

WELCOME

On behalf of the four organizing committees of the 2008 ASME Summer Conferences, we welcome you to beautiful Jacksonville, Florida. We are glad you have decided to participate in this international conference which co-locates the traditional Summer Heat Transfer Conference (SHTC), the Fluids Engineering Division Summer Meeting (FEDSM), the Energy Sustainability Conference (ESC), and the Energy Nanotechnology International Conference (ENIC). These co-located conferences are hosted by four ASME divisions and one ASME institute to make it an unprecedented event. This is a unique opportunity to expand international cooperation, understanding, and promotion of efforts and disciplines in a variety of areas, creating in one location the ability to attend a broad spectrum of technical sessions for one registration fee. Registration for one conference allows attendance at all “four” conferences. The registration fee includes proceedings in CD form for all conferences and all food functions, including continental breakfasts, lunches, a dinner banquet, and refreshments during breaks.

We have constructed these conferences in such a way so as to provide you with as much information as possible in three and one-half days. We have invited a number of outstanding individuals to present us with plenary addresses keynoting various important topics in heat transfer, fluids engineering, energy sustainability, and energy nanotechnology. On Sunday, we are also offering a set of workshops including one jointly sponsored and organized by Mississippi State University, the University of Florida, North Carolina State University, and the Southeast CHP Applications Center under the umbrella of the ASME on the role of combined cooling, heating and power in Florida’s energy future. On Monday evening, the winner of the 2007 Max Jacob Memorial Award will be recognized. On Tuesday afternoon, the Energy Nanotechnology Conference will hold a series of panels concerned with commercialization of nanotechnologies for energy applications. The newly selected Freeman Scholar, Professor William K. George, will present the Freeman Scholar Lecture on Wednesday. The Conference will host sessions for students in the form of Tutorials/Workshops and also provide an opportunity for students from several teams to present details concerning the technologies involved in their design of the Solar Boat for the ASME/IEEE Solar Splash Intercollegiate World Championship Competition for Solar/Electric Boating (see www.solarsplash.com). In addition, on Tuesday evening we will have the conference dinner banquet where we recognize the conference organizers and best papers for each conference.

Putting together such an outstanding technical program was made possible in part because of the hard work of ASME staff and many volunteers. We especially thank Stacey Cooper, Angeline Mendez, Gloribeth Carrero, Annette Robinson, and Nhora Cortes-Comerer for their dedication and timely response to the many inquiries from authors and organizers and for putting the technical program together and preparing the conference proceedings. Our gratitude also goes out to the plenary speakers (Dr. Kathryn McCarthy, Professor Jacob N. Chung, Professor William K. George, Dr. Stuart Jessup, Dr. J. Michael Davis, Dr. Trung Van Nguyen, Dr. Arthur J. Nozik, and Professor Mildred Dresselhaus) for the time and commitment they have given in generously sharing their knowledge with the attendees. Our thanks also go to the technical program committee consisting of technical track chairs, topic chairs, session organizers, panel moderators, panelists, workshop instructors, and all the technical reviewers whose contributions ensure maintaining the high quality of the papers presented at ASME conferences. Of course, we thank the authors for without whose contributions this event would not have been possible. Last and certainly not the least, our sincere thanks go to Kelly Sutton, University of Arizona, who as the dedicated Administrative Conference Chair coordinated all the activities related to conference administration and logistics and prepared the printed conference program.

We encourage you to enjoy the wide variety of technical venues these conferences have to offer in the fantastically beautiful surroundings of Jacksonville.

Chang Oh, Heat Transfer Conference General Chair

Jim A. Liburdy, Fluids Engineering Conference General Chair

Sriram Somasundaram and Jeffrey Morehouse, Energy Sustainability Conference Co-General Chairs

Andrei Fedorov and Gang Chen, 3rd Energy Nanotechnology International Conference Co-General Chairs

S.A. Sherif, Heat Transfer Conference Technical Program Chair

Joel T. Park, Fluids Engineering Conference Technical Program Chair

B.G. Shiva Prasad and Jorge Gonzalez, Energy Sustainability Co-Technical Program Chairs

Li Shi, 3rd Energy Nanotechnology International Conference Technical Program Chair

CONFERENCE ORGANIZERS

Heat Transfer

General Chair

Dr. Chang Oh, Idaho National Laboratory

Technical Program Chair

Professor S.A. Sherif, University of Florida

Energy Sustainability

Advanced Energy Systems Division (Tracks 1-20) Technical Program Chair

Dr. B. G. Shiva Prasad, Emerson Climate Technologies

General Program Chair

Sriram Somasundaram, Pacific Northwest National Laboratory

Solar Energy Division (Tracks 21-31) Technical Program Chair

Dr. Jorge E. Gonzalez, Santa Clara University

General Program Chair

Dr. Jeffrey H. Morehouse, University of South Carolina

Fluids Engineering

General Chair

Jim Liburdy, Oregon State University

Technical Program Chair

Joel T. Park, Naval Surface Warfare Center

Energy Nano

Conference Chair

Andrei Fedorov, Georgia Institute of Technology

Conference Co-Chairs

Gang Chen, Massachusetts Institute of Technology

Timothy Fisher, Purdue University

Arun Majumdar, University of California at Berkeley

Program Chair

Li Shi, University of Texas at Austin

PLENARY SPEAKERS

Monday, 8:00-9:00 am

The Role of Nuclear Energy in Our Future

Dr. Kathryn A. McCarthy

Energy is the key to prosperity, and the world demand for energy will continue to grow. This growth will be particularly significant in developing countries. Nuclear energy will be an important part of that energy growth, as it provides clean, safe, affordable energy. There are many signs that nuclear energy is expanding. The US Nuclear Regulatory Commission has developed new licensing procedures for nuclear reactors, and many applications are in process. The Generation IV program is developing the next generation of reactors. The Global Nuclear Energy Partnership (GNEP), a global approach to the expansion of nuclear energy, seeks to enable the expansion of nuclear energy worldwide in a safe, secure, and sustainable manner. The GNEP concept includes assured fuel supply and take-back for countries that agree to forgo fuel full cycle capabilities. Implementation of GNEP includes closure of the nuclear fuel cycle, where used fuel from reactors is recycled, enabling the utilization of the energy still available in the used fuel, and reducing the amount of material that must be disposed of for long periods of time.

Biography: Dr. McCarthy currently serves as the Director for the Systems Analysis Campaign for the Department of Energy Global Nuclear Energy Partnership (GNEP), and is Deputy Associate Laboratory Director for Nuclear Science & Technology at the Idaho National Laboratory. She is an Affiliate Faculty member with Idaho State University. She received her B.S. in Nuclear Engineering, at the University of Arizona in 1983; M.S., 1986 and Ph.D., 1989, in Nuclear Engineering at the University of California, Los Angeles. Dr. McCarthy was a Guest Scientist at the Kernforschungszentrum (Nuclear Research Center) in Karlsruhe, Germany, March-September 1989, and spent a year in the Soviet Union with the Department of Energy US/USSR Young Scientist Program, at the Efremov and Kurchatov Institutes in Russia, and the Latvian Academy of Science in Latvia September 1989-August 1990. She is a member of the American Nuclear Society, beginning as a student in 1979, and has served on the ANS Board of Directors 2002-2008 (two terms), is the former Vice Chair of Professional Women in ANS, the ANS Planning Committee, Fusion Energy Division Chair (2000-2001), Vice-Chair (1999-2000) and Executive Committee (1996-1999), American Nuclear Society Idaho Section Chair (2001-2002) and Vice-Chair (2000-2001), and the University of Arizona Student Chapter ANS President (1982-83). Her awards include an American Nuclear Society Presidential Citation in 2007, the 2000 ANS Women's Achievement Award, 1996 International Thermonuclear Experimental Reactor U.S. Home Team Leadership Award, the 1994 David Rose Award for Excellence in Fusion Engineering.

Monday, 1:00-2:00 pm

Thirty Years of Naval Propulsor Hydrodynamic Research at the Naval Surface Warfare Center, Carderock Division

Dr. Stuart Jessup

Dr. Jessup will speak on the numerous activities of the Navy's propulsor design and research community since 1976. This will include Naval fleet class propeller designs, and numerous research efforts to improve Naval propeller performance. Research areas will include propeller blade surface pressure measurements for the validation of potential based prediction codes, measurement of blade flows using LDV to support RANS code development, and crashback studies to advance the use of LES, using PIV and unsteady load measurement techniques.

BIO: Dr. Jessup received his B.S. and M.S. from MIT in Ocean Engineering in 1974 and 1976, and his Ph.D. at Catholic university of America in 1989. Dr. Jessup has been a member of the International Towing Tank Conference, received the David W. Taylor award in 1996, the Navy Meritorious Civilian Service award in 2000, and became a member of the National Academy of Engineering in 2007. Dr. Jessup is currently the Senior Scientist for Hydrodynamics at the Naval Surface Warfare Center

And

Multiple Exciton Generation in Semiconductor Quantum Dots and Novel Molecules: Applications to Third Generation Solar Photon Conversion

Arthur Nozik

National Renewable Energy Laboratory & University of Colorado

ABSTRACT: In order to utilize solar power for the production of electricity and fuel on a massive scale, it will be necessary to develop solar photon conversion systems that have an appropriate combination of high efficiency

(delivered watts/m²) and low capital cost (\$/m²). One potential, long-term approach to high efficiency is to utilize the unique properties of quantum dot nanostructures to control the relaxation dynamics of photogenerated carriers to produce either enhanced photocurrent through efficient photogenerated electron-hole pair multiplication or enhanced photopotential through hot electron transport and transfer processes. To achieve these desirable effects it is necessary to understand and control the dynamics of hot electron and hole relaxation, cooling, charge transport, and interfacial charge transfer of the photogenerated carriers with femtosecond (fs) to ns time resolution. At NREL, we have been studying these fundamental dynamics in various bulk and nanoscale semiconductors (quantum dots (QDs), quantum rods/wires, and quantum wells) for many years using fs transient absorption, photoluminescence, and THz spectroscopy. Recently, we predicted that the generation of more than one electron-hole pair (which exist as excitons in QDs) per absorbed photon would be an efficient process in QDs. This prediction has been confirmed over the past several years in several classes of QDs. We have observed very efficient and ultrafast multiple exciton generation (MEG) from absorbed single high energy photons in Group IV-VI and recently in Si QDs. Efficient MEG has the potential to greatly enhance the conversion efficiency of solar cells that incorporate QDs for both solar electricity and solar fuel (i.e. H₂) production. Selected aspects of this work will be summarized and recent advances will be discussed; a unique quantum mechanical model to explain efficient and ultrafast MEG based on the coherent superposition of multiple excitonic states (in collaboration with Al. L. Efros and A. Shabaev at NRL) will also be discussed. Various possible configurations for quantum dot solar cells that could produce ultrahigh conversion efficiencies for the production of electricity and solar fuels (e.g. H₂ from H₂O) will be presented, along with progress in developing such new types of solar cells. Finally, we have also predicted an analogous MEG effect in molecules (called singlet fission) that could be used in molecular chromophore-sensitized nanocrystalline TiO₂ solar cells and new preliminary evidence for this effect will also be presented.

BIOGRAPHY: Dr. Arthur J. Nozik is a Senior Research Fellow at the U.S. DOE National Renewable Energy Laboratory (NREL) and Professor Adjoint in the Department of Chemistry and Biochemistry at the University of Colorado, Boulder. In 2007 he was appointed the Scientific Director of the new Center for Revolutionary Solar Photoconversion under the Colorado Renewable Energy Collaboratory. Nozik received his BChE from Cornell University in 1959 and his PhD in Physical Chemistry from Yale University in 1967. Before joining NREL in 1978, then known as the Solar Energy Research Institute (SERI), he conducted research at the Materials Research Center of the Allied Chemical Corporation (now Honeywell, Inc). Dr. Nozik's research interests include size quantization effects in semiconductor quantum dots and quantum wells, including multiple exciton generation from a single photon; the applications of unique effects in nanostructures to advanced approaches for solar photon conversion; photogenerated carrier relaxation dynamics in various semiconductor structures; photoelectrochemistry of semiconductor-molecule interfaces; photoelectrochemical energy conversion; photocatalysis; optical, magnetic and electrical properties of solids; and Mössbauer spectroscopy. He has published over 200 papers and book chapters in these fields, written or edited 5 books, holds 11 U.S. patents, and has delivered over 240 invited talks at universities, conferences, and symposia. He has served on numerous scientific review and advisory panels, chaired and organized many international and national conferences, workshops, and symposia, and received several awards in solar energy research, including the 2008 Eni Award and the 2002 Research Award of the Electrochemical Society. Dr. Nozik has been a Senior Editor of The Journal of Physical Chemistry from 1993 to 2005. A Special Festschrift Issue of The Journal of Physical Chemistry honoring Dr. Nozik's scientific career appeared in the December 21, 2006 issue. Dr. Nozik is a Fellow of the American Physical Society and a Fellow of the American Association for the Advancement of Science; he is also a member of the American Chemical Society, the Electrochemical Society, and the Materials Research Society.

