



founded in 1931

GORDON RESEARCH CONFERENCES *frontiers of science*

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

**2009 GORDON RESEARCH CONFERENCE
on PHOTOCHEMISTRY**

FINAL PROGRESS REPORT

DEPARTMENT OF ENERGY
GRANT NO. DE-SC0001732

The Gordon Research Conference on PHOTOCHEMISTRY was held at Bryant University, Smithfield, Rhode Island, July 5-10, 2009. The Conference was well-attended with 107 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 107 attendees, 61 voluntarily responded to a general inquiry regarding ethnicity which appears on our registration forms. Of the 61 respondents, 19% were Minorities – 3% Hispanic, 13% Asian & 3% African America. Approximately 20% of the participants at the 2009 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In designing the formal speakers program, emphasis was placed on current unpublished research and discussion of the future target areas in this field.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 As you know, in the interest of promoting the presentation of unpublished and frontier-breaking research, Gordon Research Conferences does not permit publication of meeting proceedings.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,

Michael Wasielewski, PI & Conference Chairperson
NORTHWESTERN UNIVERSITY

PHOTOCHEMISTRY

July 5-10, 2009
Bryant University
Smithfield, RI

Chair:

Michael Wasielewski

Vice Chair:

Cornelia Bohne

The impact of photochemistry on diverse fields ranging from materials and environmental science to biology and medicine has never been greater. The 2009 Gordon Conference on Photochemistry will highlight recent advances in these key areas while also presenting the latest research on new photochemical reactions and mechanistic studies. Session topics will include: development of new chromophores, light harvesting materials, solar energy conversion, photocontrolled biomolecules, light-triggered amplification reactions, and advanced bioimaging techniques. The Conference will continue its 45 year history of promoting interactions between fundamental and applied scientists, a hallmark of the Gordon Conferences. In addition, oral presentations, poster sessions and informal discussions will provide opportunities for junior scientists and students to present their own work and discuss their results with leaders in the field. Applicants to the Conference are encouraged to submit abstracts for poster presentations in order to gain visibility and feedback on their research. In addition, a number of poster abstracts will be selected for presentation as short talks. The conference chairs (Michael Wasielewski, m-wasielewski@northwestern.edu and Bruce Armitage, army@cmu.edu) can be contacted with questions relating to the program and poster sessions and look forward to an engaging and dynamic conference.

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 **SOLAR ENERGY CONVERSION**

Discussion Leader: **Ana Moore** (Arizona State University)

7:40 pm - 8:10 pm **Leif Hammarström** (Uppsala University)
"Controlling Electron Transfer for Artificial Photosynthesis"

8:10 pm - 8:20 pm Discussion

8:20 pm - 8:50 pm **Devens Gust** (Arizona State University)
"Photochromic Control of Photochemical Processes: From Photosynthesis to Molecule-Based Signal Transduction"

8:50 pm - 9:00 pm Discussion

9:00 pm - 9:20 pm **Emily Weiss** (Northwestern University)
"The Surface Chemistry of Colloidal Semiconductor Nanocrystals"

9:20 pm - 9:30 pm Discussion

MONDAY

7:30 am - 8:30 am Breakfast

8:30 am Group Photo

9:00 am - 12:30 pm **REACTIONS AND MECHANISMS (In Memory of N.C. Yang)**

Discussion Leader: **Anthony Trozzolo** (University of Notre Dame)

9:00 am - 9:30 am **Samir Farid** (University of Rochester)
"Quantum Amplification via an Adiabatic Triplet Reaction"

9:30 am - 9:40 am Discussion

9:40 am - 10:10 am **Andrei Kutateladze** (University of Denver)
"Detection and Massive Photoamplification of Molecular Recognition Events"

10:10 am - 10:20 am Discussion

10:20 am - 10:40 am Coffee Break

10:40 am - 11:10 am **Igor Alabugin** (Florida State University)
"The Many Faces of Alkyne Photochemistry"

