

The 2003 Applied and Environmental Microbiology Gordon Research Conference was held July 27 through August 1 at Connecticut College in New London, Connecticut. There were 103 in attendance including 13 graduate students and 11 postdoctoral fellows. Thirty-one women participated and 38 attendees were from outside the US.

The program of oral presentations (Attachment A) was designed to initiate with a definition of a bacterial species as an introduction to our understanding of the biodiversity of the environment. From there the talks moved on to the causes of microbial biodiversity, mutagenesis, horizontal gene transfer, and the stresses imposed on bacteria in the environment. The parameters molding the populations of cells that were touched on in the presentations included biofilm lifestyle, pH, O<sub>2</sub>, UV, metals, antibiotics, and recalcitrant organic substrates. The keynote address by Dr. Chris Chyba introduced a most extreme environment for microbes, Europa. Unfortunately, there was not enough time for discussion. After almost every talk there were enough spontaneous questions that discussion had to be limited to stay near the schedule. Rarely does this happen.

Much discussion also took place at the poster sessions that were scheduled for each afternoon and again after the evening oral presentations. The variety included in the 61 posters was robust. Many ideas were exchanged and some new collaborations were established.

Interestingly, the afternoons were used on two occasions for spontaneous open discussions. On Monday afternoon, Victor de Lorenzo offered to lead a discussion on environmental microbial ecology issues. A group of about 25 met for over 90 minutes and the discussion was free ranging and participated in by most of those present. On Wednesday afternoon, Dr. Jon Lloyd and others led a discussion on microbial metal interactions that attracted an even larger group of about 40. These spontaneous interest groups were lauded by all who participated and there was enthusiasm for more in the future.

The funds available for support of the conference were used to cover the travel and registration costs of all the speakers and conveners of the sessions. In addition, funds were available for the registration of all graduate students.

The 2005 AEM Gordon Research Conference promises to be even better. Dr. Gerard Muyzer will chair the conference with Dr. Kenneth Nealson as the Co-Chair. The rapid movement of the fields of applied and environmental microbiology makes this a most exciting time for the intense exchange that occurs in such a conference. The support of the Department of Energy is greatly appreciated.

ATTACHMENT A:

## Applied & Environmental Microbiology

July 27 - August 1, 2003  
Connecticut College  
New London, CT

Chair: [Judy D Wall](#)  
Vice Chair: [Gerard Muyzer](#)

### SUNDAY

2:00 pm - 9:00 pm Arrival and Check-in

6:00 pm Dinner

7:30 p.m. Opening Comments: **Judy D. Wall & Gerard Muyzer**

7:40 pm - 9:00 pm **Biodiversity and the Bacterial Species**

Discussion Leader: **JAMES STALEY**, USA, University of Washington, Seattle

8:10 p.m. **RAMON ROSSELLÓ MORA**, Spain, Institut Mediterrani d'Estudis Avançats (CSIC-UIB)  
Do bacterial species exist?

9:00 p.m. Welcoming Mixer

### MONDAY

7:30 am - 8:30 am Breakfast

9:00 am - 12:30 pm **Mechanisms of Biodiversification**

Discussion Leader: **RADHEY GUPTA**, McMaster University

9:10 a.m. **JEFFERY LAWRENCE**, USA, University of Pittsburgh  
Shaping genome content: the control of gene flow between bacterial lineages

9:55 a.m. **ARJAN de VISSER**, The Netherlands, University of Wageningen  
Space and chemical warfare promote microbial diversity.

10:25 a.m. Coffee Break (20 min)

10:45 a.m. **STEVEN E. FINKEL**, USA, University of Southern California  
Mechanisms of long-term survival and evolution in *E. coli*

11:15 a.m. **ROSEMARY J. REDFIELD**, Canada, University of British Columbia  
Do bacteria have sex?