Monday 6:00-7:30 Max Jacob Memorial Award

"Micro- To Micro-scale Heat Transfer from Metal-Graphite Composite Surfaces"

Wen-Jei Yang, Nengli Zhang and Dan L. Vrable

Tuesday, 8:00-9:00 am

**The Carbon Journey – The Nation's Need to Reduce Emissions and Increase Energy Security
J. Michael Davis, Pacific Northwest National Laboratory**

Description: Nationally and globally, two important trends are accelerating in the wrong direction and threaten our environmental sustainability and energy security—carbon dioxide emissions are continuing to go up, while the ability to meet growing energy needs with our own resources is continuing to go down. We must start now to reduce greenhouse gas emissions and ultimately stabilize atmospheric concentrations of CO₂. At the same time, any solution we consider must also address the need for energy independence and security. This talk will explore potential actions that can be taken on both the supply side and demand side of the energy equation to address the challenges of the carbon journey—including carbon capture and sequestration, energy conversion technologies

including coal gasification and biofuels, energy efficiency, integrating renewable energy onto the grid, the electrification of transportation and demand management. It will also include a discussion of how policy, technology and capital can work hand in hand to make significant progress possible

Biography: Mike Davis is the Associate Laboratory Director for the Energy and Environment Directorate at Pacific Northwest National Laboratory. In this role, Mike is responsible for ensuring that PNNL delivers outstanding science and technology solutions to the most important energy and environment issues facing the nation and the Department of Energy. At the highest levels, the Energy and Environment Directorate and its roughly 1,000 staff members are responsible for contributing the research, development and deployment to increase the nation's energy capacity, reduce dependence on imported oil and reduce the environmental effects of legacy waste and energy use. The directorate conducts about \$200 million of business annually for government and industrial clients.

Prior to his career at Avista, Mike was president and CEO of Kyocera Solar, a leading global producer and supplier of solar electric components and systems, and of Kyocera's predecessor, Golden Genesis Company. During his tenure, Mike established Golden Genesis Company as the largest publicly traded distributor, integrator and marketer of solar electric systems and products for distributed power applications in the Western hemisphere. Mike was appointed in 1989 by President Bush as the U.S. Department of Energy's Assistant Secretary for Conservation and Renewable Energy. During his four-year term, he launched programs such as the U.S. Advanced Battery Consortium, the Renewable Energy Production Incentive and the Photovoltaic Manufacturing Initiative. He expanded the funding available for Conservation and Renewable Energy research programs from \$350 to \$850 million per year over three years. In October 1991, Mike received the Secretary's Gold Medal Award, recognizing him for charting "a new course of industry-driven, market-oriented research and development for the federal government."

Tuesday, 1:00-2:00 pm

**Energy for Sustainability
Trung Van Nguyen, National Science Foundation**

The Energy for Sustainability Program is one of seventeen programs in the Division of Chemical, Biotechnology, Environmental and Transport (CBET) Systems of the Directorate for Engineering (ENG) in the National Science Foundation. This program is one of four programs in the Environmental Engineering and Sustainability Cluster. It is the newest program in the CBET Division, created in 2006, with the mission of funding long-term, basic and fundamental research and education that will have major impacts on the generation, conversion and storage of environmentally friendly and renewable energy. I will share some of my vision in this area and present additional information such as research areas of interest to the program and examples of recent awards.

Biography: Trung Van Nguyen was elected to be the first Director for the Energy for Sustainability program at NSF and started his position in June 2007. Concurrently, he also holds the title of Professor of Chemical & Petroleum Engineering at the University of Kansas. He has a BS from NCSU and MS and PhD from TAMU, all in Chemical Engineering. Prior to joining the faculty at the University of Kansas, he was a Postdoctoral Fellow at Los Alamos National Lab, Senior Product & Process Development Engineer at Duracell, and Member of Technical Staff at Bell Labs. His research is on transport and interfacial phenomena in fuel cells and batteries and mathematical modeling of electrochemical systems.

And

**Energy Research: Opportunities and Challenges
Mildred Dresselhaus
Massachusetts Institute of Technology**

ABSTRACT: An overview of the challenges of providing energy to an increasing global population with greater expectations for residential comforts, industrial development, and transportation mobility is discussed within the constraints of present energy supply and environmental concerns. The topics covered will span solar energy as an energy source, hydrogen as a transfer agent, and thermoelectrics for energy conversion and for cooling. The interconnection between different components of the energy will be considered. Emphasis is given to the role for basic research in addressing these challenges and the opportunities for young people to advance their careers while addressing societal concerns.

BIOGRAPHY: Mildred Dresselhaus is an Institute Professor of Electrical Engineering and Physics at MIT. Her research over the years has covered a wide range of topics in Condensed Matter and Materials Physics. She is best known for her work on carbon science and carbon nanostructures. She is also one of the researchers responsible for the resurgence of the Thermoelectrics research field 15 years ago. She co-chaired a DOE Study on "Basic Research Needs for the Hydrogen Economy in 2003 and more recently co-chaired of a National Academy Decadal Study of

Condensed Matter and Materials Physics. She served as Director of the DOE Office of Science toward the end of the Clinton Administration. Professor Dresselhaus is a member of the National Academy of Sciences, the National Academy of Engineering, and has served as President of the American Physical Society, Treasurer of the National Academy of Sciences, President of the American Association for the Advancement of Science (AAAS), and on numerous advisory committees and councils. Dr. Dresselhaus has received numerous awards, including the US National Medal of Science and 24 honorary doctorates. Her recent awards include the L'Oreal-UNESCO 2007 North American Laureate for Women in Science, and the 2008 recipient of the Oersted Medal for Physics Education from the American Association for Physics Teachers and of the 2008 Buckley Prize for Condensed Matter Physics from the American Physical Society.

Wednesday, 8:00-9:00 am

Molecular Dynamic Simulation of Liquid Argon Film Evaporation and Colloidal Adsorption Characteristics in a Nanochannel
J. N. Chung
University of Florida

A novel and physically correct molecular dynamics simulation model for the solid wall-fluid heat transfer boundary condition has been developed to capture the physics of transient phase transition of a nano-scale liquid argon film on a heated platinum surface. The eventual colloidal adsorption phenomenon on the platinum surface is precisely simulated for the first time as the evaporation is diminishing. The objective of this work is to provide microscopic characterizations of the dynamic thermal energy transport mechanisms during the liquid film evaporation and also the resulting non-evaporable colloidal adsorbed liquid layer at the end of the evaporation process. A nanochannel is constructed of platinum (Pt) wall atoms with argon as the working fluid. The proposed model is validated by heating liquid argon between two Pt walls and comparing the change in internal energy to that calculated from thermodynamic properties of argon. Phase change process is studied by simulating evaporation of a thin liquid argon film on a Pt wall using the proposed model. The gradual evaporation, initiated by rigorous jet convection, exponentially decreases with time. A non-evaporating thin film is eventually resulted and the factors governing its thickness are identified. A new method based on

the current molecular dynamics simulation is developed and used to evaluate the Hamaker constant for the "adsorbed" film and the Hamaker constant compares well with the experimental value.

Biography: Jacob N. Chung is the Andrew H. Hines, Jr./Progress Energy Eminent Scholar Chair Professor in the Department of Mechanical and Aerospace Engineering at the University of Florida. He is also the Director of micro-Scale and Microgravity Fluid Mechanics and Heat Transfer Lab at the University of Florida. He is a fellow of the American Society of Mechanical Engineers (ASME). From 2002-2005, he served as an associated editor for the ASME Journal of Heat Transfer in the areas of phase-change heat transfer and multiphase flows. He is a member of the ASME Heat Transfer Division K-11 and K-19 committees. Dr. Chung's research activities for the past thirty years have been in the general areas of fluid mechanics and heat transfer with a special focus on bubble and droplet dynamics and heat transfer, phase change heat transfer, multiphase flows, microgravity boiling, laminar-turbulent transition, turbulence in heated flows, nano- and micro-scale thermal transport phenomena, and cryogenic two-phase heat transfer. He has authored and co-authored a total of 120 archival journal papers in the above research areas. Dr. Chung and two co-authors published a book entitled "Transport Phenomena with Drops and Bubbles".

Wednesday, 1:00-2:00 pm

The 2008 Freeman Scholar Lecture
William K. George, Chalmers University of Technology

Biography: William K. George joined the faculty of the Pennsylvania State University in 1968, holding positions in both Aerospace Engineering and the Applied Research Laboratory. In 1974 he moved to the State University of New York at Buffalo Department of Mechanical and Aerospace Engineering, where he was promoted to full professor in 1980. He joined the Department of Applied Mechanics of the Chalmers University of Technology in Gothenburg, Sweden in September 2000 as *Professor of Turbulence*.

He has authored several hundred papers, mostly on turbulence and its many applications. In addition to his work on both theoretical and experimental turbulence, his contributions range from measurements in gas turbines and automotive components to the development of optical flow diagnostic techniques. One of his most important contributions was as the editor and translator of *Wind Atlas for Denmark*, which became the model for predicting wind generator performance around the world. He has supervised 25 Ph.D. students, all of whom hold responsible positions as professors, researchers, or engineers in leading establishments throughout the world.

HEAT TRANSFER TRACK AND TOPIC CHAIRS

3-2-1 Single Phase Convection I (K-8)

Track Organizer: Ronald D. Boyd, Prairie View A&M University
Topic Organizer: Christopher Kobus, Oakland University; Co-Organizer: Patrick Oosthuizen, Queen's University

13-2-1 Heat and Mass Transfer in the Natural and Built Environment (K-19)

Track Organizer: Michael B. Pate, Texas A&M University

Topic Organizer: R Figliola, Clemson University; Co-Organizers: Fotouh Al-Raqom, University of Florida and Sandra Boetcher, University of North Texas

3-3-3 Single Phase Convection II (K-8)

Track Organizer: Ronald D. Boyd, Prairie View A&M University

Topic Organizer: Christopher Kobus, Oakland University; Co-Organizer: Patrick Oosthuizen, Queen's University

17-1-1 Heat Transfer Education (K-21)

Track Organizer: S.A. Sherif, University of Florida; Co-Organizers: Fotouh Al-Raqom, University of Florida; Ayyoub Mehdizadeh, University of Florida

Topic Organizer: Fotouh Al-Raqom, University of Florida; Co-Organizers: Ayyoub Mehdizadeh, University of Florida; Alain Kassab, University of Central Florida; Eduardo Divo, University of Central Florida

3-2-3 Single Phase Convection III (K-8)

Track Organizer: Ronald D. Boyd, Prairie View A&M University
Topic Organizer: Christopher Kobus, Oakland University; Co-Organizer: Patrick Oosthuizen, Queen's University

16-3-1 Forum on Heat Transfer Visualization I (K-22)

Track Organizer: Kenneth Kihm, University of Tennessee

Topic Organizer: David Pratt, USAF, AFRL/RBS

3-3-1 Heat Transfer in Porous Media I (K-8)

Track Organizer: Ronald D. Boyd, Prairie View A&M University
Topic Organizer: Patrick Oosthuizen, Queen's University; Co-Organizers: Feng Lai, University of Oklahoma; Erik R. Bardy, Grove City College and Konstantin Matveev, WSU

2-1-1 Panel on Cyberinfrastructure for Heat Transfer

Track Organizer: Jacob Chung, University of Florida
Topic Organizer: Timothy Fisher, Purdue University

5-3-1 Experiments and Modeling of Fire and Fire Suppression – I (K-11)

Track Organizer: Alexander L Brown, Sandia National Labs; Co-Organizer: Mahesh Panchagnula

Topic Organizer: Alexander L Brown, Sandia National Labs

10-1-1 Micro/Nano-Scale Heat Transfer in Electronic Equipment (K-16)

Track Organizer: Amanie Abdelmessih, Saint Martin's University

Topic Organizer: Jayathi Murthy, Purdue University; Co-Organizer: Suresh Garimella, Cooling Technologies Research Center

5-3-2 Experiments and Modeling of Fire and Fire Suppression-II (K-11)

Track Organizer: Alexander L Brown, Sandia National Labs; Co-Organizer: Mahesh Panchagnula

Topic Organizer: Alexander L Brown, Sandia National Labs

10-2-1 Modeling, Optimization and Characterization of Electronic Packages (K-16)

Track Organizer: Amanie Abdelmessih, Saint Martin's University
Topic Organizer: Justin Wodrich, Motorola, Inc.

