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512 Liberty Lane, West Kingston, RI 02892
Phone: 401 783-4011 Fax: 401 783-7644
E-Mail: grc@grc.org
World Wide Web: <http://www.grc.org>

Nancy Ryan Gray, Ph.D.
Director

**2012 GORDON RESEARCH CONFERENCE
on MICROBIAL STRESS RESPONSE**

FINAL PROGRESS REPORT

DEPARTMENT OF ENERGY
GRANT NO. DE-SC0007382

The Gordon Research Conference on MICROBIAL STRESS RESPONSE was held at Mount Holyoke College, South Hadley, Massachusetts, July 15-20, 2012. The Conference was well-attended with 180 participants (attendees list attached). The attendees represented the spectrum of endeavor in this field coming from academia, industry, and government laboratories, both U.S. and foreign scientists, senior researchers, young investigators, and students. Of the 180 attendees, 79 voluntarily responded to a general inquiry regarding ethnicity which appears on our registration forms. Of the 79 respondents, 15% were Minorities – 1% Hispanic, 10% Asian and 4% African American. Approximately 47% of the participants at the 2012 meeting were women.

In designing the formal speakers program, emphasis was placed on current unpublished research and discussion of the future target areas in this field. There was a conscious effort to stimulate lively discussion about the key issues in the field today. Time for formal presentations was limited in the interest of group discussions. In order that more scientists could communicate their most recent results, poster presentation time was scheduled. Attached is a copy of the formal schedule and speaker program and the poster program. In addition to these formal interactions, "free time" was scheduled to allow informal discussions. Such discussions are fostering new collaborations and joint efforts in the field.

Thank you for your support of this Conference. As you know, in the interest of promoting the presentation of unpublished and frontier-breaking research, Gordon Research Conferences does not permit publication of meeting proceedings. If you wish any further details, please feel free to contact me. Thank you.

Sincerely,
Timothy J. Donohue, Conference Chairperson
UNIVERSITY OF WISCONSIN-MADISON

Microbial Stress Response

July 15-20, 2012
Mount Holyoke College
South Hadley, MA

Chairs:

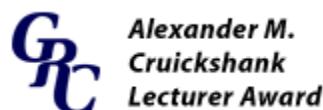
Timothy J. Donohue & Susan Gottesman

Vice Chairs:

Eduardo A. Groisman & Dianne K. Newman

The 2012 Microbial Stress Responses Gordon Research Conference will provide a forum for the open reporting of recent discoveries on the diverse mechanisms employed by microbes to respond to stress. From its inception in 1994, this conference has reported the latest advances in microbial stress responses. Posters and talks will illustrate the diverse systems used for survival during stress. Topics from past sessions include protein quality control, antibiotic, temperature, nutritional, compartmental or DNA damage stress responses. Approaches range from analysis at the molecular level (how are signals perceived and transmitted to change gene expression or function) to cellular and microbial community responses. This conference traditionally attracts researchers from the biological and physical sciences who study stress responses in medically or environmentally relevant microbes as well as in model organisms, using genetic, cell biological, genomic and computational techniques. The opportunity to integrate these diverse approaches to dissecting stress responses is a strength of the meeting. The outstanding international scientists in attendance and the range of microbial systems being investigated, together with the intimate and pleasant setting at Mount Holyoke College, provide a fertile ground for the exchange of ideas, approaches or building new collaborations among junior and senior investigators.

Contributors





SUNDAY

2:00 pm - 9:00 pm Arrival and Check-in (Office Closed 6:00 pm - 7:00 pm)
6:00 pm Dinner
7:30 pm - 7:40 pm Welcome / Introductory Comments by GRC Site Staff
7:40 pm - 9:30 pm **Stressful Communications Within And Between Cells**
 Discussion Leader: **Frederick C. Neidhardt** (University of Michigan, Ann Arbor)
7:40 pm - 8:25 pm **Bonnie Bassler** (Princeton University, HHMI)
 "Regulation of quorum sensing in *Vibrios*"
8:25 pm - 8:35 pm Discussion
8:35 pm - 9:20 pm **Carol Gross** (University of California at San Francisco)
 "Stress responses: A window into the cell"
9:20 pm - 9:30 pm Discussion
9:30 pm Reception: Willits-Hallowell Conference Center