12:15 pm Group Photo

12:30 pm Lunch

4:30 p.m. POSTER SESSION

6:00 pm Dinner

7:30 pm - 9:30 pm **Biofilms in Health and Environment**

Discussion Leader: **MATTHEW PARSEK**, USA, Northwestern University

7:40 p.m. **FRIEDRICH GÖTZ**, Germany, Universität Tübingen  
Biofilm formation in staphylococci

- 8:20 p.m. **MARK VAN LOOSDRECHT**, The Netherlands, Delft University of Technology  
Unity in biomass structures
- 8:50 p.m. **J. WILLIAM COSTERTON**, USA, Montana State University  
Biofilms in device-related and other chronic bacterial infections
- 9:30 p.m. Posters and Evening Mixer

## TUESDAY

- 7:30 am - 8:30 am Breakfast
- 9:00 am - 12:30 pm **A Genomic View of Microbial Response to Stress**  
Discussion Leader: **OLADELE OGUNSEITAN**, USA, University of California, Irvine
- 9:10 a.m. **TINA VAN DYK**, USA, DuPont Chemical Company  
LuxArray and DNA array for genome-wide analyses of stress responses in *Escherichia coli*
- 9:55 a.m. **JOCELYNE DIRUGGIERO**, USA, University of Maryland  
Stress response to DNA damage in the halophilic Archaeon, *Halobacterium* NRC-1
- 10:25 a.m. Coffee Break
- 10:45 a.m. **JOHN FOSTER**, USA, University of Alabama  
When Protons attack: The biochemical and genomic Zen of *E. coli* acid resistance
- 11:30 a.m. **GISELA STORZ**, USA, National Institutes of Health  
Regulating stress responses with noncoding RNAs
- 12:30 pm Lunch
- 4:30 p.m. POSTER SESSION
- 6:00 pm Dinner
- 7:30 pm - 9:30 pm **Microbial Use of Toxic Metals**  
Discussion Leader: **SIMON SILVER**, USA, University of Illinois, Chicago
- 7:40 p.m. **BARRY ROSEN**, USA, Wayne State University  
Pathways of arsenic detoxification in prokaryotes and eukaryotes
- 8:20 p.m. **ANNE SUMMERS**, USA, University of Georgia  
The ubiquitous (micro)biology of mercury
- 8:55 p.m. **MARC SOLIOZ**, Switzerland, University of Berne  
Molecular hardware of copper homeostasis.
- 9:30 p.m. Posters and Evening Mixer

## WEDNESDAY

- 7:30 am - 8:30 am Breakfast
- 9:00 am - 12:30 pm **Microbial Mineral Formation and Dissolution**  
Discussion Leader: **MIREILLE BRUSCHI**, France, CNRS, Marseille
- 9:10 a.m. **DIRK SCHÜLER**, Germany, Max-Planck-Institut für Marine Mikrobiologie  
The biomineralization of magnetosomes in magnetotactic bacteria
- 9:55 a.m. **JON LLOYD**, England, University of Manchester  
New uses for old enzymes; mechanisms, environmental impact and biotechnological potential of microbial metal reduction
- 10:25 a.m. Coffee Break (20 min)
- 10:45 a.m. **BRADI FY TFRO** USA Scripps Institute of Oceanography

Unraveling bacterial Mn(II) oxidations step by step: molecular mechanisms, reaction intermediates and products

- 11:30 a.m. **THOMAS DICHRISTINA**, USA, Georgia Tech University  
Uranium mineral formation and iron oxide dissolution by *Shewanella putrefaciens*
- 12:30 pm Lunch
- 2:00 p.m. Annual AEM-GRC Softball Game
- 4:00 p.m. POSTER SESSION
- 5:30 p.m. **Business Meeting: Election of Vice-Chair for 2005 AEM-GRC - Please Attend!**
- 6:00 pm Dinner
- 7:30 pm - 9:30 pm **Power and Limitations of Antimicrobials**
- Discussion Leader: **CARL CERNIGLIA**, USA, U.S. Food and Drug Administration
- 7:40 p.m. **JULIAN DAVIES**, Canada, University of British Columbia  
Are antibiotics really antibiotics?
- 8:20 p.m. **ANDREAS PESCHEL**, Germany, Universität Tübingen  
Resistance mechanisms of *Staphylococcus aureus* to antimicrobial peptides produced by the host
- 8:55 p.m. **BRUCE LEVIN**, USA, Emory University  
Phage therapy and prophylaxis: Hype, hope and reality
- 9:30 p.m. Posters and Evening Mixer