5-4-3 Hydrocarbon Combustion I (K-11)

Track Organizer: Alexander L Brown, Sandia National Labs; Co-Organizer: Mahesh Panchagnula

Topic Organizer: Kevin Lyons, NCSU

10-3-1 Heat Sinks and Two-Phase Heat Transfer in Electronic Packaging (K-16)

Track Organizer: Amanie Abdelmessih, Saint Martin's University
Topic Organizer: Mark North, Thermacore, Inc.; Co-Organizer: Pradip Majumdar, Northern Illinois University

7-2-1 Multiphase Heat Transfer I (K-13)

Track Organizer: Jungho Kim, University of Maryland
Topic Organizer: Shripad Revankar, Purdue University; Co-Organizers: Jovica Riznic, Canadian Nuclear Safety Commission; Glen Thorncroft, CALPoly SLO; Ali Siapush, INL

9-1-1 Transport Phenomena in Materials Processing and Manufacturing – I (K-15)

Track Organizer: Yuwen Zhang, University of Missouri

Topic Organizer: Ronggui Yang, University of Colorado; Co-Organizer: Roop L. Mahajan, Virginia Tech

7-2-2 Multiphase Heat Transfer II (K-13)

Track Organizer: Jungho Kim, University of Maryland

Topic Organizer: Shripad Revankar, Purdue University; Co-Organizers: Jovica Riznic, Canadian Nuclear Safety Commission; Glen Thorncroft, Cal Poly SLO; Ali Siapush, INL

9-1-2 Transport Phenomena in Materials Processing and Manufacturing III (K-15)

Track Organizer: Yuwen Zhang, University of Missouri

Topic Organizer: Ronggui Yang, University of Colorado; Co-Organizer: Roop L. Mahajan, Virginia Tech

7-3-1 Microchannel Boiling and Condensation I (K-13)

Track Organizer: Jungho Kim, University of Maryland
Topic Organizer: M. Erol Ulucakli, LAFAYETTE COLLEGE; Co-Organizers: Vinod Narayanan and Yassin Hassan, Texas A&M University

9-2-1 Heat and Mass Transfer in Nanomanufacturing (K-15)

Track Organizer: Yuwen Zhang, University of Missouri

Topic Organizer: Ben Li, University of Michigan

7-3-2 Microchannel Boiling and Condensation II (K-13)

Track Organizer: Jungho Kim, University of Maryland
Topic Organizer: M. Erol Ulucakli, LAFAYETTE COLLEGE; Co-Organizers: Vinod Narayanan and Yassin Hassan, Texas A&M University

16-3-2 Forum on Heat Transfer Visualization II (K-22)

Track Organizer: Kenneth Kihm, University of Tennessee

Topic Organizer: David Pratt, USAF, AFRL/RBS

3-3-2 Heat Transfer in Porous Media II (K-8)

Track Organizer: Ronald D. Boyd, Prairie View A&M University

Topic Organizer: Patrick Oosthuizen, Queen's University; Co-Organizers: Feng Lai, University of Oklahoma; Erik R. Bardy, Grove City College and Konstantin Matveev, WSU

14-1-1 Advances in Computational Heat Transfer I (K-20)

Track Organizer: Jamil Khan, University of South Carolina

Topic Organizer: Laila Guessous, Oakland University; Co-Organizers: Robert Spall, Utah State University and Sumanta Acharya, Louisiana State University

3-4-1 Fluid-Solid Interfacial Phenomena (K-8)

Track Organizer: Ronald D. Boyd, Prairie View A&M University

Topic Organizer: Jennifer Lukes, University of Pennsylvania; Co-Organizer: Alan McGaughey, Carnegie Mellon University

14-1-2 Advances in Computational Heat Transfer II (K-20)

Track Organizer: Jamil Khan, University of South Carolina

Topic Organizer: Laila Guessous, Oakland University; Co-Organizers: Robert Spall, Utah State University and Sumanta Acharya, Louisiana State University

3-4-2 Transport in Nanostructures, Thin Films and Across Interfaces (K-8)

Track Organizer: Ronald D. Boyd, Prairie View A&M University

Topic Organizer: Jennifer Lukes, University of Pennsylvania; Co-Organizer: Alan McGaughey, Carnegie Mellon University

14-4-1 Transport Phenomena in Fuel Cells (K-20)

Track Organizer: Jamil Khan, University of South Carolina

Topic Organizer: Pradip Majumdar; Co-Organizers: Sandip Mazumder, Ohio State University and Yitong Chen

3-4-3 Thermal Transport in Nanostructures, Thin Films and Across Interfaces - II (K-8)

Track Organizer: Ronald D. Boyd, Prairie View A&M University

Topic Organizer: Jennifer Lukes, University of Pennsylvania; Co-Organizer: Alan McGaughey, Carnegie Mellon University

5-4-5 Hydrocarbon Combustion II (K-11)

Track Organizer: Alexander L Brown, Sandia National Labs; Co-Organizer: Mahesh Panchagnula
Topic Organizer: Kevin Lyons, NCSU

10-5-1 Jets, Fluid Cooling and Channel Flow (K-16)

Track Organizer: Amanie Abdelmessih, Saint Martin's University
Topic Organizer: Alfonso Ortega

5-4-1 Industrial Reacting Flows I (K-11)

Track Organizer: Alexander L Brown, Sandia National Labs; Co-Organizer: Mahesh Panchagnula
Topic Organizer: Kevin Lyons, NCSU

2-3-1 US-India Panel on Joint Workshops and Research Cooperation

Track Organizer: Jacob Chung, University of Florida

Topic Organizer: Srinath Ekkad, Virginia Tech

5-4-4 Combustion Synthesis (K-11)

Track Organizer: Alexander L Brown, Sandia National Labs; Co-Organizer: Mahesh Panchagnula
Topic Organizer: Kevin Lyons, NCSU

10-6-1 Electronic Cooling and Design (K-16)

Track Organizer: Amanie Abdelmessih, Saint Martin's University
Topic Organizer: Ali Heydari, Sun Microsystems; Co-Organizer: James Petroski, GE Lumination

4-1-1 Micro Heat Exchangers (K-10)

Track Organizer: T.S. Ravi-guru-rajana, Wichita State University

Topic Organizer: Amir Jokar; Co-Organizer: T.S. Ravi-guru-rajana, Wichita State University

1-6-1 Thermal Issues in Combined Heat and Power Systems (K-6)

Track Organizer: Ingrid Cotoros, Lockheed Martin; Co-Organizer: Kambiz Vafai, UC Riverside

Topic Organizer: S. A. Sherif, University of Florida; Co-Organizers: Laura Schaefer, University of Pittsburg and Wei Tong

9-4-1 Materials Processing Issues in Energy Systems (K-15)

Track Organizer: Yuwen Zhang, University of Missouri

Topic Organizer: Wilson K. S. Chiu, University of Connecticut

7-4-1 Boiling and Condensation Heat Transfer I (K-13)

Track Organizer: Jungho Kim, University of Maryland

Topic Organizer: Debjyoti Banerjee, Texas A&M University; Co-Organizers: Ali Siapush, INL; Abhijit Mukherjee, MTU; Si Young Lee, Savannah River National Laboratory

8-1-1 Gas Turbine Heat Transfer (K-14)

Track Organizer: William E. Lear, University of Florida; Co-Organizer: Richard Rivir, AFRL/RZ

Topic Organizer: William E. Lear, University of Florida; Topic Co-Organizer: Richard Rivir, AFRL/RZ

7-4-2 Boiling and Condensation Heat Transfer II (K-13)

Track Organizer: Jungho Kim, University of Maryland

Topic Organizer: Debjyoti Banerjee, Texas A&M University; Co-Organizers: Ali Siapush, INL; Abhijit Mukherjee, MTU; Si Young Lee, Savannah River National Laboratory

8-1-2 Computation of Turbine Cooling and Heat Transfer (K-14)

Track Organizer: William E. Lear, University of Florida; Co-Organizer: Richard Rivir, AFRL/RZ

Topic Organizer: William E. Lear, University of Florida; Topic Co-Organizer: Richard Rivir, AFRL/RZ

7-6-1 Heat Pipes I (K-13)

Track Organizer: Jungho Kim, University of Maryland

Topic Organizer: Hongbin Ma, University of Missouri; Co-Organizers: Ali Siapush, INL and Rathinam Selvam, University of Arkansas

11-1-1 Heat and Mass Transfer in Biotechnology -I (K-17)

Track Organizer: Jacob Chung, University of Florida; Co-Organizer: Malisa Samtinoranont, University of Florida

Topic Organizer: Jacob Chung, University of Florida; Topic Co-Organizer: Malisa Samtinoranont, University of Florida

7-6-2 Heat Pipes II (K-13)

Track Organizer: Jungho Kim, University of Maryland

Topic Organizer: Hongbin Ma, University of Missouri; Co-Organizers: Ali Siapush, INL and Rathinam Selvam, University of Arkansas

14-5-1 Industrial Applications of Computational Heat Transfer - I (K-20)

Track Organizer: Jamil Khan, University of South Carolina

Topic Organizer: Kevin Dowding; Co-Organizer: Stephen Webb, Sandia National Laboratories

3-6-2 Fundamentals of Heat Conduction (K-8)

Track Organizer: Ronald D. Boyd, Prairie View A&M University

Topic Organizer: Leslie Phinney, Sandia National Laboratories; Co-Organizer: Donald Beasley, Clemson University

14-5-2 Industrial Application of Computational Heat Transfer – II (K-20)

Track Organizer: Jamil Khan, University of South Carolina

Topic Organizer: Kevin Dowding; Co-Organizer: Stephen Webb, Sandia National Laboratories

13-1-1 Panel on Future Directions in Renewable and Sustainable Energy Research (K-19)

Track Organizer: Michael B. Pate, Iowa State University

Topic Organizer: Jacob Chung, University of Florida

14-6-1 Micro/Nano Scale Applications of Computational Heat Transfer (K-20)

Track Organizer: Jamil Khan, University of South Carolina

Topic Organizer: Jayathi Murthy, Purdue University; Co-Organizer: Xiulin Ruan, Purdue University

3-6-3 Fundamentals of Heat Transfer - I (K-8)

Track Organizer: Ronald D. Boyd, Prairie View A&M University

Topic Organizer: Leslie Phinney, Sandia National Laboratories; Co-Organizer: Donald Beasley, Clemson University

4-2-6 High Temperature Applications (K-10)

Track Organizer: T.S. Ravi-guru-rajana, Wichita State University

Topic Organizer: T.S. Ravi-guru-rajana, Wichita State University; Topic Co-Organizer: Vijayaraghavan Chakravarthy, Praxair Inc

1-1-1 Inverse Problems and Optimization in Heat Transfer (K-6)

Track Organizer: Ingrid Cotoros, Lockheed Martin; Co-Organizer: Kambiz Vafai, UC Riverside

Topic Organizer: Kyle Daun, University of Waterloo; Co-Organizers: Matthew R. Jones, Brigham Young University; Kevin Dowding and Keith Woodbury, The University of Alabama

4-2-8 Optimization and Efficiency (K-10)

Track Organizer: T.S. Ravi-guru-rajana, Wichita State University

Topic Organizer: T.S. Ravi-guru-rajana, Wichita State University; Topic Co-Organizer: Vijayaraghavan Chakravarthy, Praxair Inc

4-3-1 CFD Modeling (K-10)

Track Organizer: T.S. Ravi-guru-rajana, Wichita State University

Topic Organizer: Arun Muley, Honeywell Aerospace; Co-Organizer: Yaroslav Chudnovsky, Gas Technology Institute

1-4-1 Integrated Modeling (K-6)

Track Organizer: Ingrid Cotoros, Lockheed Martin; Co-Organizer: Kambiz Vafai, UC Riverside

Topic Organizer: Jennifer Batson, Lockheed Martin; Co-Organizer: Ab Hashemi

4-3-2 CFD Modeling - II (K-10)

Track Organizer: T.S. Ravi-guru-rajana, Wichita State University

Topic Organizer: Arun Muley, Honeywell Aerospace; Co-Organizer: Yaroslav Chudnovsky, Gas Technology Institute

11-1-2 Heat and Mass Transfer in Biotechnology - II (K-17)

Track Organizer: Jacob Chung, University of Florida; Co-Organizer: Malisa Sarntinoranont, University of Florida

Topic Organizer: Jacob Chung, University of Florida; Topic Co-Organizer: Malisa Sarntinoranont, University of Florida

7-5-1 Enhancement Methods (K-13)

Track Organizer: Jungho Kim, University of Maryland

Topic Organizer: Keith Hollingsworth, University of Houston; Co-Organizers: Afshin Ghajar, Oklahoma State University; Abhijit Mukherjee, MTU and Cila Herman

18-1-1 Thermophysical Properties - I (K-7)

Track Organizer: S. A. Sherif, University of Florida; Co-Organizer: A.M. Mahmoud, University of Florida and Ayyoub Mehdizadeh, University of Florida

Topic Organizer: S. A. Sherif, University of Florida; Topic Co-Organizer: A.M. Mahmoud, University of Florida; Ayyoub Mehdizadeh, University of Florida; S.A. Sherif, University of Florida

6-1-1 High Heat Flux Cooling for Avionics (K-12)

Track Organizer: Ashley F Emery

Topic Organizer: Julie Asfia, Boeing Company; Co-Organizers: M. Erol Ulucakli, LAFAYETTE COLLEGE and David Carrington, Los Alamos National Laboratory

18-1-2 Thermophysical Properties - II (K-7)

Track Organizer: S. A. Sherif, University of Florida; Co-Organizer: A.M. Mahmoud, University of Florida and Ayyoub Mehdizadeh, University of Florida

Topic Organizer: S. A. Sherif, University of Florida; Topic Co-Organizer: A.M. Mahmoud, University of Florida; Ayyoub Mehdizadeh, University of Florida

6-2-1 Heat Transfer in Novel Thermal Management System (TMS) for Aerospace (K-12)

Track Organizer: Ashley F Emery

Topic Organizer: M. Erol Ulucakli, LAFAYETTE COLLEGE; Co-Organizers: Julie Asfia, Boeing Company and N.K. Anand

2-2-1 General Papers - I

Track Organizer: Jacob Chung, University of Florida

Topic Organizer: Jacob Chung, University of Florida

3-6-4 Fundamentals of Heat Transfer II (K-8)

Track Organizer: Ronald D. Boyd, Prairie View A&M University

Topic Organizer: Leslie Phinney, Sandia National Laboratories; Co-Organizer: Donald Beasley, Clemson University

1-3-1 Heat Transfer in Nanostructure and Naoporous Materials (K-6)

Track Organizer: Ingrid Cotoros, Lockheed Martin; Co-Organizer: Kambiz Vafai, UC Riverside

Topic Organizer: Ab Hashemi; Co-Organizer: Ingrid Cotoros, Lockheed Martin

2-2-2 General Papers II

Track Organizer: Jacob Chung, University of Florida

Topic Organizer: Jacob Chung, University of Florida

19-1-1 Low Temperature Heat and Mass Transfer (K-18)

Track Organizer: S. A. Sherif, University of Florida

Topic Organizer: Peng Zhang, Shanghai Jiao Tong University; Co-Organizers: Ayyoub Mehdizadeh, University of Florida; Fotouh Al-Raqom, University of Florida and S. A. Sherif, University of Florida

7-1-1 Spray and Jet Heat Transfer (K-13)

Track Organizer: Jungho Kim, University of Maryland

Topic Organizer: Jungho Kim, U. of Maryland; Co-Organizers: Vinod Narayanan and Tailian Chen, Wolverine Tube Inc.

