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**GORDON RESEARCH CONFERENCES** *frontiers of science*  
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**Nancy Ryan Gray, Ph.D.**  
Director

**2010 GORDON RESEARCH CONFERENCE  
on TETRAPYRROLES, CHEMISTRY & BIOLOGY OF**

**FINAL PROGRESS REPORT**

DEPARTMENT OF ENERGY  
GRANT NO. DE-SC0004678

The Gordon Research Conference on **TETRAPYRROLES, CHEMISTRY & BIOLOGY OF** was held at Salve Regina University, Newport, Rhode Island, July 25-30, 2010. The Conference was well-attended with 114 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 114 attendees, 58 voluntarily responded to a general inquiry regarding ethnicity which appears on our registration forms. Of the 58 respondents, 28% were Minorities – 17% Hispanic & 21% Asian. Approximately 33% of the participants at the 2010 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In designing the formal speakers program, emphasis was placed on current unpublished research and discussion of the future target areas in this field.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 As you know, in the interest of promoting the presentation of unpublished and frontier-breaking research, Gordon Research Conferences does not permit publication of meeting proceedings.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,  
Angela Wilks, Conference Chairperson  
UNIVERSITY OF MARYLAND

## TETRAPYRROLES, CHEMISTRY & BIOLOGY OF

July 25-30, 2010

Salve Regina University

Newport, RI

Chair:

**Angela Wilks**

Vice Chair:

**Harry A. Dailey**

The objective of the Chemistry & Biology of Tetrapyrroles Gordon Conference is to bring together researchers from diverse disciplines that otherwise would not interact. By bringing biologists, chemists, engineers and clinicians with a common interest in tetrapyrroles the conference provides a forum for cross-disciplinary ideas and collaboration. The perspective provided by biologists, chemists, and clinicians working in fields such as newly discovered defects in human porphyrin metabolism, the myriad of strategies for light harvesting in photosynthetic organisms, novel tetrapyrroles that serve as auxiliary chromophores or enzyme cofactors, synthetic strategies in the design of novel tetrapyrrole scaffolds, and tetrapyrrole based cell signaling and regulatory systems, makes this conference unique in the field. Over the years the growing evidence for the role of tetrapyrroles and their reactive intermediates in cell signaling and regulation has been of increasing importance at this conference. The 2010 conference on Chemistry & Biology of Tetrapyrroles will focus on many of these new frontiers as outlined in the preliminary program listed below.

Speakers will emphasize unpublished results and new findings in the field. The oral sessions will be followed by the highly interactive afternoon poster sessions. The poster sessions provide all conferees with the opportunity to present their latest research and to exchange ideas in a more informal setting. As in the past, this opportunity will continue during the nightly social gathering that takes place in the poster hall following the evening lectures. All conferees are encouraged to submit and present posters. At the conference the best poster in the areas of biology, chemistry and medicine will be selected by a panel of previous conference chairs.

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### 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	<b>HEME DEGRADATION: OXIDATIVE STRESS AND CELLULAR FUNCTION</b> Discussion Leader: <b>Paul R. Ortiz de Montellano</b> (University of California at San Francisco, USA) <b>Stephen W. Ragsdale</b> (University of Michigan, USA) "Thiol-disulfide redox switches that regulate heme-binding to proteins" Discussion <b>Mahin D. Maines</b> (University of Rochester, USA) "Human biliverdin reductase; a bridge at the crossroads of multiple signal transduction pathways"
9:15 pm - 9:30 pm	Discussion

