G. L., and Coates, J. D. (2008) A novel ecological role of the *Firmicutes* identified in thermophilic microbial fuel cells. *ISME J*. 2008 **2**:1146-1156.
14. Liu, Z., Desantis, T. Z., Andersen, G. L., and Knight R. (2008) Accurate taxonomy assignments from 16S rRNA sequences produced by highly parallel pyrosequencers. *Nucleic Acids Res*. **36**:e120
15. West, K. A., Johnson, D. R., Hu, P., DeSantis, T. Z., Brodie, E. L., Lee, P. K. H., Feil, H., Andersen, G. L., Zinder, S. H., and Alvarez-Cohen, L. (2008) Comparative genomics of "*Dehalococcoides ethenogenes*" 195 and an enrichment culture containing unsequenced "*Dehalococcoides*" strains. *Appl. Env. Micro*. **74:**3533-3540.
16. Vogler A. J., Driebe E. M., Lee J., Auerbach R. K, Allender C. J., Stanley M., Kubota K., Andersen G. L., Radnedge L., Worsham P. L., Keim P, Wagner D. M. (2008) Assays for the rapid and specific identification of North American *Yersinia pestis* and the common laboratory strain CO92. *Biotechniques* **44:** 201-207.
17. Johnson, D. R., Brodie, E. L., Hubbard, A. E., Andersen, G. L., Zinder, S. H., and Alvarez-Cohen, L. (2008) Temporal transcriptomic microarray analysis of "*Dehalococcoides ethenogenes*" strain 195 during the transition into stationary phase. *Appl. Env. Micro*. **74:**2864-2872.
18. Dalevi D, Desantis T. Z., Fredslund J., Andersen G. L., Markowitz V. M., and Hugenholtz, P. (2008) Automated group assignment in large phylogenetic trees using GRUNT: GRouping, Ungrouping, Naming Tool. *BMC Bioinformatics* **8:**402.
19. Hillson, N. J., Hu, P., Andersen, G. L., and Shapiro, L. (2007) *Caulobacter crescentus* as a Whole-Cell Uranium Biosensor. *Appl. Env. Micro*. **73:** 7615-7621
20. DeSantis, T. Z., Brodie, E. L., Moberg, J. P., Zubieta, I. X., Piceno, Y. M. and Andersen, G. L. (2007) High-density universal 16S rRNA microarray analysis reveals broader diversity than typical clone library when sampling the environment. *Microb. Ecol.* **53:**371-383.
21. Lynch, S. V., Dixon, L., Benoit, M. R., Brodie, E. L., Keyhan, M., Hu, P., Ackerley D. F., Andersen, G.L., and Matin, A. (2007) Role of the *rapA* Gene in Controlling Antibiotic Resistance of *Escherichia coli* Biofilms. *Antimicrob. Agents Chemother*. **51:**3650-3658.
22. Flanagan, J. L., Brodie, E. L., Weng, L., Lynch, S. V., Garcia, O., Brown, R., Hugenholtz, P., DeSantis, T. Z., Andersen, G. L., Wiener-Kronish, J. P. and Bristow, J. (2007) Decline in bacterial diversity of intubated patients colonized with *Pseudomonas aeruginosa*. *J. Clin. Microbiol.* **45**:1954-1962
23. Brodie, E. L., Desantis, T. Z., Parker, J. P., Zubietta, I. X., Piceno, Y. M., and Andersen, G. L., (2007) Urban aerosols harbor diverse and dynamic bacterial populations. *Proc Natl Acad Sci.* **104**:299-304.
24. Wilson, K. H., Brown, R. S., Andersen, G. L., Tsang, J., and Sartor, B., 2006 (2006) Comparison of fecal biota from specific pathogen free and feral mice. *Anaerobe* **12**:249-253.
25. Lin, L. H., Wang, P. L., Rumble, D., Lippmann-Pipke, J., Boice, E., Pratt, L. M., Sherwood Lollar, B., Brodie, E. L., Hazen, T. C., Andersen, G. L., DeSantis, T. Z., Moser, D. P., Kershaw, D., and Onstott, T. C., (2006) Long-term sustainability of a high-energy, low-diversity crustal biome. *Science* **314:**479-482.
26. Brodie, E. L., DeSantis, T. Z., Joyner, D. C., Baek, S. M., Larsen, J. T., Andersen, G. L., Hazen, T.C., Richardson, P. M., Herman, D. J., Tokunaga, T. K., Wan, J. M., and Firestone, M. K., (2006)

Application of a high-density oligonucleotide microarray approach to study bacterial population dynamics during uranium reduction and reoxidation. *Appl. Env. Micro.* **72:**6288-6298.