NOTES

MONDAY August 11, 2008

7:00 – 8:00 am

Terrace Pavilion

Author's Breakfast
General Continental Breakfast

8:00 – 9:00 am

Grand Ballroom

Plenary: **The Role of Nuclear Energy in Our Future**
Dr. Kathryn A. McCarthy, Idaho National Laboratory

PARALLEL SESSIONS / 9:10 – 10:40 am

City Terrace 4

3-2-1 Single Phase Convection I (K-8)

Chair: Christopher Kobus, *Oakland University*; *Co-Chair:* Patrick Oosthuizen, *Queen's University*

56033 Experimental and Computational Analysis of Natural Convection over Flat Plate
Farhana Afroz, Chowdhury Md. Feroz and Sumon Saha

56091 Applied Pulsed Flow for Single-Phase Convective Heat Transfer Enhancement in a Laminar Flow Cooling System

Bolaji O. Olayiwola, Gerhard Schaldach and Peter Walzel

56190 Natural Convective Heat Transfer from an Inclined Narrow Isothermal Flat Plate

Patrick H. Oosthuizen and Abdulrahim Kalendar

56193 The Effect of Partitions on the Laminar Natural Convection in a Square Cavity

Wenjiang Wu and Chan Y. Ching

56472 Experimental Aero-Thermal Characterization of a Circular Jet Impinging a Plate; Influence of Impingement Flow Mach Number on Convective Heat Exchange Radial Distribution

Gildas Lalizel, Christophe David, Matthieu F'Enot and Ea Dorignac

10:40 – 11:00 am

Break

City Terrace 5

2-1-1 Panel on Cyberinfrastructure for Heat Transfer

Chair:: Timothy Fisher, *Purdue University*

56064 Computational Research Tools
Jennifer Lukes

56065 Computational Learning Tools
Jayathi Murthy

56066 Online Lectures and Tutorials
Costas Grigoropoulos

56067 Community Wiki
Greg Walker

56068 Properties Database and Experimental Network
Li Shi

56069 International Partnerships
Pinar Menguc

56071 Industrial Partnerships
Suresh Garimella

56072 NSF Opportunities in Cyberinfrastructure
Patrick Phelan

City Terrace 6

7-2-1 Multiphase Heat Transfer I (K-13)

Chair: Jovica Riznic, *Canadian Nuclear Safety Commission*; *Co-Chair:* Ali Siapush, *INL*

56057 Numerical Simulation on Melting and Solidification of a Phase-change Material in an Aluminum Plate-fin Thermal Storage

Minhui Lv, Hao Peng and Xiang Ling

56080 CFD Modeling Analysis of Mechanical Draft Cooling Tower

Si Y. Lee, Alfred J. Garrett, James S. Bollinger and Larry D. Koffman

56113 Experimental and Numerical Investigation of Heat Characteristics of Liquid Flow with Micro-Encapsulated Phase Change Material

Rami Sabbah, Jamal Yagoobi and Said Al Hallaj

56015 On The Critical Flows of Pressurized Pipe Systems

Moon-Sun Chung and Sung-Jae Lee

56349 Vibration/Shock-Tolerant Capillary Two-Phase Loop Technology for Vehicle Thermal Control

Xudong Tang, Chanwoo Park and Jeffrey Perez

MONDAY August 11, 2008

PARALLEL SESSIONS / 9:10 – 10:40 am

City Terrace 7

13-2-1 Heat and Mass Transfer in the Natural and Built Environment (K-19)
Chair: R Figliola, *Clemson University;*
Co-Chairs: Fotouh Al-Raqom, *University of Florida* and Sandra Boetcher, *University of North Texas*

56326 Numerical Investigation on Thermal and Fluid Dynamic Behaviors of Air Conditioning in Aircraft Cabin
 G. Balducci, V. Bianco, O. Manca, S. Nardini and M. Roma

56101 Transient Human Thermal Comfort Response in Convective and Radiative Environments
 Mohamad Al-Othmani, Nesreen Ghaddar and Kamel Ghali

56470 Experimental Model to Characterize the Evaporative Cooling of Horizontal Roofs
 Margarita Gil Samaniego Ramos and Héctor Enrique Campbell Ramírez

56162 Evaluation of Convective Heat and Mass Transfer in Open Sun and Green House Drying
 S.K.Shukla

City Terrace 8

5-3-1 Experiments and Modeling of Fire and Fire Suppression-1 (K-11)
Chair: Ofodike A. Ezekoye, *The University of Texas at Austin*

56074 Carbon Monoxide Transport through Water Curtain
 W.K. Chow and Mabel K.K. Ip

56085 One-Dimensional Smoke Movement in Vertical Open Shafts at Steady State: Theoretical Prediction and Experimental Verification
 Xiaoqian Sun, Yuanzhou Li, Ran Huo, Wanki Chow, Naikong Fong and Cheheng Gigi Lui

56270 Direct Radiation from Wildfires through Square Screens
 Ahmad Sharifian and David R Buttsworth

56424 The Double-Diffusive Convection in the Process of Water Mist Fire Suppression
 Kai Xu and Wen-Qiang Lu

City Terrace 9

9-1-1 Transport Phenomena in Materials Processing and Manufacturing I (K-15)
Chair: : Ronghui Ma, *University of Maryland, Baltimore County*

56103 Measurement of Cooling Curves in Centrifugal Casting of a Ferrous Alloy
 Romulo Heringer, Marcelo A. Martorano and Mário Boccalini Jr.

56296 Experimental Study on Double-Diffusive Convection during Solidification of NH₄Cl-H₂O Hypereutectic Solution in Cylindrical Cavity
 Bofeng Bai, Jun Lu, Lei Zhang and Heng Li

56294 Thermosolutal Convection and Solute Segregation of HgCdTe Alloy during the Vertical Bridgman Single Crystal Growth
 Jun Lu, Bofeng Bai, Zhixiang Wen and Liejin Guo

56395 Accumulated Temperature Measurement of Transparent Material Induced by High-Repetition-rate Femtosecond Laser Pulses (presentation only)
 Moosung Kim

10:40 – 11:00 am

Break

MONDAY August 11, 2008

PARALLEL SESSIONS / 11:00 am – 12:30 pm

City Terrace 4

3-2-2 Single Phase Convection II (K-8)

Chair: Christopher Kobus, *Oakland University*; *Co-Chair:* : Patrick Oosthuizen, *Queen's University*

56093 Development of a Heat Transfer Correlation for the Transitional Flow in a Horizontal Tube Using Support Vector Machines

L. M. Tam, A. J. Ghajar, H. K. Tam and S. C. Tam

56094 Development of a Flow Regime Map for a Horizontal Pipe with the Multi-Classification Support Vector Machines

L. M. Tam, A. J. Ghajar, H. K. Tam and S. C. Tam

56201 Numerical Simulation of the Impact of Both Air Conditioning System and Train's Movement on Platform Air Temperature Distribution

Hui Yang, Li Jia and Lixin Yang

56274 Transient Heat Transfer from Single Horizontal Heaters in Forced Flow of Helium Gas at Exponentially Increasing Heat Inputs

Qiusheng Liu and Makoto Shibahara

56025 Natural Convective Heat Transfer from an Isothermal Vertical Square Cylinder Mounted on a Flat Adiabatic Base

Patrick H. Oosthuizen

Terrace Pavilion

12:05 – 1:00 pm

Lunch

Grand Ballroom 4&5

1:00 – 2:00 pm

Plenary: Thirty Years of Naval Propulsor Hydrodynamic Research at the Naval Surface Warfare Center, Carderock Division
Dr. Stuart Jessup, Naval Surface Warfare Center

City Terrace 5

10-1-1 Micro/Nano-Scale Heat Transfer in Electronic Equipment (K-16)

Chair: Jayathi Murthy, *Purdue University*
Co-Chair: Suresh Garimella, *Cooling Technologies Research Center*

56001 Thermal Conductivity Measurements of SI-SiO₂-SI Sandwich Structures for Micro/Nano Electronics

Christina Royce, Mehmet Arik, Stanton Weaver, J. W. Bray, Victor Ovsyuk, Anatoly Klimenko and Andrey Yarts

56037 Enhanced Mini-Channel Forced Convection with Phase-Change Particles

Fatemeh Hassanipour and Jose' Lage

56195 An Analysis of the Flow Fields within Geometrically-Similar Miniature Scale Centrifugal Pumps

Daniel Kearney, Jeff Punch and Ronan Grimes

56483 Carbon Nanotube Array Thermal Interfaces Enhanced with Paraffin Wax

Baratunde A. Cola, Stephen L. Hodson, Xianfan Xu and Timothy S. Fisher

City Terrace 6

7-2-2 Multiphase Heat Transfer II (K-13)

Chair: Glen Thorncroft; *Co-chair:* Jovica Riznic, *Canadian Nuclear Safety Commission*

56142 Thermal Homogenization in Spherical Reservoir by EHD Conduction Phenomenon

Miad Yazdani and Jamal Seyed-Yagoobi

56206 Numerical and Experimental Investigation of Melting in Vertical Circular Tubes

H. Shmueli, G. Ziskind and R. Letan

56232 Heat Transfer Performance during Condensation of R-134A

M. H. Al-Hajeri and A. M. Koluib

56246 Numerical Investigation on Bubbly Flow and Heat Transfer Characters in a Liquid-Reactor

Lixin Yang

56392 Bubble Coalescence and Break-up Studies using a Three-Dimensional Lattice Boltzmann Method (presentation only)

Amit Gupta

MONDAY August 11, 2008

PARALLEL SESSIONS /11:00 am – 12:30 pm

City Terrace 7

17-1-1 Heat Transfer Education (K-21)

Chair: Fotouh Al-Raqom, *University of Florida*; *Co-Chairs:* Ayyoub Mehdizadeh, *University of Florida*; Alain Kassab, *University of Central Florida*; Eduardo Divo, *University of Central Florida*

56073 Josef Stefan and His Contributions to Heat Transfer
John Crepeau

56433 An Active Learning Approach for Teaching Undergraduate Heat Transfer
Michael B. Pate

56451 Upwinded Localized Collocation Meshless Method (ULCMM) for Thermo-Fluids Modeling (presentation only)
Eduardo Divo

City Terrace 8

5-3-2 Experiments and Modeling of Fire and Fire Suppression-II (K-11)

Chair W.K. Chow, *The Hong Kong Polytechnic University*:

56177 Experimental Study of Thermal Response of LPG Tanks Subjected to External Fire
Zhi Xiang Xing and Xiao Fang Zhao

56184 Study of the Gas Combustion LP in an Atmospheric Burner
Armando Gallegos-Muñoz, Armando Balderas-Bernal and Alejandro Ramírez-Barrón

56370 Plume Rise Calculations Using a Control Volume Approach and the Damped Spring Oscillator Analogy
Alexander L. Brown and Nathan E. Bixler

56456 Effects of Exit Vent Location on Fire Room Conditions during PPV
Colin M. Beal and Ofodike A Ezekoye

City Terrace 9

9-1-2 Transport Phenomena in Materials Processing and Manufacturing III (K-15)

Chair: Calvin Li, *University of Toledo*;
Co-Chair: Roop L. Mahajan, *Virginia Tech*

56124 Transport Processes Governing the Drawing of a Hollow Optical Fiber
Jing Yang, Rutgers and Yogesh Jaluria

56499 Investigation on Heat Transfer and Its Effect on Titanium Hot Forging Process
K. Davami, M. K. Besharaty, A. Mellat and B. Serajzadeh

56334 Heat Transfer Experiments and Process Development Measurements in the Production of Aerospace Wire
Guillermo Varela, Joshua Whitley, Daniel Cox and Tom Roy

56455 Investigation of Potential Benefits of Using Bricks of High Thermal Capacity and Conductivity in a Rotating Calcining Kiln
Zhao Lei, Ting Wang and Robert T. Tonti

MONDAY August 11, 2008

PARALLEL SESSIONS /2:10 – 3:40 pm

City Terrace 4

3-2-3 Single Phase Convection III (K-8)

Chair : Patrick Oosthuizen, *Queen's University*; *Co-Chair*: Christopher Kobus, *Oakland University*

56228 An Investigation of the Physical Mechanism of Heat Transfer Augmentation in Stagnating Flows Subject to Freestream Turbulence

Andrew R. Gifford, Thomas E. Diller and Pavlos P. Vlachos

56302 An Investigation of the Physical Mechanism of Heat Transfer Augmentation in Boundary Layer Flows Subject to Freestream Turbulence