**MONDAY**

7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	<b>HEME BIOSYNTHESIS: GENES, PROTEINS AND DISEASE</b> Discussion Leader: <b>Jean Charles Deybach</b> (University of Paris, FRANCE) <b>Barry H. Paw</b> (Harvard Medical School, USA) "Mitoferin solute carriers and their role in vertebrate heme synthesis in the mitochondria" Discussion 10:00 am Coffee Break / Group Photo (10:15 am) 10:30 am - 11:10 am <b>Sharon D. Whatley</b> (University of Cardiff, UK) "Molecular basis of human protoporphyrin" 11:10 am - 11:30 am Discussion 11:30 am - 12:10 pm <b>John D. Phillips</b> (University of Utah, USA) "Efficient decarboxylation: What works and why" 12:10 pm - 12:30 pm Discussion 12:30 pm Lunch
9:40 am - 10:00 am	Discussion
10:00 am	Coffee Break / Group Photo (10:15 am)
10:30 am - 11:10 am	<b>Sharon D. Whatley</b> (University of Cardiff, UK) "Molecular basis of human protoporphyrin"
11:10 am - 11:30 am	Discussion
11:30 am - 12:10 pm	<b>John D. Phillips</b> (University of Utah, USA) "Efficient decarboxylation: What works and why"
12:10 pm - 12:30 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	<b>LIGHT HARVESTING PIGMENTS: STRUCTURE, FUNCTION AND REGULATION</b>
	Discussion Leader: <b>Alison Smith</b> (University of Cambridge, UK)
7:30 pm - 8:10 pm	<b>Jesse Woodson</b> (Salk Institute, USA) "Tetrapyrroles and chloroplast to nucleus communication in <i>Arabidopsis</i> "
8:10 pm - 8:30 pm	Discussion
8:30 pm - 9:10 pm	<b>Matthew J. Terry</b> (University of Southampton, UK) "Regulation of chlorophyll synthesis by light and plastid signals"
9:10 pm - 9:30 pm	Discussion
<b>TUESDAY</b>	
7:30 am - 8:30 am	Breakfast
9:00 am - 12:30 pm	<b>TETRACYRROLE ENZYMES: CATALYSIS AND REACTIVITY</b>
	Discussion Leader: <b>Gloria Ferreira</b> (University of Southern Florida, USA)
9:00 am - 9:40 am	<b>Jennifer L. DuBois</b> (University of Notre Dame, USA) "Making Dioxygen using Heme : O-O Bond Formation by Chlorite Dismutase"
9:40 am - 10:00 am	Discussion
10:00 am	Coffee Break
10:30 am - 11:10 am	<b>Martin J. Warren</b> (University of Kent, UK) "Putting tetrapyrroles in their place - the assembly of an organelle specifically for cobalamin dependent enzymes"
11:10 am - 11:30 am	Discussion
11:30 am - 12:10 pm	<b>C.S. Raman</b> (University of Maryland, Baltimore, USA) "How do novel functions evolve from existing heme protein scaffolds?"
12:10 pm - 12:30 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	<b>TETRACYRROLES: NEW METHODOLOGIES IN CATALYSIS AND CHEMISTRY</b>
	Discussion Leader: <b>Kevin Smith</b> (Louisiana State University, USA)
7:30 pm - 8:10 pm	<b>Silviu Balaban</b> (Karlsruhe Institute of Technology, Germany)

	"Biomimetic Light-harvesting"
8:10 pm - 8:30 pm	Discussion
8:30 pm - 9:10 pm	<b>R. David Britt</b> (University of California at Davis, USA) "Multifrequency EPR studies of biliverdin-derived radical intermediates in the bilin reductase enzyme pcyA"
9:10 pm - 9:30 pm	Discussion