MONDAY

7:30 am - 8:30 am Breakfast
8:45 am Group Photo
9:00 am - 12:30 pm **Living With And Without Oxygen**
 Discussion Leader: **John Helmann** (Cornell University)
9:00 am - 9:35 am **Patricia Kiley** (University of Wisconsin)
 "Role of IscR in oxygen regulation in *Escherichia coli*"
9:35 am - 9:45 am Discussion
9:45 am - 10:20 am **James Imlay** (University of Illinois, Urbana-Champaign)
 "How reactive oxygen species damage enzymes"
10:20 am - 10:30 am Discussion
10:30 am Coffee Break
11:00 am - 11:35 am **Eric Massé** (University of Sherbrooke)
 "Regulating mRNA translation and decay with small RNAs during iron, carbon, and membrane stresses"

11:35 am - 11:45 am	Discussion
11:45 am - 12:00 pm	Jeanette Winter (Technische University, Munich) "Reversible methionine oxidation activates a transcription factor in response to hypochlorite-mediated oxidative stress"
12:00 pm - 12:05 pm	Discussion
12:05 pm - 12:20 pm	Sam Dukan (CNRS) "CO ₂ and oxidative stress"
12:20 pm - 12:25 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	<u>Poster Session I</u> : Kendade Atrium
6:00 pm	Dinner
7:30 pm - 9:30 pm	Stress Of Alternate Lifestyles Discussion Leader: Dianne Newman (California Institute of Technology)
7:30 pm - 8:05 pm	David Botstein (Princeton University) "Coordination of growth rate, cell cycle, stress response and metabolic activity in yeast"
8:05 pm - 8:15 pm	Discussion
8:15 pm - 8:50 pm	Urs Jenal (Biozentrum, University of Basel) "The role of C-di-GMP signaling in bacterial persistence"
8:50 pm - 9:00 pm	Discussion
9:00 pm - 9:15 pm	Michael Ibbá (Ohio State University) "Adaptation of the translation quality control machinery to amino acid stress"
9:15 pm - 9:20 pm	Discussion
TUESDAY	
7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	Stress Sensing: Logic for Signal Transduction Discussion Leader: Michael Laub (MIT)
9:00 am - 9:35 am	Mark Goulian (University of Pennsylvania) "Membrane protein expression triggers chromosome repositioning in bacteria"
9:35 am - 9:45 am	Discussion
9:45 am - 10:20 am	James Locke (Caltech) "Modeling of stress sigma factor control"
10:20 am - 10:30 am	Discussion
10:30 am	Coffee Break
11:00 am - 11:15 am	Athanasios Typas (EMBL) "A signal transduction system connecting cell shape to cell division in

Escherichia coli"

11:15 am - 11:20 am Discussion

11:20 am - 11:35 am **Joshua Modell** (Massachusetts Institute of Technology)
"Regulatory pathways controlling cell division after DNA damage in *Caulobacter crescentus*"

11:35 am - 11:40 am Discussion

11:40 am - 11:55 am **Maude Guillier** (CNRS, IBPC)
"Complex interplay between two-component systems and small regulatory RNAs in bacteria"

11:55 am - 12:00 pm Discussion

12:00 pm - 12:15 pm **Cari Vanderpool** (University of Illinois)
"Small RNA binding site multiplicity required for efficient regulation of a polycistronic mRNA"

12:15 pm - 12:20 pm Discussion

12:30 pm Lunch

1:30 pm - 4:00 pm Free Time

4:00 pm - 6:00 pm Poster Session II: Kendade Atrium

6:00 pm Dinner

Sensing Stress: Regulatory Networks and Post-transcriptional Responses

Discussion Leader: **Regine Hengge** (Freie Universität Berlin)

7:30 pm - 8:05 pm **Giesela Storz** (NICHD, NIH)
"Additional levels of regulation provided by small RNAs and small proteins"

8:05 pm - 8:15 pm Discussion

8:15 pm - 8:50 pm **Tom Silhavy** (Princeton University)
"Divide and Conquer: Genetic dissection of the beta-barrel assembly machine"

8:50 pm - 9:00 pm Discussion

9:00 pm - 9:15 pm **Tejas Kalastavadi** (Massachusetts Institute of Technology)
"Interplay between the AAA+ Lon protease and sHsps: New insights into control of degradation"

9:15 pm - 9:20 pm Discussion

WEDNESDAY

7:30 am - 8:30 am Breakfast

Living with Others: Signals Controlling Microbe-Host Interactions

Discussion Leader: **Eduardo Groisman** (Yale University)

9:00 am - 9:35 am **Margaret McFall-Ngai** (University of Wisconsin)