## THURSDAY

- 7:30 am - 8:30 am Breakfast
- 9:00 am - 12:30 pm **Biodegradation of Recalcitrant Organic Compounds**
- Discussion Leader **LILY YOUNG**, USA, Rutgers University
- 9:10 a.m. **JIM SPAIN**, USA, U.S. Air Force  
Biodegradation of nitroaromatic compounds: Recent evolution
- 9:55 a.m. **LINDSAY ELTIS**, Canada, University of British Columbia  
Understanding and engineering the enzymes of PCB degradation
- 10:25 a.m. Coffee Break (20 min)
- 10:45 a.m. **KATE SCOW**, USA, University of California, Davis  
Biodegradation and microbial ecology of methyl tert-butyl ether (MTBE) contaminated groundwater
- 11:30 a.m. **VICTOR DE LORENZO**, Spain, The Autonomous University of Madrid  
*Pseudomonas* promoters in the test tube and in the environment
- 12:30 pm Lunch
- 4:30 p.m. POSTER SESSION B
- 6:00 pm Dinner
- 7:30 pm - 9:30 pm **Special Lecture**
- Discussion Leader: **KENNETH NEALSON**, USA, University of Southern California
- 7:45 pm **CHRISTOPHER CHYBA**, USA, Stanford University  
Prospects for extraterrestrial life: What we know, what we think we know, and what we'd like to know
- 8:45 p.m. Closing comments: **Judy D. Wall & Gerard Muyzer**

9:00 p.m. Closing Mixer and Dance

**FRIDAY**

7:30 am - 8:30 am Breakfast

9:00 am Depart

**ATTACHMENT B:**

**Gordon Research Conference on  
Applied and Environmental Microbiology**

**July 27 - August 1, 2003  
Conneticut College, New London, CT**

**Poster session A: Monday and Tuesday 4:30 - 6:00 and 9.45 p.m.**

**Poster A1**

Author: Josey Becker

Institute: Purdue University

Co-authors: A. Konopka, C.H. Nakatsu

Title: Bacterial activity, community structure, and degree of spatial heterogeneity on the mcroscale at a long-term contaminated site.

**Poster A2**

Author: Sylvie Becquevort

Institute: Université Libre de Bruxelles

Co-authors: O. Kimpem, P. Servais

Title: Genetic and functional diversity of marine bacteria in response to different organic matter resources.

**Poster A3**

Author: Kelly S. Bender

Institute: University of Illinois

Co-authors: M.R. Rice, J.D. Coates, L.A. Achenbach

Title: A universal chlorite dismutase primer set for the detection of (per)chlorate reducing bacteria

**Poster A4**

Author: Roberto Borghese

Institute: University of Bologna

Title: Multiple effects of potassium tellurite ( $K_2TeO_3$ ) on the growth characteristics and the bioenergetics of the phototrophic bacterium *Rhodobacter capsulatus*

**Poster A5**

Author: Dayle Blencowe

Institute: Cardiff University

Title: Nitroglycerine biodegradation: Phase 2 - "The dinitrates"

**Poster A6**

Author: Mireille Bruschi

Institute: CNRS, Marseilles, France

Co-authors: C. Michel, B. Chardin, P. Turano, M.T. Giudici-Ortoni, P. Decloquement

Title: Bioremediation of chromate using sulfate-reducing bacteria; thermodynamic analysis, molecular mechanisms and biotechnological applications

**Poster A7**

Author: Jon R. Lloyd

Institute: University Of Manchester

Co-authors: Iain T. Burke, C. Boothman, R.J. Mortimer, K. Morris, J.R. Lloyd

Title: Biogeochemistry of Tc; a microcosm based study

**Poster A8**

Author: Alexander Boronin

Institute: Russian Academy of Sciences, Pushchino, Moscow Region

Title: *Pseudomonas* plasmids for degradation of polycyclic aromatic hydrocarbons

**Poster A9**

Author: Huangen Ding

Institute: Louisiana State University

Title: Developing a hypersensitive *E. coli* strain for detecting redox cycling chemicals

**Poster A10**

Author: Kathryn Docherty

Institute: University of Notre Dame

Title: The effects of pyridinium ionic liquids on groundwater microbial communities