11:10 am - 11:20 am Discussion

11:20 am - 11:50 am **Willie Leigh** (McMaster University)
"Group 14 Reactive Intermediates. Photochemical Methods for the Study of Silylenes, Germylenes and Stannylenes - the Heavy Cousins of Singlet Carbenes"

11:50 am - 12:00 pm Discussion

12:00 pm - 12:15 pm **Deepak Shukla** (Eastman Kodak Co.)
"Chain Amplification in Photoreactions of N-alkoxypyridinium Salts in the Presence of Bases"

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
 6:00 pm Dinner

7:30 pm - 9:30 pm

SUPRAMOLECULAR PHOTOCHEMISTRY

Discussion Leader: **Linda Shimizu** (University of South Carolina)
 7:30 pm - 8:10 pm **J. Fraser Stoddart** (Northwestern University)
 "Light-Gated STOP-GO Molecular Shuttles and Shuttles"
 8:10 pm - 8:25 pm Discussion
 8:25 pm - 9:05 pm **Frank Würthner** (University of Würzburg)
 "Dye Assemblies for Supramolecular Electronics and Photovoltaics"
 9:05 pm - 9:20 pm Discussion

TUESDAY

7:30 am - 8:30 am Breakfast

9:00 am - 12:30 pm

BIOLOGICAL PHOTOCHEMISTRY AND IMAGING

Discussion Leader: **Sarah Schmidtke** (College of Wooster)
 9:00 am - 9:30 am **Linda Johnston** (National Research Council - Steacie Institute for Molecular Sciences)
 "Fluorescence Imaging and Dynamics on the Nanoscale"
 9:30 am - 9:40 am Discussion
 9:40 am - 10:10 am **Alexander Deiters** (North Carolina State University)
 "Photochemical Regulation of Gene Expression"
 10:10 am - 10:20 am Discussion
 10:20 am - 10:40 am Coffee Break
 10:40 am - 11:10 am **Bern Kohler** (Ohio State University)
 "UV Photoproduct Formation in Free and Nucleosomal DNA"
 11:10 am - 11:20 am Discussion
 11:20 am - 11:50 am **Dmitry Matyushov** (Arizona State University)
 "Energetics of Protein Charge Transfer and Bacterial Photosynthesis"
 11:50 am - 12:00 pm Discussion
 12:00 pm - 12:15 pm **Cristian Strassert** (Westfälische Wilhelms-Universität Münster)
 "Photoactive Hybrid Nanomaterials For Targeting, Labeling And Killing Antibiotic Resistant Bacteria"
 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

6:00 pm Dinner

7:30 pm - 9:30 pm **SINGLE MOLECULE PHOTOCHEMISTRY**

Discussion Leader: **Jason Kahn** (University of Maryland)

7:30 pm - 8:00 pm **Marcel Bruchez** (Carnegie Mellon University)
"Photostable and Regularly Blinking Fluorogen-Activating Peptides for Super-resolution Imaging"

8:00 pm - 8:10 pm Discussion

8:10 pm - 8:40 pm **Johan Hofkens** (KU Leuven)
"Performant Dyes for Demanding Microscopy Applications"

8:40 pm - 8:50 pm Discussion

8:50 pm - 9:20 pm **Dongho Kim** (Yonsei University)
"Excitation Energy Delocalization Processes of Various Porphyrin Arrays Probed by Single Molecule Fluorescence Spectroscopy"

9:20 pm - 9:30 pm Discussion

WEDNESDAY

7:30 am - 8:30 am Breakfast

9:00 am - 12:30 pm **SPECTROSCOPY AND DYNAMICS**

Discussion Leader: **Torsten Fiebig** (Boston College)

9:00 am - 9:30 am **David McCamant** (University of Rochester)
"Ultrafast Electronic and Vibrational Spectroscopy of Charge Transfer Compounds"