## WEDNESDAY

7:30 am - 8:30 am	Breakfast
<b>HEME TRANSPORTERS, SENSORS AND REGULATORS</b>	
	Discussion Leader: <b>Bill Lanzilotta</b> (University of Georgia, USA)
9:00 am - 9:40 am	<b>Carla V. Finkielstein</b> (Virginia Polytechnic Institute, USA) "Cross-talk mechanisms link circadian pathways to metabolic conditions"
9:40 am - 10:00 am	Discussion
10:00 am	Coffee Break
10:30 am - 11:10 am	<b>Stuart J. Ferguson</b> (University of Oxford, UK) "Complexity and Diversity in making the thioether bonds to heme in c-type cytochromes"
11:10 am - 11:30 am	Discussion
11:30 am - 12:10 pm	<b>Mark R. O'Brian</b> (SUNY at Buffalo) "Heme-mediated control of metal homeostasis"
12:10 pm - 12:30 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
<b>TETRACYANOBORROLES AS IMAGING AND THERAPEUTIC MOLECULES</b>	
	Discussion Leader: <b>Graça H. Vicente</b> (Louisiana State University, USA)
7:30 pm - 8:10 pm	<b>Zeev Gross</b> (Technion-Israel Institute of Chemistry, Israel) "Metalocorroles for cellular and whole animal imaging and as therapeutic molecules"
8:10 pm - 8:30 pm	Discussion
8:30 pm - 9:10 pm	<b>Gang Zheng</b> (University of Toronto, Canada) "New roles for porphyrins in molecular imaging and therapy"
9:10 pm - 9:30 pm	Discussion

## THURSDAY

7:30 am - 8:30 am	Breakfast
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9:00 am - 12:30 pm	<b>HEME IN INFECTIOUS DISEASE</b>
	Discussion Leader: <b>Eric Skaar</b> (Vanderbilt University, USA)
9:00 am - 9:40 am	<b>Cecile Wandersman</b> (Institute Pasteur, France) "Iron extraction from heme: hammer or forceps"
9:40 am - 10:00 am	Discussion
10:00 am	Coffee Break
10:30 am - 11:10 am	<b>Bernard Meunier</b> (Palumed, FRANCE) "Heme as trigger and target for trioxane-containing antimalarial drugs"
11:10 am - 11:30 am	Discussion
11:30 am - 12:10 pm	<b>Amanda G. Oglesby</b> (University of Colorado at Denver, USA) "Heme regulation in <i>Pseudomonas aeruginosa</i> "
12:10 pm - 12:30 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	<b><u>Business Meeting</u></b> (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 - 9:15 pm	<b>KEYNOTE ADDRESS</b>
	Discussion Leader: <b>Nicole Frankenburg-Dinkel</b> (Ruhr-University, Bochum, Germany)
8:00 pm - 8:50 pm	<b>J. Clark Lagarias</b> (University of California at Davis, USA) "Lord of the broken rings: From near UV to near IR and back again"
8:50 pm - 9:15 pm	Discussion
<b>FRIDAY</b>	
7:30 am - 8:30 am	Breakfast
9:00 am	Depart

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Funding for this conference was made possible (in part) by 1 R13 DK88398-01 from NIDDK. The views expressed in written conference materials or publications and by speakers and moderators do not necessarily reflect the official policies of the Department of Health and Human Services; nor does mention by trade names, commercial practices, or organizations imply endorsement by the U.S. Government.