David O. Hubble, Thomas E. Diller and Pavlos P. Vlachos

56329 Numerical Investigation on Forced Convection in Circular Tubes with Septa

D. Corrente, O. Manca, S. Nardini, D. Ricci and G. Masullo

56359 Transient Natural Convection Slip Flow in a Vertical Microchannel Heated at Uniform Heat Flux

Bernardo Buonomo and Oronzio Manca

56024 Three-Dimensional Natural Convective Flow in a Rectangular Enclosure with a Rectangular Heated Section on One Vertical Wall and with the Other Vertical Walls Cooled

Patrick H. Oosthuizen, Abdulrahim Kalendar and Thomas M. Simko

City Terrace 5

10-2-1 Modeling, Optimization and Characterization of Electronic Packages (K-16)

Chair: Justin Wodrich, *Motorola, Inc.*

56170 Characterization of Microstructures for Heat Transfer Performance in Passive Cooling Devices

Ram Ranjan, Suresh V. Garimella and Jayathi Y. Murthy

56012 Numerical Analysis of a Hybrid Heat Sink with using a Phase Change Material: Application to a Cooling of an Electronic Component

Mustapha Faraji and Hamid El Qarnia

56056 Multidisciplinary Placement Optimization of Heat Generating Semiconductor Logic Blocks

Tohru Suwa and Hamid Hadim

56454 CFD Analysis of a Notebook Computer Thermal Management Solution

Fidan Seza Yalçın, Cüneyt Sert and Ilker Tari

56401 Numerical Prediction of Heat Transfer Enhancement in a Semiconductor Device with a Swivelled Module Board

Srinivas Bhatt

City Terrace 6

7-3-1 Microchannel Boiling and Condensation I (K-13)

Chair: M. Erol Ulucakli, *Lafayette College*; *Co-Chairs*: Yassin Hassan, *Texas A&M University*; Vinod Narayanan, *Oregon State University*

56084 Characteristics of Two-Component Two-Phase Flow and Heat Transfer in a Flat Microchannel

Matthew L Roesle and F A Kulacki

56116 Two-Phase Heat Transfer and Bubble Dynamics in a Microchannel Array

T. P. Lagus and F. A. Kulacki

56176 Convective Boiling Between 2D Plates: Shear Flow Influence on Bubbles Growth, Detachment and Evolution

D. Serret, D. Brutin, O. Rahli, C. Le Niliot and L. Tadrist

56253 Local Wall Temperature Measurements in Microchannel Flows Using Infrared Thermography

Daniel Krebs, Vinod Narayanan, James Liburdy and Deborah Pence

MONDAY August 11, 2008

PARALLEL SESSIONS /2:10 – 3:40 pm

City Terrace 7

**16-3-1 Forum on Heat Transfer
Visualization I (K-22)**

Chair: David Pratt, *USAF, AFRL/RBS*; Co-
Chair: Kenneth Kihm, *University of
Tennessee*

**56352 The Visualization of Thin Film
Evaporation on Thin Micro Sintered
Copper Mesh Screen**

Chen Li, G. P. Peterson, Ji Li and Nikhil
Koratkar

**56459 Near-Field Imaging Using Surface
Plasmon Resonance (SPR) Reflectance
(presentation only)**

Kenneth Kihm

**56219 Natural Convection around a
Horizontal Heated Square-Section
Cylinder in an Enclosure: Visualization
and Dynamic Characterization of
Instabilities by Particle Image
Velocimetry**

Gillian Leplat, Philippe Barricau, Philippe
Reulet and Pierre Millan

City Terrace 8

5-4-3 Hydrocarbon Combustion I (K-11)

Chair: Chenn Zhou, *Purdue University
Calumet*

**56083 Pyrolysis Modelling in a
Woodstove**

Rajesh Gupta

**56255 Heat and Mass Transfer from
Platinum-Coated Cylinders in
Axisymmetric Hydrogen-Air Boundary
Layers**

Timothy W. Tong, Mohsen M. Abou-Ellail
and Yuan Li

**56286 Simulation of s CO-H₂-Air
Turbulent Diffusion Flame by the
Chemical Equilibrium Method with a
Few Chemical Reactions**

Kazui Fukumoto and Yoshifumi Ogami

**56304 Flame Holding and Combustion
Characteristics of a Geometrical Flame
Holder**

K. A. Ahmed and D. J. Forliti

**56466 Ignition and Combustion
Characteristics of Liquid Fuel Droplets
Containing Metal Nanoparticles**

Tae-Woo Lee, Himanshu Tyagi, David
Sonenschein, Patrick E. Phelan, Ravi
Prasher
Robert Peck and Paul Arentzen

City Terrace 9

**9-2-1 Heat and Mass Transfer in
Nanomanufacturing (K-15)**

Chair: Ben Li, *University of Michigan*;
Co-Chair: Yuwen Zhang, *University of
Missouri*

**56242 Impact of Thermophoresis on
Carbon Nanotube Growth by Chemical
Vapor Deposition**

Andrew C. Lysaght and Wilson K. S. Chiu

**56180 Reverse Monte Carlo Modeling
of Signal Transport in Light-Pipe
Radiation Thermometers**

Hakan Erturk, Ofodike A Ezekoye and
John R Howell

**56489 Experimental and Theoretical
Analysis of the Nanoscale Laser Ablation
with a Near Field Scanning Optical Tip**

Sy-Bor Wen

**56096 Dual Pump Femtosecond Laser
Induced Plasma**

Meg Mahat, Tae Y. Choi, Nasrasadani
Seifolah and Arup Neogi

3:40 – 4:00 pm Break

MONDAY August 11, 2008

PARALLEL SESSIONS /4:00 – 5:30 pm

City Terrace 4

3-3-1 Heat Transfer in Porous Media I (K-8)

Chair: Patrick Oosthuizen, *Queen's University*; *Co-Chair:* Erik R. Bardy, *Grove City College*

56158 A Compact Thermal Resistance Model for Determining Effective Thermal Conductivity in the Fibrous Gas Diffusion Layers of Fuel Cells
E. Sadeghi, M. Bahrami and N. Djilali

56171 The Effect of Pore Shape to the Effective Thermal Conductivity of Thermal Barrier Coatings
Ozge Altun and Y. Erhan Böke

56477 Thermal Radiation in a Packed Bed with Internal Heat Generation
Jaap E Hoffmann

56110 Transient Natural Convection from a Vertically Embedded Heat Source in a Thermally Stratified Porous Layer
J. Zhang and F. C. Lai

56111 Prediction of Natural Convection Heat Transfer in Layered Porous Cavities by Homogeneous Anisotropic Model
R. L. Marvel and F. C. Lai

City Terrace 5

10-3-1 Heat Sinks and Two-Phase Heat Transfer in Electronic Packaging (K-16)

Chair: Mark North, *Thermacore, Inc.*; *Co-Chair:* Pradip Majumdar, *Northern Illinois University*

56205 Pin-Fin Heat Sink with Horizontal Base and Blocked Edges
D. Sahray, H. Shmueli, N. Segal, G. Ziskind and R. Letan

56492 An Analytical Hierarchical Processing Based Heat Sink Selection and CFD Simulation for Porous Heat Sink (presentation only)
Manish Attal

56187 Modeling and Testing of an Integrated Evaporator-Condenser Device for CPU Cooling
Mark Aaron Chan, Christopher R. Yap and Kim Choon Ng

56337 Stability Analysis and Network Design of Evaporative Micro-Channels
Hee Joon Lee and Shi-Chune Yao

City Terrace 6

7-3-2 Microchannel Boiling and Condensation II (K-13)

Chair: M. Erol Ulucakli, *Lafayette College*; *Co-Chairs:* Vinod Narayanan, *Oregon State University*; Yassin Hassan, *Texas A&M University*

56389 The Micro-Scale of Boiling Processes of FC-72 in a Confined Space
Anthony J. Fernandez, Sergio Escobar-Vargas, Drazen Fabris, Jorge E. Gonzalez, Ratnesh Sharma and Cullen Bash

56463 Dimensionless Transition Criteria for Condensation in Microchannels (presentation only)
Srinivas Garimella

56465 Heat Transfer Model for Near-Critical Pressure Condensation of Refrigerant Blends in Microchannels (presentation only)
Srinivas Garimella

56342 Two Phase Analysis of Heat Transfer and Dispersion of Nano Particles in a Microchannel
S.M.M Nayinian, M. Shams, H. Afshar and G. Ahmadi

56291 Dryout during Flow Boiling in a Single Circular Minichannel: Experimentation and Modelling
Davide Del Col, Alberto Cavallini, Stefano Bortolin, Marko Matkovic and Luisa Rossetto

6:00-7:30

Grand Ballroom 4 and 5

Max Jacob Memorial Award

"Micro- To Micro-scale Heat Transfer from Metal-Graphite Composite Surfaces"
Wen-Jei Yang, Nengli Zhang and Dan L. Vrable

MONDAY August 11, 2008

PARALLEL SESSIONS /4:00 – 5:30 pm

City Terrace 7

16-3-2 Forum on Heat Transfer Visualization II (K-22)

Chair: David Pratt, *USAF, AFRL/RBS; Co-Chair:* Kenneth Kihm, *University of Tennessee*

56443 Tomographic Reconstruction of Unsteady Fields Using Proper Orthogonal Decomposition

Dhruv Singh, Atul Srivastava and K Muralidhar

56179 Measurements of Bubble Nucleation Characteristics in Pool Boiling of a Wetting Liquid on Smooth and Roughened Surfaces

John P. McHale and Suresh V. Garimella

56402 PIV Measurements in the Condenser Region of a Gas-Loaded Thermosyphon

Martin Cleary, Ronan Grimes, Marc Hodes and Mark T. North

56196 Edge Detection Based on Wavelet Analysis with Gaussian Filter and Application in Multiphase Flow

Bin Chen, Fude Guo and Tao Ning

City Terrace 8

5-4-5 Hydrocarbon Combustion II (K-11)

Chair: Cheng-Xian Lin, *The University of Tennessee*

56310 Spectral Radiation Properties of a Turbulent Ethylene Pool Fire

Kaushik Biswas, Yuan Zheng and Jay Gore

56420 A Combined Experimental and Numerical Study of Heat Transfer Characteristics for Methane/Air Flame Impinging Normally on a Flat Surface

Subhash Chander and Anjan Ray

56151 A Numerical Investigation on Soot Formation from Laminar Diffusion Flames of Ethylene/Methane Mixture

Hongsheng Guo, Stephanie Trottier, Matthew R. Johnson and Gregory J. Smallwood

56104 Evaporating Meniscus in a Capillary Tube with High Heat Flux Induced by Micro Diffusion Flame

J. Chen and X. F. Peng

56108 Calibration of Chemical Kinetic Models Using Simulations of Small-Scale Cookoff Experiments

Aaron P. Wemhoff, Richard Becker and Alan K. Burnham

City Terrace 9

9-4-1 Materials Processing Issues in Energy Systems (K-15)

Chair: Wilson K. S. Chiu, *University of Connecticut*

56283 Simultaneous Production of Hydrogen and CNTs by In-Liquid Plasma, and Its

Discharge Characteristics

Shinfuku Nomura, Hiromichi Toyota, Shinobu Mukasa, Yoshiaki Hattori, Yoshiyuki Takahashi, Naoharu Ueda, Hiroshi Yamashita, Hiroaki Tsuruno and Muneo Tanaka

56354 Performance of Dense Vertical Cracked Air Plasma Spray Processed Thermal Barrier Coatings: Thermo-Physical Properties Measurements, and Effects Of Thermal Stress on Thermal Cycling Failure

Patrick F. Mensah, Nalini Uppu and Ravinder Diwan

56500 Heat Flux Estimation in Direct Chill Casting Using Experimental and Inverse Finite Element Method

Ashok Kumar Nallathambi, Umair Alam and Eckehard Specht

56097

Electron and Focused Ion Beams in Thermal Science and Engineering

Tae-Youl Choi and Dimos Poulikakos

TUESDAY August 12, 2008

7:00 – 8:00 am

Terrace Pavilion

Author's Breakfast
General Continental Breakfast

8:00 – 9:10 am

Grand Ballroom

Plenary: **The Carbon Journey – The Nation's Need to Reduce Emissions and Increase Energy Security**
J. Michael Davis, Pacific Northwest National Laboratory

PARALLEL SESSIONS / 9:00 – 10:40 am

City Terrace 4

3-3-2 Heat Transfer in Porous Media II (K-8)

Chair: Erik R. Bardy, *Grove City College;*
CoChair: Feng Lai, *University of Oklahoma*

56248 Numerical Simulation of Laminar Confined Impinging Jet in a Composite Channel

Marcelo J.S. de Lemos

56249 Mathematical Modeling of Flow and Heat Transfer in a Moving Bed Reactor

Marcelo J.S. de Lemos

56250 Turbulent Flow in a Composite Channel with a Wavy Interface

Marcelo J.S. de Lemos

56375 Permeability and Thermal Transport in Compressed Open-Cell Foams

S. Ravi Annapragada, Jayathi Y. Murthy and Suresh V. Garimella

City Terrace 5

10-5-1 Jets, Fluid Cooling and Channel Flow (K-16)