	"The stress of communication across domains: Establishment of a stable symbiosis"
9:35 am - 9:45 am	Discussion
9:45 am - 10:20 am	Richard Losick (Harvard University) "Chains, Communities and Going Green"
10:20 am - 10:30 am	Discussion
10:30 am	Coffee Break
11:00 am - 11:35 am	Thad Stappenbeck (Washington University) "Bacterial mechanisms that simulate colitis in a susceptible host"
11:35 am - 11:45 am	Discussion
11:45 am - 12:00 pm	Lars Dietrich (Columbia University) "Bacterial community morphogenesis is intimately linked to the intracellular redox state"
12:00 pm - 12:05 pm	Discussion
12:05 pm - 12:20 pm	Julia Schwartzman (University of Wisconsin-Madison) "Acid tolerance provides a link between chitin oligosaccharide metabolism and symbiosis"
12:20 pm - 12:25 pm	Discussion
12:30 pm	Lunch
1:30 pm - 4:00 pm	Free Time
4:00 pm - 6:00 pm	<u>Poster Session III</u> : Kendade Atrium
6:00 pm	Dinner
7:00 pm - 7:30 pm	<u>Business Meeting</u> <i>Nominations for the next Vice Chair; Fill out Conference Evaluation Forms; Discuss future Site & Scheduling preferences; Election of the next Vice Chair</i>
7:30 pm - 9:30 pm	Living with Others: Stress in Microbial Communities Discussion Leader: Beth Lazazzera (University of California Los Angeles)
7:30 pm - 8:05 pm	Saeed Tavazoie (Columbia University) "Extreme adaptation through loss of function"
8:05 pm - 8:15 pm	Discussion
8:15 pm - 8:30 pm	Dao Nguyen (McGill University) "The role of the stringent response in <i>Pseudomonas aeruginosa</i> antibiotic tolerance"
8:30 pm - 8:35 pm	Discussion
8:35 pm - 8:50 pm	Diego Serra (Institut fur Biologie) "High resolution spatial order of physiological differentiation in structured biofilms of <i>Escherichia coli</i> "
8:50 pm - 8:55 pm	Discussion

8:55 pm - 9:10 pm **Darshan Pathak** (University of Wyoming)
"Kin recognition regulates outer membrane exchange between *Myxobacteria* biofilm cells"

9:10 pm - 9:15 pm Discussion

THURSDAY

7:30 am - 8:30 am Breakfast

Bacterial Hibernation/Persistence

Discussion Leader: **Ned Ruby** (University of Wisconsin)

9:00 am - 9:35 am **Kenn Gerdes** (Newcastle University)
"Bacterial persistence and the stringent response"

9:35 am - 9:45 am Discussion

9:45 am - 10:20 am **Malcolm Winkler** (Indiana University)
"Pneumococcal peptidoglycan biosynthesis and antibiotic stress responses"

10:20 am - 10:30 am Discussion

10:30 am Coffee Break

11:00 am - 11:15 am **Michael Sebert** (Childrens Hospital of Philadelphia)
"Regulation of competence in *Streptococcus pneumoniae* in response to the genomic mutational load"

11:15 am - 11:20 am Discussion

11:20 am - 11:35 am **Eunjin Lee** (Yale)
"Control of a *Salmonella* Virulence Locus by an ATP-sensing Leader mRNA"

11:35 am - 11:40 am Discussion

11:40 am - 11:55 am **Jonathan Dworkin** (Columbia University)
"Regulation of metabolic dormancy by reversible phosphorylation of translation"

11:55 am - 12:05 pm Discussion

12:05 pm - 12:20 pm **Rick Fasani** (University of California-Davis)
"Stress and Persistence are linked via Toxin-Antitoxin systems"

12:20 pm - 12:25 pm Discussion

12:30 pm Lunch

1:30 pm - 4:00 pm Free Time

4:00 pm - 6:00 pm Poster Session IV: Kendade Atrium

6:00 pm Dinner

DNA Damage Control

Discussion Leader: **Tania Baker** (Massachusetts Institute of Technology, HHMI)

7:30 pm - 8:00 pm **Alan Grossman** (Massachusetts Institute of Technology)
"Replication and stress"

8:00 pm - 8:10 pm	Discussion
8:10 pm - 8:40 pm	Luciano Marraffini (The Rockefeller University) "CRISPR interference, friend or foe?"
8:40 pm - 8:50 pm	Discussion
8:50 pm - 9:05 pm	Jue Wang (Baylor College of Medicine) "How (p)ppGpp allows survival of <i>Bacillus subtilis</i> during stress"
9:05 pm - 9:10 pm	Discussion

FRIDAY

7:30 am - 8:30 am	Breakfast
9:00 am	Departure

This material is based upon work supported by the Department of Energy under Award Number DE-SC0007382. This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