27. DeSantis, T. Z. Jr., Hugenholtz, P., Keller, K., Brodie, E. L., Larsen, N., Piceno, Y.M., Phan, R., and Andersen, G. L., (2006) NAST: a multiple sequence alignment server for comparative analysis of 16S rRNA genes. *Nucleic Acids Res.* **34** (Web Server issue): W394- W399.
28. DeSantis, T. Z., Hugenholtz, P., Larsen, N., Rojas, M., Brodie, E. L., Keller, K., Huber, T., Dalevi, D., Hu P, and Andersen, G. L., (2006) Greengenes, a chimera-checked 16S rRNA gene database and workbench compatible with ARB. *Appl. Env. Micro*. **72:**5069-5072.
29. Chain, P. S. G., Hu, P., Malfatti, S. A., Radnedge, L., Larimer, F., Vergez, L. M., Worsham, P., Chu, M. C., and Andersen, G. L., (2006) Complete genome sequence of *Yersinia pestis* strains Antiqua and Nepal516: evidence of gene reduction in an emerging pathogen. *J. Bacteriol*. **188:** 4453-4463.
30. Clavijo, R. I., Loui, C., Andersen, G. L., Riley, L. W., and Lu, S., (2006) Identification of genes associated with survival of *Salmonella enterica* serovar Enteritidis in chicken egg albumen. Appl. Env. Micro. **72:**1055-1064.
31. Hu, P., Brodie, E. L., Suzuki, Y., McAdams, H. H., and Andersen, G. L., (2005) Whole-genome transcriptional analysis of heavy metal stresses in *Caulobacter crescentus*. *J. Bacteriol*. **187**:8437-8449.
32. DeSantis, T. Z., Stone, C. E., Murray, S. R., Moberg, J. P., and Andersen, G. L., (2005) Rapid quantification and taxonomic classification of environmental DNA from both prokaryotic and eukaryotic origins using a microarray. *FEMS Micro. Lett*. **245:** 271-278.
33. DeSantis, T. Z., Dubosarskiy, I., and Andersen, G. L., (2003) Comprehensive aligned sequence construction for automated design of effective probes (CASCADE-P) using 16S rDNA. *Bioinformatics* **19:** 1461-1468
34. Radnedge, L., Agron, P. G., Hill, K. H., Jackson, P. J., Ticknor, L. O., Keim, P, and Andersen, G. L., (2003) Genome differences that distinguish *Bacillus anthracis* from *Bacillus cereus* and *Bacillus thuringiensis*. *Appl. Env. Micro*. **69:**2755-2764.
35. Agron, P. G., Sobecky, P., and Andersen, G. L., (2002) Establishment of uncharacterized plasmids in *Escherichia coli* by *in vitro* transposition. *FEMS Microbiology Letters* **217:** 249-254.
36. Agron, P. G., Macht, M., Radnedge, L., Skowronski, E. W., Miller, W., and Andersen, G. L. (2002) Use of subtractive hybridization to survey comprehensively prokaryotic genomic differences. *FEMS Microbiology Letters* **211:** 175-182.
37. Radnedge, L., Agron, P. G., Worsham, P. L., and Andersen, G. L. (2002) Genome plasticity in *Yersinia pestis*. *Microbiology* **148:** 1687-1698.
38. Wilson, K. H., Wilson, W. J., Radosevich, J. L., DeSantis, T. Z., Viswanathan, V. S., Kuczmarski, T. A., and Andersen, G. L. (2002) High density microarray of small subunit ribosomal DNA probes. *Appl. Env. Micro*. **68:** (5) 2535-2541.
39. Wilson, W. J., Strout, C. L., DeSantis, T. Z., Stilwell, J. L., Carrano, A. V., and Andersen, G. L. (2002) Sequence specific identification of 18 pathogenic microorganisms using microarray technology. *Molecular and Cellular Probes* **16:** (2) 119-127.
40. Radosevich, J. L., Wilson, W. J., Shinn, J. H., DeSantis, T. Z., and Andersen, G. L. (2002) Development of a high-volume aerosol collection system for the identification of airborne microorganisms. *Lett. Appl. Micro.* **34:**162-167.
41. Radnedge, L., Gamez-Chin, S., McCready, P. M., Worsham, P. L. and Andersen, G. L. (2001) Identification of nucleotide sequences for the specific and rapid detection of *Yersinia pestis*. *Appl. Env. Micro*. **67:** (8) 3759-3762
42. Agron, P. G., Walker, R. L., Kinde, H., Sawyer, S. J., Hayes, D. C., Wollard, J., and Andersen, G. L. (2001) Identification by subtractive hybridization of sequences specific for *Salmonella enterica* serovar Enteritidis. *Appl. Env. Micro*. **67:** (11) 4984-4991
43. Skowronski, E. W.; Armstrong, N, Andersen, G. L., Macht, M., and McCready, P. M. (2000) Magnetic, microplate-format plasmid isolation protocol for high-yield, sequencing-grade DNA. *Biotechniques* **29**: 786-792.
44. Bogush, M. L., Velikodvorskaya, T. V., Lebedev, Y. B., Nikolaev, L. G., Lukyanov, S. A., Fradkov, A. F., Pliyev, B. K., Boichenko, M. N., Usatova, G. N., Vorobiev, A. A., Andersen, G. L., and

Sverdlov E. D. (1999) Identification and localization of differences between *Escherichia coli* and *Salmonella typhimurium* genomes with the use of suppressive subtractive hybridization. *Molecular and General Genetics* **262:** 721-729