Chair: Alfonso Ortega

56220 An Investigation of Thermal and Velocity Fields for a Confined Jet over the RE Range of 1,000-24,000

N. Jeffers, J. Punch and E. Walsh

56474 Experimental Study of Non-Boiling Spray Cooling Heat Transfer for Inclined Sprays

Yongxian Guo, Jianyuan Jia, Weidong Wang and Shaorong Zhou

56230 Immersion Cooling of Power Electronics in Segregated Hydrofluoroether Liquids

Cindy M. Barnes and Philip E. Tuma

City Terrace 6

7-4-1 Boiling and Condensation Heat Transfer I (K-13)

Chair: Debjyoti Banerjee, *Texas A&M University;* *Co-Chairs:* Abhijit Mukherjee, *MTU;* Ali Siapush, *INL*

56039 A Visual Study of Two-Phase Change Heat Transfer in Horizontal Bottom Heating Beads Packed Porous Structures

Calvin Hong Li

56131 Scaling of Passive Condenser System Separate Effect Facility

Shripad T. Revankar, Seungmin Oh, Wenzhong Zhou and Gavin Henderson

56204 Approximate Solution for the Heat Transfer Controlled Growth of a Steadily Translating Vapor Bubble

Michael Shusser

56010 Experimental Observation of the Dynamic Micro- and Macro-Layer during Pool Boiling

Craig Gerardi, Jacopo Buongiorno, Linwen Hu and Thomas McKrell

56013 Two-Phase Friction Factor Obtained from Various Void Fraction Models during Condensation of R134A in Vertical Downward Flow At High Mass Flux

Ahmet Selim Dalkilic, Suriyan Laohalertdecha and Somchai Wongwises

10:40 – 11:00 am

Break

TUESDAY August 12, 2008

PARALLEL SESSIONS / 9:10 – 10:40 am

City Terrace 7

14-1-1 Advances in Computational Heat Transfer I (K-20)

Chair: Laila Guessous, *Oakland University*; *Co-Chairs:* Robert Spall, *Utah State University*; Sumanta Acharya, *Louisiana State University*

56038 Modeling Flash Diffusivity Experiments in Two Dimensions for Thick Samples

Robert L. McMasters

56076 Simulation of Radiation Heat Transfer of Three Dimensional Participating Media by Radiative Exchange Method

Mohammad Hadi Bordbar and Timo Hyppänen

56145 An Unstructured Reacting Flow Solver with Coupled Implicit Solution of the Species Conservation Equations

Ankan Kumar and Sandip Mazumder

56199 Numerical Computation of Compressible Laminar Flow with Heat Transfer in the Entrance Region of a Pipe

M. Ziaei Rad, A. Nouri-Broujerdi and J. Seume

City Terrace 8

5-4-1 Industrial Reacting Flows I (K-11)

Chair: T-W. Lee, *Arizona State University*

56200 Numerical Study on High Temperature Air Combustion in U-Type Tube

Xing Li, Li Jia, Tiantian Zhang and Lixin Yang

56229 Computation of Nitrogen Oxides in Radiant Porous Burner Flows

Timothy W. Tong, Mohsen M. Abou-Ellail, Yuan Li and Karam R. Beshay

56245 Numerical Simulation of Reactive Turbulent Flows over Bluff Body Flame Holders: A Parametric Study

Richard Holder and Cheng-Xian (Charlie) Lin

56256 Study of Co-Injection of Natural Gas and Pulverized Coal in Blast Furnace under Pure Oxygen Environment

Mingyan Gu and Jiabin Li

56366 CFD Analysis of Batch-Type Reheating Furnace with Regenerative Burners

Bin Wu, Tom Roesel, Andrew M. Arnold, Zhaojiang Xu, Eugene Arnold, George Downey III and Chenn Q. Zhou

City Terrace 9

8-1-1 Gas Turbine Heat Transfer (K-14)

Chair: Srinath Ekkad, *Virginia Tech*; *Co-Chair:* William E. Lear, *University of Florida*

56155 Effects of Syngas Ash Particle Size on Deposition and Erosion of a Film Cooled Leading Edge

Ali Rozati, Danesh K. Tafti and Sai Shrinivas Sreedharan

56280 Validation of Mist/Steam Cooling CFD model in a Horizontal Tube

T. S. Dhanasekaran and Ting Wang

56347 Characteristics of Cooling of the Leading Edge with a Row of Dual Impinging Jets

X. C. Li

10:40 – 11:00 am

Break

TUESDAY August 12, 2008

PARALLEL SESSIONS /11:00 am – 12:30 pm

City Terrace 4

3-4-1 Fluid-Solid Interfacial Phenomena (K-8)

Chair: Alan McGaughey, *Carnegie Mellon University*; *Co-Chair:* Jennifer Lukes, *University of Pennsylvania*

56089 Mean-Field Bounds and the Classical Nature of Thermal Conduction in Nanofluids

Jacob Eapen

56390 Effect of Polymer Chains on Heat Transfer on Nanofins

Navdeep Singh and Debjyoti Banerjee

56444 Effect of Brownian and Thermophoretic Diffusions of Nanoparticles on Nonequilibrium Heat Conduction in Nanofluids

Yuwen Zhang, Ling Li and H.B. Ma

56043 Molecular Dynamics Simulations of Translational Thermal Accommodation Coefficients for Time-Resolved LH

K. J. Daun, G. J. Smallwood and F. Liu

Terrace Pavilion

12:05 – 1:00 pm

Lunch

Grand Ballroom 4&5

1:00 – 2:00

Plenary: Energy for Sustainability

Dr. Trung Van Nguyen, National Science Foundation

Orlando

1:00 – 2:00

Plenary: Energy Research: Opportunities and Challenges

Dr. Mildred Dresselhaus, Massachusetts Institute of Technology

City Terrace 5

2-3-1 US-India Panel on Joint Workshops and Research Cooperation

Chair: Srinath Ekkad, *Virginia Tech*

56506 Overview of ISHMT/ASME Joint Heat Transfer Conferences and Workshops, Srinath Ekkad

56507 Overview of Electronic Cooling Workshop and Sabbatical Experience in India, Timothy Fisher

56510 Keynote Address and Workshop Experience, Tom Shih

56508 Workshops in Nuclear Heat Transfer, Heat Exchangers, and Fuel Cells, Shripad Revankar

56509 Past Workshops and Experience of US Faculty in India, Suresh Garimella

56511 Heat Exchanger Workshop - Successes and Future Directions, Arun Muley

City Terrace 6

7-4-2 Boiling and Condensation Heat Transfer II (K-13)

Chair: Abhijit Mukherjee, *MTU*; *Co-Chairs:* Debjyoti Banerjee, *Texas A&M University*; Ali Siapush, *INL*

56223 Modeling of Two-Phase Flow Structure Evolution in Subcooled Nucleate Convective Boiling with Coupling of Bubble-Tracking and Two-Fluid Models

Ivo Kljenak, Boštjan Končar and Borut Mavko

56272 Transient Pool Boiling CHF in FC-72

P.F. Sutopo, Katsuya Fukuda and Qiusheng Liu

56378 Determination of Dimensionality of Pool Boiling on a Thin Horizontal Disk under Subcooled Conditions Using Thin – Film Thermocouples

Vijaykumar Sathyamurthi and Debjyoti Banerjee

56397 Forced Convection Film Boiling Heat Transfer from Single Horizontal Cylinders in Saturated and Subcooled Liquids: Part 1- Experimental Data and Its Correlation for Saturated Liquids

Qiusheng Liu and Katsuya Fukuda

56446 Formulation of Film Theory Equations for Modeling of Condensation of Steam-Air Mixtures in a Shell and Tube Condenser

Yousef Haseli, Ibrahim Dincer and Greg Frank Naterer

TUESDAY August 12, 2008

PARALLEL SESSIONS / 11:00 am – 12:30 pm

City Terrace 7

14-1-2 Advances in Computational Heat Transfer II (K-20)

Chair: : Robert Spall, *Utah State University*; *Co-Chairs:* Laila Guessous, *Oakland University*; Sumanta Acharya, *Louisiana State University*

56265 A Novel Finite Difference Method for Flow Calculation on Co-located Grids

Z. Z. Xia, P. Zhang and R. Z. Wang

56117 Investigation of a Split-Dimple Fin Geometry for Heat Transfer Augmentation

Mohammad A. Elyyan and Danesh K. Tafti

56222 Unsteady Heat Transfer from a Spherical Particle in Turbulent and Oscillating Ambient Flows

Prosenjit Bagchi and Kirit Kottam

City Terrace 8

5-4-4 Combustion Synthesis (K-11)

Chair: Aaron Wemhoff, *Lawrence Livermore National Laboratory*; *Co-Chair:* Robert McMasters, *Virginia Military Institute*

56313 Computational Study of Reactive Flow in Halide Chemical Vapor Deposition of Silicon Carbide Epitaxial Film

Rong Wang and Ronghui Ma

56363 Methodology for the Numerical Simulation of Natural Gas, Coal, and Coke Combustion in a Blast Furnace

William Walker, Mingyan Gu, Naresh Selvarasu, John D'Alessio, Neil Macfadyen and Chenn Zhou

56002 Observations on Flame Stretching in a Scale Room Model with Natural Vent

W.K. Chow and C.K. Law

56251 The Developmental Research of Regeneration Ladle Heater with Gas Backflow Technology

Linjiang Zou and Lin Cheng

City Terrace 9

8-1-2 Computation of Turbine Cooling and Heat Transfer (K-14)

Chair: Richard Rivir, *AFRL/RZ*; *Co-Chair:* William E. Lear, *University of Florida*:

56422 Large Eddy Simulation of the Heat Transfer Due to Swirling and Non-Swirling Jet Impingement

Naseem Uddin, S. O. Neumann and B. Weigand

56382 Tip Leakage Flow and Heat Transfer Characteristics on Shroud and Rotor Blade Tip in an Axial Gas Turbine Engine: Steady Analysis

Md Hamidur Rahman, Ibrahim Hassan and Sung In Kim

56194 Effect of Upstream Step on Flat Plate Film Cooling Effectiveness Using PSP

Akhilesh P Rallabandi, Joshua Grizzle and Je Chin Han

TUESDAY August 12, 2008

PARALLEL SESSIONS /2:10 – 3:40 pm

City Terrace 4

3-4-2 Transport in Nanostructures, Thin Films and Across Interfaces (K-8)

Chair: Jennifer Lukes, *University of Pennsylvania*; *Co-Chair:* Alan McGaughey, *Carnegie Mellon University*

56146 Argon Thermal Conductivity by Anharmonic Lattice Dynamics Calculations

J.E. Turney, A.J.H. McGaughey and C.H. Amon

56473 Designing Si/Si_{1-x}Ge_x Superlattices with Tailored Thermal Transport Properties

E. S. Landry and A.J.H. McGaughey

56328 Thermal Transport Measurements of Nanowire-Substrate Interfaces

Monalisa Mazumder and Theodorian Borca-Tasciuc

56427 Modeling of Subcontinuum Thermal Transport across Semiconductor-Gas Interfaces

Dhruv Singh, Xiaohui Guo, Alina Alexeenko, Jayathi Y. Murthy and Timothy S. Fisher

3:40 – 4:00 pm Break

City Terrace 5

10-6-1 Electronic Cooling and Design (K-16)

Chair: Ali Heydari, *Sun Microsystems*; *co-Chair:* : James Petroski, *GE Lumination*

56210 Optimization of Thermoelectric Modules for Computer System Thermal Management and Infrastructure Energy Efficiency

Amip Shah, Anita Rogacs and Chandrakant Patel

56292 Thermal Analysis of a Micro-Electro-Mechanical Deformable Thin Film Package and Development of the Temperature Control System Using Transient Testing Method

Jae Choon Kim, Jin Taek Chung, Jae Hong Min, Dong Jin Lee, Ji-Hyuk Yu, JuHwan Lim, Byeong-Kwon Ju and SungWoo Hwang

56405 Piezoelectric Fans: Heat Transfer Enhancements or Electronics Cooling

James Petroski, Mehmet Arik and Mustafa Gursoy

56458 Validation of Dynamic Models for an Air-Cooled CPU Chip Cooling Device

R. Zhang, C. Zhang and J. Jiang

City Terrace 6

7-6-1 Heat Pipes I (K-13)

Chair: Hongbin Ma, *University of Missouri*; *Co-Chairs:* Ali Siapush, *INL*; Rathinam Selvam, *University of Arkansas*

56105 Transient Thermal and Hydrodynamic Performances of Flat Heat Pipe Subjected to Heating with Multiple Electronic Components

R. Sonan Ocho, S. Harmand, J. Pellé, D. Leger and M. Fakès

56128 Performance of a Flexible Evaporator for Loop Heat Pipe Applications

James F. Klausner and Mukta S. Limaye

56160 Heat Transport Capability and Fluid Flow Neutron Radiography of a Three-Dimensional Oscillating Heat Pipes

B. Borgmeyer, C. Wilson, R. A. Winholtz and H. B. Ma

56147 Parametric Control of a Two-Phase Thermal Management System for Space Applications

M.J. Brooks, L.C. Nortje, W.E. Lear and S.A. Sherif

TUESDAY August 12, 2008

PARALLEL SESSIONS /2:10 – 3:40 pm

City Terrace 7

14-4-1 Transport Phenomena in Fuel Cells (K-20)

Chair: Pradip Majumdar; *Co-Chairs:* Sandip Mazumder, *Ohio State University;* Yitung Chen