9:30 am - 9:40 am Discussion

9:40 am - 10:10 am **Lin Chen** (Argonne National Laboratories)
"Structural Dynamics of Transition Metal Complexes for Solar Energy Conversion"

10:10 am - 10:20 am Discussion

10:20 am - 10:40 am Coffee Break

10:40 am - 11:10 am **David Jonas** (University of Colorado)
"Nonadiabatic Electronic Dynamics at Conical Funnels and in Quantum Dots"

11:10 am - 11:20 am Discussion

11:20 am - 11:50 am **Niels Damrauer** (University of Colorado)
"Manipulating Electron Transfer Phenomena through Structure and Quantum Control"

11:50 am - 12:00 pm Discussion

12:00 pm - 12:15 pm **Karen Mulfort** (Argonne National Laboratory)
"Correlating ground and excited-state solution X-ray structures with

	ultrafast transient optical spectroscopy for cobaloxime-based H ₂ photocatalysts"
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
6:00 pm	Dinner
7:30 pm - 9:30 pm	SPIN EFFECTS IN PHOTOCHEMISTRY
	Discussion Leader: Tijana Rajh (Argonne National Laboratories)
7:30 pm - 8:00 pm	Christiane Timmel (University of Oxford) "A Bird's Eye View of Molecular Compasses"
8:00 pm - 8:10 pm	Discussion
8:10 pm - 8:40 pm	David Shultz (North Carolina State University) "A Lecture in Two Parts: I. Electronic Coupling in Donor-Acceptor Biradicals. II. Photo-switchable Valence Tautomers"
8:40 pm - 8:50 pm	Discussion
8:50 pm - 9:20 pm	Malcolm Forbes (University of North Carolina) "Proton-Coupled Electron Transfer Reactions: The Radicals Behind the Ru(bpy) ₃ "
9:20 pm - 9:30 pm	Discussion

THURSDAY

7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	MATERIALS PHOTOCHEMISTRY
	Discussion Leader: Pavel Anzenbacher (Bowling Green State University)
9:00 am - 9:30 am	Uwe Bunz (Georgia Institute of Technology) "Cruciform Fluorophores in Blue, Green and Yellow"
9:30 am - 9:40 am	Discussion
9:40 am - 10:10 am	Elizabeth Harbron (College of William and Mary) "Photoswitchable Conjugated Polymer Nanoparticles"
10:10 am - 10:20 am	Discussion
10:20 am - 10:40 am	Coffee Break
10:40 am - 11:10 am	Dirk Guld (University Nürnberg-Erlangen) "Carbon Nanostructures - Supramolecular Approach to Power Solar Energy Conversion"
11:10 am - 11:20 am	Discussion
11:20 am - 11:50 am	Thuc-Quyen Nguyen (University of California at Santa Barbara) "Organic Semiconducting Nanostructures for Solar Energy Conversion"
11:50 am - 12:00 pm	Discussion

12:00 pm - 12:15 pm	Jye-Shane Yang (National Taiwan University) "Pentipitycene-Derived Oligo(p-phenyleneethynylene)s: Conformation, Chain-Length Effect, and Intrachain Energy transfer"
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
6:00 pm	Dinner
7:00 pm - 7:30 pm	<u>Business Meeting</u> (Nominations for the next Vice Chair; Fill out Conference Evaluation Forms; Discuss future Site & Scheduling preferences; Election of the next Vice Chair)
7:30 pm - 9:30 pm	FRONTIERS OF PHOTOCHEMISTRY Discussion Leader: Francisco Raymo (University of Miami)
7:30 pm - 8:10 pm	Klaus Hahn (University of North Carolina)
8:10 pm - 8:30 pm	Discussion
8:30 pm - 9:10 pm	Valentina Emiliani (University of Paris-Descartes) "Good Shape Photolysis"
9:10 pm - 9:30 pm	Discussion
FRIDAY	
7:30 am - 8:30 am	Breakfast
9:00 am	Departure

Photochemistry (2009)