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AHN, BO-EUN	MIT	Poster Presenter	Registered
ANDERSON, CAROLYN	UNIVERSITY OF CALIFORNIA, DAVIS	Poster Presenter	Registered
ANDERSON, MELISSA	UNIVERSITY OF NORTH CAROLINA – CHAPEL HILL	Poster Presenter	Registered
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COLLET, JEAN FRANCOIS	WELBIO - UNIVERSITE DE LOUVAIN	Poster Presenter	Registered
DALE, AARON G	UNIVERSITY COLLEGE LONDON	Poster Presenter	Registered
DAS, ARIJIT K	INSTITUTE OF MICROBIAL TECHNOLOGY	Poster Presenter	Registered
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GOTTESMAN, SUSAN	NIH, NCI	Chair	Registered
GOULIAN, MARK D	UNIVERSITY OF PENNSYLVANIA	Speaker	Registered
GRAY, MICHAEL J	UNIVERSITY OF MICHIGAN	Poster Presenter	Registered
GREENWELL, ROGER S	HOFSTRA UNIVERSITY	Poster Presenter	Registered
GROISMAN, EDUARDO A	YALE UNIVERSITY SCHOOL OF MEDICINE	Vice Chair	Registered
GROSS, CAROL	UCSF MEDICAL CENTER	Speaker	Registered
GROSSMAN, ALAN	MASSACHUSETTS INSTITUTE OF TECHNOLOGY	Speaker	Registered
GUARIGLIA-OROPEZA, VERONICA	CORNELL UNIVERSITY	Poster Presenter	Registered
GUILLIER, MAUDE	CNRS UPR 9073	Poster Presenter	Registered
GUNDLACH, JASMIN	TECHNISCHE UNIVERSITAET MUENCHEN	Poster Presenter	Registered
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KIVIET, DANIEL J	ETH ZURICH	Poster Presenter	Registered
KLUMPP, STEFAN	MAX PLANCK INSTITUTE OF COLLOIDS AND	Poster Presenter	Registered

INTERFACES

KNIGHT, JOHN	WAKE FOREST UNIVERSITY SCHOOL OF MEDICINE	Poster Presenter	Registered
KOVACS, AKOS T	UNIVERSITY OF GRONINGEN	Poster Presenter	Registered
KRAEMER, REINHARD	UNIVERSITY OF COLOGNE	Poster Presenter	Registered
KRULWICH, TERRY A	MOUNT SINAI SCHOOL OF MEDICINE	Poster Presenter	Registered
KULKARNI, GARGI	CALIFORNIA INSTITUTE OF TECHNOLOGY	Poster Presenter	Registered
LAUB, MICHAEL	HHMI, MIT	Discussion Leader	Registered
LAZZERA, BETH	UNIVERSITY OF CALIFORNIA, LOS ANGELES	Poster Presenter	Registered
LE, YAN	TECHNISCHE UNIVERSITÄT MÜNCHEN	Poster Presenter	Registered
LEE, HYUN-JUNG	LMB/NCI/NIH	Poster Presenter	Registered
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LOPEZ REDONDO, MARIA LUISA M	NYU- MEDICAL CENTER	Attendee	Registered
LOSICK, RICHARD M	HARVARD UNIVERSITY	Speaker	Registered
MAHONEY, TARA PENNY F	PRINCETON UNIVERSITY	Poster Presenter	Registered
MANDEL, MARK J	NORTHWESTERN UNIVERSITY	Poster Presenter	Registered
MANDIN, PIERRE	CNRS	Poster Presenter	Registered
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MAXIMOV, STANISLAV	UNIVERSITY OF COLOGNE	Poster Presenter	Registered
MCFALL-NGAI, MARGARET	UNIVERSITY OF WISCONSIN-MADISON	Speaker	Registered
METTERT, ERIN L	UNIVERSITY OF WISCONSIN-MADISON	Poster Presenter	Registered
METZGER, LISA C	INSTITUTE OF MICROBIOLOGY, ETH ZURICH	Poster Presenter	Registered
MEYER, ANNE S	DELFT UNIVERSITY OF TECHNOLOGY	Poster Presenter	Registered
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MODELL, JOSHUA W	MIT	Poster Presenter	Registered
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NEIDHARDT, FREDERICK C	UNIVERSITY OF MICHIGAN MEDICAL SCHOOL	Discussion Leader	Registered
NEWMAN, DIANNE K	CALTECH	Vice Chair	Registered
NGUYEN, DAO	MCGILL UNIVERSITY	Poster Presenter	Registered