**Poster A11**

Author: Harold L. Drake

Institute: University of Bayreuth, Germany

Co-authors: K. Küsel, A. Gössner, C.R. Lovell

Title: Ecophysiology of an aerotolerant acetogen, *Sporomusa* ST-1, isolated from *Juncus* roots

**Poster A12**

Author: Said El Fantroussi  
Institute: University of Louvain, Belgium  
Title: Microbial ecology of TNT-contaminated soils and anaerobic TNT biodegradation processes

**Poster A13**

Author: Kevin P. Feris  
Institute: University of Montana  
Co-authors: P.W. Ramsey, C. Frazar, J.N. Moore, J.E. Gannon, W.E. Holben  
Title: Establishing a causal link between the fluvial deposition of heavy metals and changes in hyporheic microbial community structure: a mesocosm study

**Poster A14**

Author: Julia Foght  
Institute: University of Alberta  
Co-authors: M. Bhatia, M. Sharp  
Title: Analysis of bacterial communities from a high arctic glacier

**Poster A15**

Author: Bernardo Gonzalez  
Institute: Universidad Catolica De Chile  
Title: Role of the pJP4 catabolic plasmid in the performance of the versatile, pollutant-degrading bacterium *Ralstonia eutropha* JMP134 (pJP4): New insights from the complete sequence and annotation of JP4.

**Poster A16**

Author: Evelyn Hackl  
Institute: ARC Seibersdorf Research, Austria  
Title: Diversity and community structure of bacteria inhabiting soils of unmanaged forests with different soil and vegetation characteristics

**Poster A17**

Author: Max M. Häggblom  
Institute: Rutgers University  
Co-authors: M.K. Männistö  
Title: Diversity of psychrotolerant bacteria in the Finnish arctic

**Poster A18**

Author: Rolf U. Halden  
Institute: Johns Hopkins University  
Co-authors: R.N. Cole, C. Bradford, D. Chen, K.J. Schwab  
Title: Rapid detection of microbial pathogens using proteomics



**Poster A19**

Author: Maria E. Hernandez

Institute: California Institute Of Technology

Title: Phenazines and other redox active antibiotics promote mineral reduction

**Poster A20**

Author: Nelly Henry

Institute: Currie Institute, Paris

Title: Understanding bactericide properties of cationic surfaces: Strategy and preliminary results

**Poster A21**

Author: William E. Holben

Institute: University Of Montana

Co-authors: K.P. Feris, A. Kettunen, J.H.A. Apajalahti

Title: GC fractionation enhances microbial community diversity assessment and detection of minority populations of bacteria

**Poster A22**

Author: Mark A. Holland

Institute: Salisbury University

Title: *Methylobacterium* spp.: A symbiont for everyone?

**Poster A23**

Author: Krassimira R. Hristova

Institute: University of California, Davis

Title: Characterization of the MTBE biodegradation pathway in strain PM1

**Poster A24**

Author: Jon R. Lloyd

Institute: University Of Manchester

Co-authors: Fahana Islam, A.G. Gault, C. Botthman, D.A. Polya, D. Chatterjee, J.R. Lloyd

Title: Direct evidence for the release of arsenic by metal-reducing bacteria in sediments from a contaminated aquifer in Bengal

**Poster A25**

Author: Wael Ismail

Institute: University Of Freiburg, Germany

Title: Novel aerobic CoA-dependent pathway of phenylacetate - catabolism in various bacterial species

**Poster A26**

Author: Cheok Jeon

Institute: Cornell University

Co-authors: W. Park, P. Padmanabhan, C. DeRito, J. R. Snape,  
E. L. Madsen

Title: Use of stable isotope probing to discover of a novel bacterium with distinctive dioxygenase that is responsible for in situ biodegradation in contaminated sediment

**Poster A27**

Author: Johannes Knobloch

Institute: Universitaetsklinikum Hamburg Eppendorf

Title: Disintegration of *S. epidermidis* biofilms under glucose limitation depends on the activity of the alternative sigma factor sigma B

**Poster A28**

Author: Arthur L. Koch

Institute: Indiana University

Title: Choices of bacteria for the uptake and consumption of multiple resources for current and future needs