Name	Organization	Participation	Status
ACHARYA, JIBA RAJ	LOUISIANA STATE UNIVERSITY	Poster Presenter	Registered
ALABUGIN, IGOR V	FLORIDA STATE UNIVERSITY	Speaker	Registered
ALEMAN, ELVIN	WAYNE STATE UNIVERSITY/NSF	Poster Presenter	Registered
ANZENBACHER, PAVEL	BOWLING GREEN STATE UNIVERSITY	Discussion Leader	Registered
ARMITAGE, BRUCE A	CARNEGIE MELLON UNIVERSITY	Chair	Registered
BASARIC, NIKOLA	RUDJER BOSKOVIC INSTITUTE	Poster Presenter	Registered
BAUMANN, CHRISTOPHER A.	UNIVERSITY OF SCRANTON	Poster Presenter	Registered
BILLONE, PAUL S	UNIVERSITY OF OTTAWA	Poster Presenter	Registered
BOHNE, CORNELIA	UNIVERSITY OF VICTORIA	Vice Chair	Registered
BRUCHEZ, MARCEL P	CARNEGIE MELLON UNIVERSITY	Speaker	Registered
BUNZ, UWE	GEORGIA INSTITUTE OF TECHNOLOGY	Speaker	Registered
CERONI, PAOLA	UNIVERSITY OF BOLOGNA	Poster Presenter	Registered
CHEN, LIN X	ARGONNE NAT'L LAB/NORTHWESTERN U.	Speaker	Registered
CLARK, TRAVIS B	UNIVERSITY OF MICHIGAN	Poster Presenter	Registered
COHEN, BRIAN W	BROOKHAVEN NATIONAL LAB	Poster Presenter	Registered
COSA, GONZALO	MCGILL UNIVERSITY	Poster Presenter	Registered
DA SILVA, JOSE PAULO	UNIVERSITY OF ALGARVE	Poster Presenter	Registered
DAMRAUER, NIELS H	UNIVERSITY OF COLORADO	Speaker	Registered
DEITERS, ALEXANDER	NORTH CAROLINA STATE UNIVERSITY	Speaker	Registered
DJUROVICH, PETER I	UNIVERSITY OF SOUTHERN CALIFORNIA	Poster Presenter	Registered
EL-KHOULY, MOHAMED E.	OSAKA UNIVERSITY	Poster Presenter	Registered
FARID, SAMIR	UNIVERSITY OF ROCHESTER	Speaker	Registered
FIEBIG, TORSTEN	BOSTON COLLEGE	Discussion Leader	Registered
FLYNN, DANIEL C	UNIVERSITY OF MICHIGAN	Poster Presenter	Registered
FORBES, MALCOLM D.E.	UNIVERSITY OF NORTH CAROLINA	Speaker	Registered
FRANK, NATIA L	UNIVERSITY OF VICTORIA	Poster Presenter	Registered
GIVENS, RICHARD S.	UNIVERSITY OF KANSAS	Attendee	Registered
GOMES, PAULO J. S.	CHEMISTRY DEPARTEMNT OF UNIVERSITY OF COIMBRA	Poster Presenter	Registered
GRIMM, BRUNO	UNIVERSITY OF ERLANGEN	Poster Presenter	Registered
GROZEMA, FERDINAND C	DELFT UNIVERSITY OF TECHNOLOGY	Poster Presenter	Registered
GULDI, DIRK M	UNIVERSITY OF ERLANGEN-NUERNBERG	Speaker	Registered
GUST, DEVENS	ARIZONA STATE UNIVERSITY	Speaker	Registered
HAHN, KLAUS M	UNIVERSITY OF NORTH CAROLINA, CHAPEL HILL	Speaker	Registered
HAMMARSTROM, LEIF	UPPSALA UNIVERSITY	Speaker	Registered
HARBRON, ELIZABETH J	COLLEGE OF WILLIAM& MARY	Speaker	Registered
HARIHARAN, MAHESH	NORTHWESTERN UNIVERSITY	Poster Presenter	Registered
HOBLEY, JONATHAN	INSTITUTE OF MATERIALS RESEARCH & ENGINEERING	Poster Presenter	Registered
HOFKENS, JOHAN	KU LEUVEN BE419052173	Speaker	Registered
HORNER, MICHAEL G	PERFORMANCE INDICATOR LLC	Attendee	Registered
HWANG, EUIYONG	LOUISIANA STATE UNIVERSITY	Poster Presenter	Registered
JAYARAJ, NITHYANANDHAN	UNIVERSITY OF MIAMI	Poster Presenter	Registered
JAYARAMAN, SIVAGURU	NORTH DAKOTA STATE UNIVERSITY	Poster Presenter	Registered
JOCKUSCH, STEFFEN	COLUMBIA UNIVERSITY NEW YORK	Poster Presenter	Registered
JOHNSTON, LINDA	NATIONAL RESEARCH COUNCIL CANADA	Speaker	Registered
JONAS, DAVID M	UNIVERSITY OF COLORADO	Speaker	Registered
JONES, PAUL B	WAKE FOREST UNIVERSITY	Poster Presenter	Registered
KAHN, JASON D	UNIVERSITY OF MARYLAND	Discussion Leader	Registered