56020 Computational Modeling of the Cathode Catalyst Layer of a PEMFC
Sai Kamarajugadda and Sandip Mazumder

56408 Validation of a Computational Polymer Electrolyte Fuel Cell Model
Richard S. Fu and Ugur Pasaogullari

56425 Transient Modeling of Direct Internal Reforming Planar Solid Oxide Fuel Cells
C. Ozgur Colpan, Ibrahim Dincer and Feridun Hamdullahpur

56447 Effect of Reduced Temperature and Cathode Porosity on the Performance of Tubular Solid Oxide Fuel Cell
A.K. Sleiti, University of Central Florida

56362 A New Bipolar Plate of PEM Electrolysis Cell with Uniform Flow And Heat Transfer Fields
J. H. Nie, K. M. Veepuri, Y. T. Chen and J. F. Wu

3:40 – 4:00 pm Break

City Terrace 9

11-1-1 Heat and Mass Transfer in Biotechnology –I (K-17)

Chair: Malisa Sarntinoranont, *University of Florida;* *Co-Chair:* Deborah Pence, *Oregon State University*

56063 Theoretical Evaporation Model of a Single Droplet in Laser Treatment of PWS in Conjunction with Cryogen Spray Cooling
Zhifu Zhou, Hui Xin, Bin Chen and Guoxiang Wang

56198 Thermal Modelling for Design Optimization of a Microfluidic Device for Continuous Flow Polymerase Chain Reaction (PCR)
Sumeet Kumar, Todd Thorsen and Sarit Kumar Das

56396 Thermal Ablation of Mouse Skin Tissue Using Ultra-Short Pulsed 1552 nm Laser
Amir Yousef Sajjadi, Ogugua Onyejekwe, Shreya Raje, Kunal Mitra and Michael Grace

56409 Transient Thermal Response of Skin Tissue
Muge Pirtini Cetingul and Cila Herman

TUESDAY August 12, 2008

PARALLEL SESSIONS /4:00 – 5:30 pm

City Terrace 4

3-4-3 Thermal Transport in Nanostructures, Thin Films and Across Interfaces – II (K-8)

Chair: Alan McGaughey, *Carnegie Mellon University*; *Co-Chair:* Jennifer Lukes, *University of Pennsylvania*

56207 Quantum Dots for Liquid-Phase Thermometry in Silicon Microchannels
Myeongsub Kim and Minami Yoda

56244 Temperature Modeling for Carbon Nanofiber Breakdown

Drazen Fabris, Hirohiko Kitsuki, Toshishige Yamada, Xuhui Sun, Jorge Gonzalez Cruz and Cary Y. Yang

56339 Curvature Effect on the Thermal Conductivity of Nanowires

Liang-Chun Liu, Ronggui Yang and Meijiu Huang

56341 Radiative Properties of GaAs from First Principles Calculations

Hua Bao and Xiulin Ruan

56435 Longitudinal Thermal Conductivity of Silicon Nanowire Composites (presentation only)

Dipali Pradhan

6:00 – 8:00

Grand Ballroom 4 and 5

Awards Banquet

City Terrace 5

4-1-1 Micro Heat Exchangers (K-10)

Chair: Amir Jokar

56305 Axial Heat Conduction in Counter Flow Microchannel Heat Exchangers

B. Mathew and H. Hegab

56315 Effectiveness of Parallel Flow Microchannel Heat Exchangers with External Heat Transfer and Internal Heat Generation

B. Mathew and H. Hegab

56150 A Novel Gas-Water Heat Exchanger with Minichannels

Yang Chen, Per Lundqvist and Björn Palm

56029 Experimental Apparatus for Measuring in Tube Condensation Heat Transfer Coefficient and Pressure Drop Using Smooth and Micro-Fin Tubes for HFC Refrigerants

Pradeep A. Patil and S.N. Sapali

City Terrace 6

7-6-2 Heat Pipes II (K-13)

Chair: Hongbin Ma, *University of Missouri*; *Co-Chair:* Rathinam Selvam, *University of Arkansas*

56298 Thermal and Visual Observation of Water and Acetone Oscillating Heat Pipes

C. Wilson, B. Borgmeyer, I. Yoon, R. A. Winholtz, H. B. Ma, D. L. Jacobson, D. S. Hussey and M. Arif

56387 Loop Heat Pipe Startup with Liquid Core Visualization

B.P. d'Entremont, A.G. Kulakov, J.M. Ochterbeck, J. Perez and P.D. Rogers

56047 Development of the Loop Heat Pipe (LHP)

K. Tanaka

56203 Experimental Research on Heat Transfer Characteristic of Pulsating Heat Pipe

Li Jia and Yan Li

TUESDAY August 12, 2008

PARALLEL SESSIONS /4:00 – 5:30 pm

City Terrace 7

14-5-1 Industrial Applications of Computational Heat Transfer – I (K-20)
Chair: Kevin Dowding; *Co-Chair:* Stephen Webb, *Sandia National Laboratories*

56081 A Study on the Optimal Design of Heating Chamber in Sputtering Process for Large-Sized LCD Panel Manufacturing
Bin Hu and Kwang-Sun Kim

56078 Enhancement of Natural Convection Heat Transfer Rate in Internal Compressible Flows by Inserting Stationary Inserts
Emad Y. Tanbour and Ramin K. Rahmani

56303 An Efficient Software Architecture for Automated Coupling of Convection and Thermal Radiation Tools
Christian Rauch, Thomas Hörmann, Sebastian Jagsch and Raimund Almbauer

56040 The Effect of Obstacle Geometry and Its Position on Thermal Stratification in Solar Powered Domestic Hot Water Storage Tanks
Necdet Altuntop, Veysel Özceyhan, Yusuf Tekin and Sibel Gunes

City Terrace 8

1-6-1 Thermal Issues in Combined Heat and Power Systems (K-6)
Chair: Laura Schaefer, *University of Pittsburgh;* *Co-Chairs:* Wei Tong; S. A. Sherif, *University of Florida*

56062 Numerical Analysis for a Vapor Feed Miniature Direct Methanol Fuel Cell System
Bin Xiao and Amir Faghri

56077 CFD Approach Analysis of Chemical Reactions Coupled Convective Heat Transfer in Reformer Ducts
Jinliang Yuan, Guogang Yang and Bengt Sundén

56129 Thermal-economic Optimization of Combined Cycle Power Plant
Sepehr Sanaye and Pourya Ahmadi

56234 Optimum Flashing Pressure in Single and Double Flash Geothermal Power Plants
Shahin Amiri, Ahmad Kahrobaian and Shayan Amiri

56141 Visual Investigation and Comparison of the Thermal Characteristics of Fluid *With* and *Without* Nanoparticles Flowing Over a Heated Flat Plate
Dale A. McCants and Jamil A. Khan

City Terrace 9

11-1-2 Heat and Mass Transfer in Biotechnology – II (K-17)
Chair: Malisa Samtinoranont, *University of Florida;* *Co-Chair:* Deborah Pence, *Oregon State University*

56259 Numerical Prediction of the Temperature Distribution within a Human Eye during Laser Surgery
Sandeep Singh Kushwaha and P.S.Ghoshdastidar

56266 Errors in Skin Temperature Measurements
M. V. Dugay, S. K. S. Boetcher and E. M. Sparrow

56493 Analysis of Temperature Response in Biological Tissue with Sinusoidal Temperature Oscillation on the Skin
Ping Yuan, Hsueh-Erh LiuChih-Wei Chen and Hong-Sen Kou

WEDNESDAY August 13, 2008

7:00 – 8:00 am

Terrace Pavilion

Author's Breakfast
General Continental Breakfast

8:00 – 9:00 am

Grand Ballroom

Plenary: **Molecular Dynamic Simulation of Liquid Argon Film Evaporation and Colloidal Adsorption Characteristics in a Nanochannel**
Dr. Jacob N. Chung, University of Florida

PARALLEL SESSIONS / 9:10 – 10:40 am

City Terrace 4

3-6-2 Fundamentals of Heat Conduction (K-8)

Chair: Don Beasley; *Co-Chair:* Leslie Phinney, Sandia National Laboratories

City Terrace 5

4-2-6 High Temperature Applications (K-10)

Chair: Yaroslav Chudnovsky, Gas Technology Institute; *Co-Chair:* Vijayaraghavan Chakravarthy, Praxair Inc

City Terrace 6

7-5-1 Enhancement Methods (K-13)

Chair: Keith Hollingsworth, University of Houston; *Co-Chairs:* Afshin Ghajar, Oklahoma State University; Abhijit Mukherjee, MTU

56035 Inverse Solution to Steady Heat Conduction with Heat Generation in a Rectangular Solid Domain

M. Mosaad

56079 Experimental Study of Natural Convection Heat Transfer in a Vertical Pipe with Stationary Inserts

Emad Y. Tanbour and Ramin K. Rahmani

56275 Dependence of Heat Transfer Coefficient on Porous Structure in Porous Media

Akira Matsui, Kazuhisa Yuki and Hidetoshi Hashizume

56121 On Relativistic Transformation of Coordinates and Exact Solution of Damped Wave Conduction and Relaxation Equation

Kal Rengathan Sharma

56186 Thermal Model of a Gas Fired Generator for an Absorption GAX Cooling System

Vidal, M.A. Barrera-Chavarría, V.H. Gómez, J. Cervantes and R. Best

56350 Direct Numerical Simulation of EHD-Enhanced Film Boiling

Payam Sharifi and Asghar Esmaeeli

56123 Bessel Composite Function of the Third Order and First Kind Solution to Damped Wave Conduction and Relaxation

Kal Rengathan Sharma

56469 Thermal Analysis of Radiator Core in Heavy Duty Automobile

Srikanth Kolachalama, Kalyan Kuppa, Dhananjay Mattam and Mukul Shukla

56393 Subcooled and Saturated Pool Boiling on Nano-Finned Surfaces (presentation only)

Debyoti Banerjee

56449 Heat Transfer from Solids with Variable Thermal Conductivity and Uniform Internal Heat Generation Using HPM

Rahim Gu and W. A. Khan

56505 Designing Shell-and-Coil Mixed Convection Heat Exchangers

Nasser Ghorbani Mianroudi and Hessam Taherian

56440 Modeling the Retention of Water Droplets on Topographically-Modified, Micro-Grooved Aluminum

Andrew D. Sommers and Anthony M. Jacobi

56119 Transient Damped Wave Conduction and Relaxation in Human Skin and Thermal Wear During Winter

Kal Renganathan Sharma

56125 Prediction of Bundle Shell Side Condensation Heat Transfer Coefficient

Tailian Chen

56471 Experimental Investigation of an Evaporator Enhanced with a Micro-Porous Structure in a Two-Phase Thermosyphon Loop

Richard Furberg, Rahmatollah Khodabandeh, Björn Palm, Shanhua Li, Muhammet Toprak and Mamoun Muhammed

10:40 – 11:00 am

Break

WEDNESDAY August 13, 2008

**H
E
A
T

T
R
A
N
S
F
E
R**

PARALLEL SESSIONS / 9:10 – 10:40 am

<i>City Terrace 7</i>	<i>City Terrace 8</i>	<i>City Terrace 9</i>
14-5-2 Industrial Application of Computational Heat Transfer – II (K-20)	1-1-1 Inverse Problems and Optimization in Heat Transfer (K-6)	18-1-1 Thermophysical Properties – I (K-7)
<i>Chair: Kevin Dowding; Co-Chair: Stephen Webb, Sandia National Laboratories</i>	<i>Chair: Kyle Daun, University of Waterloo; Co-Chairs: Matthew R. Jones, Brigham Young University; Kevin Dowding; Keith Woodbury, The University of Alabama</i>	<i>Chair: A.M. Mahmoud, University of Florida; Co-Chair: Ayyoub Mehdizadeh, University of Florida; S.A. Sherif, University of Florida</i>
56109 Thermal-Structural Analysis of the Macarthur Maze Freeway Collapse Charles R. Noble, Aaron P. Wemhoff and Larry D. McMichael	56181 Reduced Order Modeling of Light Scattering by a Cloud of Particles James B. Hall, Travis J. Moore and Matthew R. Jones	56090 The Effects of Thermocouple Materials and Insulating Mica in an Erodable Surface Thermocouple Alan Grech, Tonio Sant and Mario Farrugia
56149 Experimental Validation of Passenger Car Underhood Simulation in the Presence of Convective and Radiative Heat Flux Daniele Suzzi, Bernhard Lechner, Sebastian Jagsch and Raimund Almbauer	56301 Accounting for Sensor Errors in Estimation of Surface Heat Flux by an Inverse Method Jonathan W. Woolley and Keith A. Woodbury	56197 Mid-Infrared Properties of Nanoscale Metallic Slit Arrays Y.-B. Chen, K. Fu, C.-H. Chen, P.-f. Hsu and Y.-C. Lee
56075 Heat Transfer Enhancement in a Tube Using Triangular Ribs Veyssel Ozceyhan and Sibel Gunes	56335 Predicting System Performance and Estimating Parameters for Systems Burdened with Uncertainties and Noise using Bayesian Inference A. F. Emery and D. Bardot	53227 Variation of the Thermal Conductivity of Elastomeric Foam with Pressure Erik R Bardy and Joseph C Mollendorf
56460 Analytical Study of Heat and Mass Transfer in Porous Sheets during Contact Drying Process Mohammad R. Izadpanah and Amir R. Ansari Dezfoli		56418 Thermal Wave Based Measurement of Liquid Thermal Conductivities Zhefu Wang and Richard B. Peterson
56017 Numerical Simulation of Natural Convection Flow in a Cube with a Horizontal Heated Strip Esam M. Alawadhi		