NICOLAES, VALERIE	DE DUVE INSTITUTE, UCL	Poster Presenter	Registered
OBI, IKENNA R	UMEA UNIVERSITY	Poster Presenter	Registered
PARK, DAN M	UNIVERSITY OF WISCONSIN AT MADISON	Poster Presenter	Registered
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SEBERT, MICHAEL E	CHILDREN'S HOSP OF PHILA & UNIV OF PENNSYLVANIA	Speaker	Registered
SERRA, DIEGO	INSTITUT FÜR BIOLOGIE – MIKROBIOLOGIE / FU BERLIN	Poster Presenter	Registered
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SIEGELE, DEBORAH A	TEXAS A&M UNIVERSITY	Poster Presenter	Registered
SILHAVY, THOMAS J	PRINCETON UNIVERSITY	Speaker	Registered
SLONCZEWSKI, JOAN L	KENYON COLLEGE	Poster Presenter	Registered
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STAPPENBECK, THADDEUS S	WASHINGTON UNIVERSITY SCHOOL OF MEDICINE	Speaker	Registered
STERN, ANDREW M	UNIVERSITY OF PENNSYLVANIA	Poster Presenter	Registered
STOEBEL, DANIEL M	HARVEY MUD COLLEGE	Poster Presenter	Registered
STORZ, GISELA T	NICHD, NIH	Speaker	Registered
STRAIGHT, PAUL D	TEXAS A&M UNIVERSITY	Poster Presenter	Registered
SVENSSON, SARAH L	UNIVERSITY OF BRITISH COLUMBIA	Poster Presenter	Registered
SZEWCZYK, JOANNA	WELBIO, UNIVERSITE DE LOUVAIN	Poster Presenter	Registered
TAVAZOIE, SAEED	COLUMBIA UNIVERSITY	Speaker	Registered
THANIKKAL, EDVIN J	UMEÅ UNIVERSITY	Poster Presenter	Registered
THEODRE, ALYSSA	NORTHEASTERN UNIVERSITY	Poster Presenter	Registered
THOMPSON, KARL M	HOWARD UNIVERSITY COLLEGE OF MEDICINE	Poster Presenter	Registered
TIGGES, MICHELLE M	MONTANA STATE UNIVERSITY	Poster Presenter	Registered
TOBIN KAHRSTROM, CHRISTINA	NATURE REVIEWS MICROBIOLOGY	Attendee	Registered
TODOR, HORIA	DUKE UNIVERSITY	Poster Presenter	Registered
TYPAS, ATHANASIOS	EUROPEAN MOLECULAR BIOLOGY	Speaker	Registered

LABORATORY				
UTRATNA, MARTA	NATIONAL UNIVERSITY OF IRELAND GALWAY	Poster Presenter	Registered	
VAN PUYVELDE, SANDRA	KU LEUVEN	Poster Presenter	Registered	
VANDERPOOL, CARI	UNIVERSITY OF ILLINOIS	Poster Presenter	Registered	
VEENING, JAN-WILLEM	UNIVERSITY OF GRONINGEN	Poster Presenter	Registered	
VOLLMER, AMY CHENG	SWARTHMORE COLLEGE	Poster Presenter	Registered	
WAKEMAN, CATHERINE A	VANDERBILT UNIVERSITY MEDICAL CENTER	Poster Presenter	Registered	
WANG, JUE D	BAYLOR COLLEGE OF MEDICINE	Poster Presenter	Registered	
WANG, YUN	NORTHWESTERN UNIVERSITY	Poster Presenter	Registered	
WESTBYE, ALEXANDER B	UNIVERSITY OF BRITISH COLUMBIA	Poster Presenter	Registered	
WHITE-ZIEGLER, CHRISTINE A	SMITH COLLEGE	Poster Presenter	Registered	
WILLIAMS, BARAKA S	JACKSON STATE UNIVERSITY	Poster Presenter	Registered	
WINKLER, WADE C	UNIVERSITY OF MARYLAND	Poster Presenter	Registered	
WINKLER, MALCOLM	INDIANA UNIVERSITY BLOOMINGTON	Speaker	Registered	
WINTER, JEANNETTE	TECHNISCHE UNIVERSITAET MUENCHEN	Speaker	Registered	
WINTHER-LARSEN, HANNE C	UNIVERSITY OF OSLO	Poster Presenter	Registered	
XAVIER, KARINA B	FUNDACAO CALOUSTE GULBENKIAN - IGC	Poster Presenter	Registered	
YAN, AIXIN	UNIVERSITY OF HONG KONG	Poster Presenter	Registered	
YERNOOL, DINESH A	PURDUE UNIVERSITY	Poster Presenter	Registered	
YOO, JI-SUN	SEOUL NATIONAL UNIVERSITY	Poster Presenter	Registered	
YURA, TAKASHI	KYOTO SANGYO UNIVERSITIY	Poster Presenter	Registered	
180 Attendees				