45. Andersen, G. L., Beattie, G. A., and Lindow, S. E., (1998) Molecular characterization and sequence of a methionine biosynthetic locus from *Pseudomonas syringae J. Bacteriol.* **180**: 4497-4507.
46. Andersen, G. L., Simchock, J., and Wilson, K. H. (1996). Identification of a region of genetic variability among *Bacillus anthracis* strains and related species. *J. Bacteriol.* **178**: 377-384.
47. Lindow, S. E., and Andersen, G. L. (1996) Influence of immigration on epiphytic bacterial populations on navel orange leaves. *Appl. Env. Micro*. **62**: 2978-2987.
48. Andersen, G. L., Harrell, L., and Wilson, K. H. (1995) Genetic variability of *Bacillus anthracis* and related species. *J. Clin. Microbiol.* **33**: 1847-1850.
49. Lindow, S., Andersen, G., and Beattie, G. (1993) Characteristics of insertional mutants of *Pseudomonas syringae* with reduced epiphytic fitness. *Appl. Env. Micro*. **59**:1593-1601.
50. Andersen G. L., Menkissoglou, O., and Lindow, S. E. (1991) Occurrence and properties of copper-tolerant strains of *Pseudomonas syringae* isolated from fruit-trees in California. *Phytopathology* **81**:648-656.

(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*. Horizon Scientific Press (In press).
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).
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.

(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:

1999-	Ad hoc reviewer for the following journals; PNAS, ISME Journal, 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
2004-	Ph.D. Committee Member for Mareike Viebahn, Utrecht University, Shini Sunagawa, UC Merced, Rebecca Daly, UC Berkeley, and Pei-Ying Hong, National University of Singapore.
2006-	Genomic Aerobiology Working Group, Alfred P. Sloan Foundation.
2009-	Alfred P. Sloan Foundation Scientific Advisory Board.

(g) Honors:

1993	Teaching Effectiveness Award. University of California, Berkeley, CA, 1993
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.

(h) Research Supervision:

Graduate Students - Ph.D. Committee Member for Mareike Viebahn, Utrecht University, Shini Sunagawa, UC Merced, Rebecca Daly, UC Berkeley, and Pei-Ying Hong, National University of Singapore.

Post Doctoral Scientists (completed) – Lyndsay Radnedge, Peter Agron, Eoin Brodie.

Post Doctoral Scientists (current) – Stéphanie Bernard (Swarbreck), Eric Dubinsky, Cindy Wu (co-advisor), Kristen DeAngelis (co-advisor).

Invited Talks (previous two years):

1. A Phylogenetic Microarray Approach to Monitoring and Source Tracking Coastal-Zone Pollution. November 11, 2009, Santa Clara University. Center for Science, Technology and Society, Innovation for Social Benefit Program.
2. Uncovering Microbial Diversity with Phylogenetic Microarrays. November 6, 2009, Stanford University. Fall Seminar Series, Civil & Environmental Engineering Department
3. Advances in High-Density PhyloChip Technology for Understanding the Dynamics of Microbial Communities Important to Human Health. May 2009, Philadelphia, PA. Annual meeting of the American Society for Microbiology.
4. Phylochip Analysis of Microbial Diversity, March 25-27, 2009 Walnut Creek, CA. JGI's 4th Annual User Meeting
5. Phylogenetic Microarrays for Analysis of Microbial Community Dynamics. February 2009, UC Davis, CA. Department of Plant Pathology 290 Seminar Speaker.
6. A Systems Biology Approach to Environmental Biotechnology using Ecogenomics. January 2009, Singapore. National University of Singapore.
7. Roundtable: Ecogenomics, Which Methods are Best? August 2008, Cairns, Australia. International Symposium of Microbial Ecology (ISME XII).

8. Historical overview of broad-rang DNA target amplification and sequencing. June 2008, Boston, MA. Annual meeting of the American Society for Microbiology.
9. PhyloChip microarray analysis of bacterial diversity on the Phoenix Spacecraft and associated Astrobiology Science Conference (AbSciCon) April 14-17, 2008 Santa Clara, California.
10. Application of 16S rRNA arrays in microbial ecology. February, 2008, Singapore. National University of Singapore.
11. Towards the development of a fungal microarray for microbial community characterization. September, 2007, Copenhagen, Denmark. FEISN/UNITE Mycology Meeting.
12. Application of 16S rRNA arrays in microbial ecology. September 3-6, 2007, Edinburgh Scotland. 161st Meeting of the Society for General Microbiology.
13. Characterization of microbial diversity with high-density microarrays. August, 2007, Baton Rouge, LA. Mycological Society of America Annual Meeting.

(j) Patents:

Array for Detecting Microbes. PCT/US2007/024720.
Heavy Metal Biosensor. JIB-2368PCT
Improved Method for Phylogenetic Microarray Design and Analysis. IB-2733).
Nucleotide Sequences Specific to Bacillus anthracis. Number 7,494,778.