KIM, DONGHO	YONSEI UNIVERSITY	Speaker	Registered
KOHLER, BERN	MONTANA STATE UNIVERSITY	Speaker	Registered
KUMAR, CHALLA V	UNIVERSITY OF CONNECTICUT	Poster Presenter	Registered
KUTATELADZE, ANDREI G	UNIVERSITY OF DENVER	Speaker	Registered
LANDGRAF, STEPHAN	GRAZ UNIVERSITY OF TECHNOLOGY	Poster Presenter	Registered
LEAR, BENJAMIN J	OHIO STATE UNIVERSITY	Poster Presenter	Registered
LEIGH, WILLIAM J	MCMASTER UNIVERSITY	Speaker	Registered
LEWIS, FREDERICK D	NORTHWESTERN UNIVERSITY	Poster Presenter	Registered
LOCKARD, JENNY V	ARGONNE NATIONAL LAB	Poster Presenter	Registered
LOPPNOW, GLEN R	UNIVERSITY OF ALBERTA	Poster Presenter	Registered
MATYUSHOV, DMITRY	ARIZONA STATE UNIVERSITY	Speaker	Registered
MCCAMANT, DAVID W	UNIVERSITY OF ROCHESTER	Speaker	Registered
MENKE, JESSICA L.	UNIVERSITY OF WISCONSIN-MADISON	Poster Presenter	Registered
MEYER, GERALD J	JOHNS HOPKINS UNIVERSITY	Vice Chair	Registered
MOORE, ANA L	ARIZONA STATE UNIVERSITY	Discussion Leader	Registered
MORI, TADASHI	OSAKA UNIVERSITY	Poster Presenter	Registered
MOSCATELLI, ALBERTO	CARNEGIE MELLON UNIVERSITY	Poster Presenter	Registered
MULFORT, KAREN L	ARGONNE NATIONAL LABORATORY	Poster Presenter	Registered
NESTEROV, EVGUENI E	LOUISIANA STATE UNIVERSITY	Poster Presenter	Registered
NGUYEN, QUYEN T	UNIVERSITY OF CALIFORNIA, SANTA BARBARA	Speaker	Registered
PETERSSON, JONAS	UPPSALA UNIVERSITET	Poster Presenter	Registered
PISCHEL, UWE	UNIVERSITY OF HUELVA	Poster Presenter	Registered
RACHFORD, AARON A	BOWLING GREEN STATE UNIVERSITY	Poster Presenter	Registered
RACK, JEFFREY J	OHIO UNIVERSITY	Poster Presenter	Registered
RAJH, TIJANA	ARGONNE NATIONAL LABORATORY	Discussion Leader	Registered
RAMAMURTHY, VAIDHYANATHA	UNIVERSITY OF MIAMI	Poster Presenter	Registered
RATHORE, RAJENDRA	MARQUETTE UNIVERSITY	Poster Presenter	Registered
RATTRAY, NICHOLAS J.W	THE UNIVERSITY OF MANCHESTER UK	Poster Presenter	Registered
RAYMO, FRANCISCO M	UNIVERSITY OF MIAMI	Discussion Leader	Registered
RENE-BOISNEUF, LAETITIA T	UNIVERSITY OF OTTAWA	Poster Presenter	Registered
RINCO, OLGA	LUTHER COLLEGE	Poster Presenter	Registered
SALTIEL, JACK	FLORIDA STATE UNIVERSITY	Poster Presenter	Registered
SCHMIDTKE, SARAH J	COLLEGE OF WOOSTER	Discussion Leader	Registered
SHARMA, ARCHNA	UNIVERSITY OF COIMBRA, COIMBRA, PORTUGAL	Poster Presenter	Registered
SHE, CHUNXING	ARGONNE NATIONAL LABORATORY	Poster Presenter	Registered
SHIMIZU, LINDA S	UNIVERSITY OF SOUTH CAROLINA	Discussion Leader	Registered
SHUKLA, DEEPAK	EASTMAN KODAK COMPANY	Poster Presenter	Registered
SHULTZ, DAVID A	NC STATE UNIVERSITY	Speaker	Registered
SILVI, SERENA	UNIVERSITA' DI BOLOGNA	Poster Presenter	Registered
SINGH-RACHFORD, TANYA N	BOWLING GREEN STATE UNIVERSITY	Poster Presenter	Registered
STODDART, J.FRASER	NORTHWESTERN UNIVERSITY	Speaker	Registered
STRASSET, CRISTIAN A.	WESTFAELISCHE WILHELMS-UNIVERSITAET MUENSTER	Poster Presenter	Registered
SUNDARESAN, ARUN KUMAR	COLUMBIA UNIVERSITY	Poster Presenter	Registered
SZARKO, JODI M	NORTHWESTERN UNIVERSITY	Poster Presenter	Registered
THOMAS, MARLON S	UNIVERSITY OF CALIFORNIA, RIVERSIDE	Poster Presenter	Registered
TIMMEL, CHRISTIANE R	UNIVERSITY OF OXFORD	Speaker	Registered
TOMASULO, MASSIMILIANO	PPG INDUSTRIES	Attendee	Registered
TURRO, NICHOLAS J	COLUMBIA UNIVERSITY	Attendee	Registered