## Tetrapyrroles, Chemistry & Biology of (2010)

Name	Organization	Participation	Status
ACHARYA, POULOMI	UNIVERSITY OF CALIFORNIA SAN FRANCISCO	Poster Presenter	Registered
AL-KARADAGHI, SALAM	LUND UNIVERSITY	Attendee	Registered
ANDERSON, KARL E	UNIVERSITY OF TEXAS MEDICAL BRANCH	Poster Presenter	Registered
BAGAI, IREENA	UNIVERSITY OF MICHIGAN	Poster Presenter	Registered
BALABAN, TEODOR SILVIU	KARLSRUHE INSTITUTE OF TECHNOLOGY	Speaker	Registered
BALI, SHILPA	UNIVERSITY OF OXFORD	Poster Presenter	Registered
BARKER, KYLIE D	UNIVERSITY OF MARYLAND, BALTIMORE	Poster Presenter	Registered
BARKOVITS, KATALIN	UNIVERSITY OF MARYLAND , BALTIMORE	Poster Presenter	Registered
BEALE, SAMUEL I	BROWN UNIVERSITY	Attendee	Registered
BISHOP, DAVID F	MOUNT SINAI SCHOOL OF MEDICINE	Attendee	Registered
BISSELL, MONTGOMERY D	UNIVERSITY OF CALIFORNIA	Attendee	Registered
BLOOMER, JOSEPH R	UNIVERSITY OF ALABAMA AT BIRMINGHAM	Poster Presenter	Registered
BOHLE, SCOTT	MCGILL UNIVERSITY	Poster Presenter	Registered
BOLLIVAR, DAVID W	ILLINOIS WESLEYAN UNIVERSITY	Attendee	Registered
BONKOVSKY, HERBERT L	CAROLINAS MEDICAL CENTER/UNC	Poster Presenter	Registered
BOYNTON, TYE O	UNIVERSITY OF GEORGIA	Poster Presenter	Registered
BRITT, R. DAVID	UNIVERSITY OF CALIFORNIA	Speaker	Registered
BURCH, JOSEPH S	UNIVERSITY OF GEORGIA, ATHENS	Poster Presenter	Registered
BURSTYN, JUDITH N	UNIVERSITY OF WISCONSIN-MADISON	Poster Presenter	Registered
BUSCH, ANDREA W.U.	RUHR-UNIVERSITY BOCHUM	Poster Presenter	Registered
CABALLES, FREDERICK RYAN MICHAEL L	CAROLINAS MEDICAL CENTER	Attendee	Registered
CHAKRAVARTI, RITU	CLEVELAND CLINIC FOUNDATION	Poster Presenter	Registered
CHEN, WEN	HARVARD MEDICAL SCHOOL	Poster Presenter	Registered
CLAVERO, SONIA	MOUNT SINAI SCHOOL OF MEDICINE	Poster Presenter	Registered
CORREIA, MARIA ALMIRA	UCSF	Attendee	Registered
CRICCO, JULIA A	IBR, CONICET-UNIVERSITY OF ROSARIO	Poster Presenter	Registered
DAILEY, HARRY A	UNIVERSITY OF GEORGIA	Vice Chair	Registered
DAILEY, TAMARA A	UNIVERSITY OF GEORGIA	Poster Presenter	Registered
DE ROOIJ, FELIX W.M.	ERASMUS UNIVERSITY MEDICAL CENTER	Attendee	Registered
DESNICK, ROBERT J	MOUNT SINAI SCHOOL OF MEDICINE	Poster Presenter	Registered
DEYBACH, JEAN-CHARLES P	FRENCH PORPHYRIA CENTER - INSERM U773	Discussion Leader	Registered
DOCKTER, CHRISTOPH	CARLSBERG LABORATORY	Poster Presenter	Registered
DUANMU, DEQIANG	UNIVERSITY OF CALIFORNIA DAVIS	Poster Presenter	Registered
DUBOIS, JENNIFER L	UNIVERSITY OF NOTRE DAME	Speaker	Registered
DWYER, BARNEY E	VA MEDICAL CENTER	Poster Presenter	Registered
FERGUSON, STUART J	UNIVERSITY OF OXFORD	Speaker	Registered
FERREIRA, GLORIA C	UNIVERSITY OF SOUTH FLORIDA	Discussion Leader	Registered
FINKIELSTEIN, CARLA V	VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIV.	Speaker	Registered
FRANKENBERG, NICOLE	RUHR-UNIVERSITY BOCHUM	Discussion Leader	Registered
GHOSH, ARNAB	LERNER RESEARCH INSTITUTE, CLEVELAND CLINIC	Poster Presenter	Registered
GISK, BJOERN	RUHR-UNIVERSITY BOCHUM	Poster Presenter	Registered
GOULDING, CELIA W	UC IRVINE	Poster Presenter	Registered
GROSS, ZEEV	TECHNION	Speaker	Registered