**Poster A29**

Author: Radhey S. Gupta

Institute: McMaster University

Title: The use of conserved indels in protein sequences to understand the critical issues in bacterial phylogeny

**Poster A30**

Author: Dele Ogunsaitan

Institute: University of California

Title: Proteomic assessment of niche specialization and stress avoidance

**Poster session B: Wednesday and Thursday, 4:30- 6:00 and 9:45**

**Poster B1**

Author: Alison M. Kraigsley  
Institute: University of Southern California, Los Angeles, California  
Co-authors: Paul D. Ronney  
Title: Dynamics of self-propagating fronts of motile bacteria

**Poster B2**

Author: Kirsten Küsel  
Institute: University Of Bayreuth, Germany  
Co-authors: M. Blöthe, H.L. Drake  
Title: Phylogenetic diversity of Fe(III)-reducing microorganisms at a pH gradient in acidic mining lake sediments

**Poster B3**

Author: Anniet Laverman  
Institute: University Utrecht, Germany  
Co-authors: P. van Cappellen  
Title: The effect of increased salinity on nitrate reduction kinetics in coastal freshwater sediments

**Poster B4**

Author: Haim Levy  
Institute: Israeli Institute For Biological Research  
Co-authors: M. Fisher, D. Kobiler, Z. Altboum  
Title: Identification of strain specific markers in *Bacillus anthracis* by random amplification of polymorphic DNA

**Poster B5**

Author: Eugene L. Madsen  
Institute: Cornell University  
Co-authors: C. Jeon, W. Park, P. Padmanabhan, C. DeRito, J.R. Snape  
Title: Novel bacterium with distinctive dioxygenase is responsible for in situ biodegradation in contaminated sediment

**Poster B6**

Author: Guillaume Malarte  
Institute: CNRS, Marseilles, France  
Title: Pathway of iron oxidation in an acidophilic bacteria: *Acidithiobacillus ferrooxidans*. Metabolic studies and biotechnological applications

**Poster B7**

Author: A.C. Matin

Institute: Stanford University

Co-authors: D. Ackerley, C. Gonzalez, M. Keyhan, C.H. Park

Title: Bacterial genes and proteins involved in chromate reduction

**Poster B8**

Author: George O'Toole

Institute: Dartmouth Medical School

Co-authors: S. Hinsa, M. Espinosa-Urgel, J. Ramos

Title: Biofilm formation on abiotic surfaces by a fluorescent Pseudomonad

**Poster B9**

Author: J. Jacob Parnell

Institute: Michigan State University

Co-authors: J. Park, V. Denef, J.M. Tiedje, T. Tsoi

Title: Physiological and genome-wide response of *Burkholderia* sp. nov. LB400 to PCB (polychlorinated biphenyl)-mediated stress

**Poster B10**

Author: Jordan Peccia

Institute: University Of Connecticut

Co-authors: T. Peaz-Rubio, E. Viau

Title: Effects of solar radiation and wind velocity on the concentration, viability, and population structure of bioaerosols

**Poster B11**

Author: Jose Pérez-Jiménez

Institute: Rutgers University

Co-authors: L.Y. Young, L.J. Kerkhof

Title: Dissimilatory sulfite reductase genes (*dsrAB*) disclose the composition of sulfidogenic communities in contaminated sediment worldwide

**Poster B12**

Author: Craig D. Phelps

Institute: Rutgers University

Co-authors: Meghan Tierney, Joseph Battistelli and L.Y. Young

Title: Use of metabolic biomarkers for detecting anaerobic PAH biodegradation at several disparate field sites.