VULLEV, VALENTINE I	UNIVERSITY OF CALIFORNIA, RIVERSIDE	Poster Presenter	Registered
WANG, JIMMY	NATIONAL SUN YAT-SEN UNIVERSITY	Poster Presenter	Registered
WANG, XIANGHUI	BOWLING GREEN STATE UNIVERSITY	Poster Presenter	Registered
WASIELEWSKI, MICHAEL R	NORTHWESTERN UNIVERSITY	Chair	Registered
WEISS, EMILY A	NORTHWESTERN UNIVERSITY	Speaker	Registered
WILSON, R. MARSHALL	BOWLING GREEN STATE UNIVERSITY	Poster Presenter	Registered
WURTHNER, FRANK	UNIVERSITY OF WUERZBURG	Speaker	Registered
YANG, WANG-YONG	FLORIDA STATE UNIVERSITY	Poster Presenter	Registered
YANG, JYE-SHANE	NATIONAL TAIWAN UNIVERSITY	Poster Presenter	Registered
YARON, DAVID J	CARNEGIE MELLON UNIVERSITY	Poster Presenter	Registered
ZAMADAR, MATIBUR R	THE CITY UNIVERSITY OF NEW YORK	Poster Presenter	Registered
ZIMMERMAN, HOWARD E	UNIVERSITY OF WISCONSIN	Poster Presenter	Registered