HAMZA, IQBAL	UNIVERSITY OF MARYLAND	Poster Presenter	Registered
HANSSON, MATS	CARLSBERG LABORATORY	Poster Presenter	Registered
HEGG, ERIC L	MICHIGAN STATE UNIVERSITY	Poster Presenter	Registered
HOFMANN, ECKHARD	RUHR-UNIVERSITY BOCHUM	Poster Presenter	Registered
HORTENSTEINER, STFAN	UNIVERSITY OF ZURICH	Poster Presenter	Registered
ISHIMORI, KOICHIRO	HOKKAIDO UNIVERSITY	Poster Presenter	Registered
JAFFE, EILEEN K	FOX CHASE CANCER CENTER	Poster Presenter	Registered
KRUEGER, ROBIN A	DEPARTMENT OF CHEMISTRY, UNIVERSITY OF CALGARY	Poster Presenter	Registered
KUSHNER, JAMES P	UNIVERSITY OF UTAH SCHOOL OF MEDICINE	Attendee	Registered
LADAKIS, DIMITRIOS	UNIVERSITY OF KENT	Poster Presenter	Registered
LAGARIAS, J. CLARK	UNIVERSITY OF CALIFORNIA	Speaker	Registered
LANZILOTTA, WILLIAM N	UNIVERSITY OF GEORGIA	Discussion Leader	Registered
LAYER, GUNHILD	TECHNISCHE UNIVERSITÄT BRAUNSCHWEIG	Attendee	Registered
LI, TING	CAROLINAS HEALTHCARE SYSTEM	Attendee	Registered
LOBO, SUSANA S.	UNL, INSTITUTO DE TECNOLOGIA QUIMICA E BIOLOGICA	Poster Presenter	Registered
LOURENCO, CHARLES M	UNIVERSITY OF SAO PAULO	Attendee	Registered
LOUVEL, HELENE	UNIVERSITY OF CHICAGO	Poster Presenter	Registered
MAINES, MAHIN D	UNIVERSITY OF ROCHESTER SCHOOL OF MEDICINE	Speaker	Registered
MARTASEK, PAVEL	CHARLES UNIVERSITY PRAGUE, 1ST FACULTY OF MEDICINE	Poster Presenter	Registered
MCDONAGH, ANTONY F	UNIVERSITY OF CALIFORNIA SAN FRANCISCO	Attendee	Registered
MCGUIRE, BRENDAN	UNIVERSITY OF ALABAMA AT BIRMINGHAM	Attendee	Registered
MEDLOCK, AMY E	UNIVERSITY OF GEORGIA	Poster Presenter	Registered
MEISSNER, PETER N	UNIVERSITY OF CAPE TOWN	Poster Presenter	Registered
MEUNIER, BERNARD	PALUMED	Speaker	Registered
MOHAPATRA, PRABHU	FRONTIER SCIENTIFIC, INC.	Attendee	Registered
MOORE, SIMON J	UNIVERSITY OF KENT	Poster Presenter	Registered
MUELLER, ANDRE H	CARLSBERG LABORATORIUM	Poster Presenter	Registered
O'BRIAN, MARK R	SUNY AT BUFFALO	Speaker	Registered
O'NEILL, MAURA J	UNIVERSITY OF MARYLAND BALTIMORE	Poster Presenter	Registered
OGLESBY-SHERROUSE, AMANDA G	UNIVERSITY OF COLORADO DENVER	Speaker	Registered
ORTIZ DE MONTELLANO, PAUL	UNIVERSITY OF CALIFORNIA	Discussion Leader	Registered
PARKER, CHARLES	UNIVERSITY OF UTAH SCHOOL OF MEDICINE	Attendee	Registered
PAW, BARRY	HARVARD MEDICAL SCHOOL	Speaker	Registered
PAZICNI, SAMUEL	UNIVERSITY OF NEW HAMPSHIRE	Attendee	Registered
PERINI, GUILHERME F	ALBERT EINSTEIN HOSPITAL	Attendee	Registered
PHILLIPS, JOHN D	U. OF UTAH SCHOOL OF MEDICINE	Speaker	Registered
RAGSDALE, STEPHEN W	UNIVERSITY OF MICHIGAN MEDICAL SCHOOL	Speaker	Registered
RAMAN, C. S.	UNIVERSITY OF MARYLAND	Speaker	Registered
RAVEN, EMMA	UNIVERSITY OF LEICESTER	Poster Presenter	Registered
RIMPELOVA, SILVIE	INSTITUTE OF CHEMICAL TECHNOLOGY, PRAGUE	Poster Presenter	Registered
ROXIN, ARON	UNIVERSITY OF TORONTO	Attendee	Registered
SANCOVICH, HORACIO A	BUENOS AIRES UNIVERSITY - CONICET	Poster Presenter	Registered
SCHOEFBERGER, WOLFGANG	JOHANNES KEPLER UNIVERSITY LINZ	Poster Presenter	Registered
SCOTT, ALAN F	UNIVERSITY OF KENT	Poster Presenter	Registered
SENGE, MATHIAS O	TRINITY COLLEGE DUBLIN	Attendee	Registered