**Poster B13**

Author: Francis L. de los Reyes III

Institute: North Carolina State University

Title: "Causative" microorganisms in wastewater treatment systems: Concepts and case studies

**Poster B14**

Author: E. Danielle Rhine

Institute: Rutgers University

Co-authors: E. Garcia-Dominguez, L.Y. Young

Title: Characterization of new arsenic oxidizing and reducing isolates

**Poster B15**

Author: Achim Schmalenberger

Institute: University of Bayreuth, Germany

Co-authors: K. Küsel, A. Schramm, H.L. Drake

Title: Composition of *dsrAB* genes of sulfate reducing prokaryotes analyzed by T-RFLP at different oxygen concentrations

**Poster B16**

Author: Robert R. Sharp III

Institute: Manhattan College

Title: Use of bioluminescence to monitor biofilm distribution and activity in porous media

**Poster B17**

Author: Khandaker Al Ziad Siddiquee

Institute: Kyushu Institute Of Technology, Japan

Co-authors: M.J. Arauzo-Bravo, K. Shimizu

Title: Metabolic flux analysis of *pykF* gene knockout *E. coli* based on <sup>13</sup>C-labeled experiment together with measurements of enzyme activities and intracellular metabolite concentrations

**Poster B18**

Author: Simon Silver

Institute: University of Illinois

Co-authors: L.T. Phung

Title: Arsenite oxidase: Molecular genetics for a new bacterial resistance system

**Poster B19**

Author: Simon Silver

Institute: University of Illinois

Title: Overall annotation of the genome of the *Rastonia metallodurans* strain CH3

**Poster B20**

Author: Barth F. Smets

Institute: University of Connecticut

Co-authors: M.A. Panciera, J.V. Accashian, R.G. Riefler, H.-H. Yang

Title: Characterization of complete denitration of GTN by three *Arthrobacter* sp. isolates able to use GTN as their sole nitrogen source

**Poster B21**

Author: Bongkeun Song

Institute: Princeton University

Title: Detection of selenate reductase and arsenite oxidase genes from denitrifying bacteria and the estuarine sediments

**Poster B22**

Author: Elise R. Sullivan

Institute: University of New Hampshire

Co-authors: A.C. Mumford, M.M. Majko

Title: Fluorescent in situ hybridization analysis of the microbial community structure in trichloroethene contaminated bedrock

**Poster B23**

Author: Anne Summers

Institute: University of Georgia

Co-authors: S. Nandi, J. Wireman

Title: Quantitative longitudinal profiling of complex microbial ecosystems

**Poster B24**

Author: Yanling Wang

Institute: University of Hong Kong

Co-authors: J-D Gu

Title: Environmental tolerance of *Vibrio* species isolated from the Mai Po and Deep Bay Nature Reserve Ramsar site of Hong Kong

**Poster B25**

Author: Eric A. Webb

Institute: Woods Hole Oceanographic Institution

Co-authors: F. Carpenter, J. Waterbury

Title: Probing the metal scavenging mechanisms and stress response encoded in the genomes of two oligotrophic marine cyanobacteria

**Poster B26**

Author: Hsiao-hui Yang

Institute: University of Hong Kong

Title: High subspecies diversity in *E. coli* isolated from a test bovine feedlot

**Poster B27**

Author: Ahn Young-Beom

Institute: Rutgers University

Co-authors: D.E. Fennell, L.J. Kerkhof, M.M. Häggblom

Title: Enhancement of anaerobic microbial dechlorination 1,2,3,4-tetrachlorodibenzo-p-dioxin and 1,2,3,4-tetrachlorodibenzofuran by various halogenated electron acceptors in estuarine sediments.

**Poster B28**

Author: Joan F. Braddock

Institute: University Of Alaska, Fairbanks

Co-authors: K. Budsberg, C. Wimpee

Title: Characterization of *Photobacterium phosphoreum* from migrating Alaskan salmon

**Poster B29**

Author: Gerard Muyzer

Institute: Delft University Of Technology

Co-authors: H. Banciu, D. Yu. Sorokin, R. Kleerebezem, J.G. Kuenen

Title: At the extremes: Influence of sodium concentration on growth of autotrophic sulfur-oxidizing bacteria

**Poster B30**

Author: Mark van Loosdrecht

Institute: Delft University of Technology

Co-authors: M. de Kreuk, J. Heijnen

Title: Aerobic granular sludge reactors

**Poster B31**

Author: Lee R. Krumholz

Institute: The University of Oklahoma

Co-authors: Q. Luo, J.L. Steger, D.J. Smalley, J.D. Ballard

Title: A new screening system with microarray technology for signature tagged mutagenesis with *Desulfovibrio* and *Swewanella*