SHEN, GAOZHONG	PENNSYLVANIA STATE UNIVERSITY	Poster Presenter	Registered
SINGAL, ASHWANI K	UNIVERSITY OF TEXAS MEDICAL BRANCH	Poster Presenter	Registered
SKAAR, ERIC P	VANDERBILT UNIVERSITY MEDICAL CENTER	Discussion Leader	Registered
SKOPOVA, JAROSLAVA	CHARLES UNIVERSITY PRAGUE	Poster Presenter	Registered
SMITH, KEVIN M	LOUISIANA STATE UNIVERSITY	Discussion Leader	Registered
SMITH, ALISON G	UNIVERSITY OF CAMBRIDGE	Discussion Leader	Registered
SMITH, AARON T	UNIVERSITY OF WISCONSIN--MADISON	Poster Presenter	Registered
SMITH, AARON D	UNIVERSITY OF MARYLAND, BALTIMORE	Poster Presenter	Registered
STEVENS, JULIE M	OXFORD UNIVERSITY	Poster Presenter	Registered
STORBECK, SONJA	TECHNISCHE UNIVERSITAET BRAUNSCHWEIG	Poster Presenter	Registered
TAYLOR, SAMANTHA L	UNIVERSITY OF KENT	Poster Presenter	Registered
TERRY, MATTHEW J	UNIVERSITY OF SOUTHAMPTON	Speaker	Registered
VICENTE, GRACA	LOUISIANA STATE UNIVERSITY	Discussion Leader	Registered
WANDERSMAN, CECILE	INSTITUT PASTEUR	Speaker	Registered
WANG, BRUCE M	UNIVERSITY OF CALIFORNIA, SAN FRANCISCO	Attendee	Registered
WARREN, MARTIN J	UNIVERSITY OF KENT	Speaker	Registered
WHATLEY, SHARON D	UNIVERSITY HOSPITAL OF WALES	Speaker	Registered
WIETHAUS, JESSICA	RUHR-UNIVERSITAT-BOCHUM	Poster Presenter	Registered
WILKS, ANGELA	UNIVERSITY OF MARYLAND	Chair	Registered
WOODSON, JESSE	SALK INSTITUTE	Speaker	Registered
WRIGHT, DAVID W	VANDERBILT UNIVERSITY	Poster Presenter	Registered
YASUDA, MAKIKO	MOUNT SINAI SCHOOL OF MEDICINE	Poster Presenter	Registered
YI, LI	UNIVERSITY OF MICHIGAN	Poster Presenter	Registered
YIN, LIANG	INDIANA UNIVERSITY AT BLOOMINGTON	Poster Presenter	Registered
ZAPPA, SEBASTIEN D	INDIANA UNIVERSITY - BIOLOGY DEPT - BAUER LAB	Poster Presenter	Registered
ZHENG, GANG	UNIVERSITY OF TORONTO	Speaker	Registered

**114 Attendees**