10:40 – 11:00 am

Break

WEDNESDAY August 13, 2008

PARALLEL SESSIONS /11:00 am – 12:30 pm

<i>City Terrace 4</i>	<i>City Terrace 5</i>	<i>City Terrace 6</i>
13-1-1 Panel on Future Directions in Renewable and Sustainable Energy Research (K-19)	4-2-8 Optimization and Efficiency (K-10)	6-1-1 High Heat Flux Cooling for Avionics (K-12)
<i>Chair: Jacob Chung, University of Florida Co-Chair: S.A. Sherif, University of Florida;</i>	<i>Chair: Behnam Bahr; Co-Chair: Paul Rubas, ExxonMobil Research & Engineering</i>	<i>Chair: Julie Asfia, Boeing Company; Co-Chairs: M. Erol Ulucakli, Lafayette College; David Carrington, Los Alamos National Laboratory</i>
56512 Thermodynamic and Thermal Transport Challenges in Energy Technologies Enabling Sustainable Transportation, Andrei Fedorov	56114 Design of Fin Plate Heat Exchanger for Increasing Micro Turbine Efficiency and Introduction of Fin Plate Heat Exchanger Design Software (KhoshNasr) for this Purpose Mehdi Nasrabadi and Ramin Haghighi Khoshkhoo	56438 Aerothermal Analysis of Small Payloads Delivered into Low Earth Orbit from an Airborne Launch Platform Martin J. Guillot and Ian McNab
56513 Distributed Energy: Its Role in a Sustainable Energy Future, William E. Lear		
56514 Potential of Hydrogen Production using Wind Energy, Michael B. Pate		
56515 Some Research Needs for More Sustainable Transportation, Vernon Roan		
56516 Research Needs for the Thermal-Chemical Conversion of Biomass and Solid Waste to Energy, Jacob Chung		
56517 Solar Energy Research on new Thermodynamic Cycles and Advanced Working Fluids, D. Yogi Goswami		
	56407 Assessment of Heat Transfer Effectiveness -- Application to Shell Bitumen Plant, Takoradi, Ghana Anthony Simons	56208 Explorations of Carbon Nanotube Wick Structure for High Heat Flux Cooling Qingjun Cai, Chung-lung Chen, Guangyong Xiong and Zhifeng Ren
	56442 Design and Limitations of Conduction-Based Heat Exchangers for Thermoacoustic Systems (presentation only) Cila Herman	56318 Thermally Induced Flow Structures in Aircraft Wing Compartments D. Newport, V. Egan, M. Aguanno, V. Lacarac, T. Brown, B. Estebe and Y. Murer
	56258 Simulation and Optimization of Drying Of Wood Chips with Superheated Steam in a Rotary Kiln P.S.Ghoshdastidar and Ankit Agarwal	
	56504 Experimental Study of Mixed Convection Shell-and-Coil Heat Exchanger Nasser Ghorbani Mianroudi, Mofid Gorji and Hessam Taherian	

Terrace Pavilion
12:05 – 1:00 pm

Lunch

Grand Ballroom 4&5

Plenary: 2008 Freeman Scholar Lecture
William K. George, Chalmers University of Technology

WEDNESDAY August 13, 2008

PARALLEL SESSIONS / 11:00 am – 12:30 pm

<i>City Terrace 7</i>	<i>City Terrace 8</i>	<i>City Terrace 9</i>
14-6-1 Micro/Nano Scale Applications of Computational Heat Transfer (K-20) <i>Chair: Jayathi Murthy, Purdue University; Co-Chair: Xiulin Ruan, Purdue University</i>		18-1-2 Thermophysical Properties – II (K-7) <i>Chair: Ayyoub Mehdizadeh, University of Florida; Co-Chair: A.M. Mahmoud, University of Florida; ; S.A. Sherif, University of Florida</i>
56233 Slip-flow and Conjugate Heat Transfer in Rectangular Microchannels H.D. Madhawa Hettiarachchi, Mihajlo Golubovic, William M Worek and WJ Minkowycz		56139 Chemical Kinetic Parameter Estimation for Ammonia Borane Hydrolysis Sumit Basu, Yuan Zheng and Jay P. Gore
56264 Modeling of Polarization-Specific Phonon Transmission Functions through Interfaces Zhen Huang, Jayathi Murthy and Timothy Fisher		56468 The Numerical Mirage Method for Photothermal Characterization of Materials Michael T. Demko, Stephen R. Hostler and Alexis R. Abramson
56288 Effects of Triangular Rough Elements on Flow And Heat Transfer in Micro-Channels Yan-hui Feng, Ai-guo Wang, Lin Lin, Xin-xin Zhang and Xin Liu		56487 Thermo-Physical Features of Extreme Activity of Metallic Nano-Particles Babak Shokri, Maziar S. Yaghmaee and M. Reza Rahimipour
56289 Modelization and Analysis of Natural Convection Heat Transfer in Nanofluids Pietro Marco Congedo, Stefano Collura and Paolo Maria Congedo		

H
E
A
T

T
R
A
N
S
F
E
R

WEDNESDAY August 13, 2008

PARALLEL SESSIONS /2:10 – 3:40 pm

City Terrace 4

3-6-3 Fundamentals of Heat Transfer – I (K-8)

Chair: Leslie Phinney, *Sandia National Laboratories*; *Co-Chair:* Don Beasley

56061 Numerical Prediction of Flow and Heat Transfer Rates in Metal Based Microchannels Using Lattice Boltzmann Method

Pritish R. Parida and Srinath V. Ekkad

56333 Turbulent Natural Convection in a Differentially Heated Vertical Channel

Abolfazl Shiri and William K. George

56413 Natural Convection Heat Transfer from Vertical Square Ducts

Mohamed E. Ali

56008 Entropy-Based Loss Coefficients for Turbulent Channel Flow with Heat Transfer

G. F. Naterer and O. B. Adeyinka

56028 Buoyant Convection Superposed Metal Foam and Water Layers

V. Kathare, F. A. Kulacki and Jane H. Davidson

City Terrace 5

4-3-1 CFD Modeling (K-10)

Chair: Arun Muley, *Honeywell Aerospace*; *Co-Chair:* Raj Manglik

56216 Numerical Study on Forced Convective Heat Transfer in Porous Pin Fin Channels

Jian Yang, Zen Ming and Qiuwang Wang

56421 Three-Dimensional CFD Modelling and Analysis of the Thermal Entrainment in Open Refrigerated Display Cabinets

Pedro Dinis Gaspar, L.C. Carrilho Gonçalves and R.A. Pitarma

56452 CFD Modeling and Analysis of a Small Shell-and-Tube Heat Exchanger

Ender Ozden and Ilker Tari

56217 Numerical Studies of a Novel Combined Multiple Shell-Pass Shell-and-Tube

Heat Exchanger with Helical Baffles
Qiuwang Wang, Guidong Chen, Qiuyang Chen, Min Zeng and Dahai Zhang

56011 A Dynamic Heat Transfer Analysis of a Three-Sided Pyramidal Fin of Scalene Triangular Cross-Sectional Area

Richard G. Carranza

City Terrace 6

6-2-1 Heat Transfer in Novel Thermal Management System (TMS) for Aerospace (K-12)

Chair: M. Erol Ulucakli, *Lafayette College*; *Co-Chair:* Julie Asfia, *Boeing Company*; N.K. Anand

56284 Measurement of Transient Natural Convection in Non-Ventilated Aircraft Compartments

V. Egan, T.W. Confrey, D. Newport and V. Lacarac

56319 A Thermoregulatory Model for Cooling Garment Applications with Transient Metabolic Rates

Johan K. Westin, Jayanta S. Kapa and Louis C. Chow

56320 An Analysis of Natural Convection in Leading Edge Wing Compartments

V. Egan, D. Moore, D. Newport, V. Lacarac, T. Brown and B. Estebe

56321 Velocity Field Measurements in Leading Edge Wing Compartments

V. Egan, D. T. Newport, V. Larcarac, T. Brown and B. Estebe

3:40 – 4:00 pm Break

WEDNESDAY August 13, 2008

PARALLEL SESSIONS /2:10 – 3:40 pm

City Terrace 7

2-2-1 General Papers - I

Chair: Jacob Chung, *University of Florida*; *Co-Chairs:* Shalabh Maroo, *University of Florida*; A.M. Mahmoud, *University of Florida*; Ayyoub Mehdizadeh, *University of Florida*

56044 Heat Transfer Enhancement in Channel Flow Using an Inclined Square Cylinder

Dong-Hyeog Yoon, Kyung-Soo Yang and Choon-Bum Choi

56172 The Effect of a Magnetic Field on Bouyancy-Driven L_{IN} Differentially Heated Square Cavity with Two Insulated Baffles

M. Ghassemi, M. Pirmohammadi and G. A. Sheikhzadeh

56238 Numerical Study of Natural Convection in a Partitioned Cavity

M. Ghassemi, M. Pirmohammadi and G. A. Sheikhzadeh

56497 Integrated Gas Dynamic and Thermodynamic Computational Modeling of Multicylinder 4-stroke Spark Ignition Engine using Gasoline as Fuel

J.V. Tirkey, H.N. Gupta and S.K.Shukla

56254 Temperature and Concentration Simulations in the Methanol Steam Reformer

Yen-Cho Chen, Rei-Yu Chein and Li-Chun Chen

3:40 – 4:00 pm Break

City Terrace 8

1-4-1 Integrated Modeling (K-6)

Chair: Jennifer Batson, *Lockheed Martin*; *Co-Chair:* Ab Hashemi

56191 Reverse Monte-Carlo Ray-Tracing Method Combined with Full Spectrum K-Distribution Method for Radiative Heat Transfer

Xiaojing Sun and Philip J. Smith

56236 Experimental and Numerical Determination of Thermal Radiative Properties of ZnO Particulate Media

Patrick Coray, Wojciech Lipiński and Aldo Steinfeld

56332 Numerical and Experimental Study on Heat Transfer Process under Microwave Irradiation with Inserting Reflector to Enhance Energy Absorption Rate

M Kumja, Ng Kim Choon and Christopher Yap

City Terrace 9

19-1-1 Low Temperature Heat and Mass Transfer (K-18)

Chair: Ayyoub Mehdizadeh, *University of Florida*; *Co-Chairs:* Peng Zhang, *Shanghai Jiao Tong University*; Fotouh Al-Raqom, *University of Florida*; S.A. Sherif, *University of Florida*

56163 Flow Boiling Patterns of Liquid Nitrogen in Micro-Tubes

P. Zhang, X. Fu and R. Z. Wang

56316 Experimental and Computational Study of Nanoparticle Transport in Agarose Gel

M. Salloum, D. Su, R. Ma and L. Zhu

56436 Performance of Thermoacoustic Refrigerators: Cooling Load and Coefficient of Performance

Cila Herman, Christopher Lavin and Zdenek Trávníček

WEDNESDAY August 13, 2008

PARALLEL SESSIONS /4:00 – 5:30 pm

City Terrace 4

3-6-4 Fundamentals of Heat Transfer II (K-8)

Chair: Don Beasley; *Co-Chair:* Leslie Phinney, *Sandia National Laboratories*

56243 Validation of a Thermal Spreading/Constriction Resistance Model for a Convectively Cooled Plate with an Applied Heat Flux
P.Y.C. Lee and W.H. Leong

56467 Solution of Heat Conduction Problem in Automotive Clutch and Brake Systems
Abdullah M. Al-Shabibi

56448 Effect of Variable Thermal Conductivity on Heat Transfer From a Hollow Sphere with Heat Generation
Z. H. Khan and W. A. Khan

56501 The Temperature Distributions of Trapezoidal Fin under Periodic Thermal Conditions
H.Shokouhmand, N.Khabazi, S.M.Taghavi and H.Jafari

56159 Analytic Solution of Thermal Spreading Resistance: Generalization To Arbitrary-Shape Heat Sources on a Half-Space
E. Sadeghi, M. Bahrami and N. Djilali

City Terrace 5

4-3-2 CFD Modeling – II (K-10)

Chair: Arun Muley, *Honeywell Aerospace*;
Co-Chair: Vijayaraghavan Chakravarthy, *Praxair Inc*

56237 Developing Forced and Free Convection for Inclined Semicircular Ducts
Yousef M. F. El. Hasadi

56268 Negatively Buoyant Plume Flow in a Baffle
S. K. S. Boetcher and F. A. Kulacki

56478 Heat Transfer Enhancement in Triangular Fin
H.Shokouhmand, M.Moghaddami and H.Jafari

56213 Performance Comparison of Particle Swarm Optimization and Genetic Algorithm in Rolling Fin-Tube Heat Exchanger Optimization Design
W.T.Han, L.H.Tang, G.N.Xie and Q.W.Wang

56241 Artificial-Neural-Networks-based Correlating Heat Transfer and Friction of Three Kinds of Heat Exchangers having Large Tube-Diameter and Large Tube-Row
Gongnan Xie, Bengt Sunden, Linghong Tang and Qiuwang Wang

City Terrace 6

7-1-1 Spray and Jet Heat Transfer (K-13)

Chair: Vinod Narayanan, *Oregon State University*; *Co-Chairs:* Tailian Chen, *Wolverine Tube Inc.*; Jungho Kim, *U. of Maryland*

56034 Direct Simulation of Spray Cooling: Effect of Multiple Droplet Impact and Latent Heat of Vaporization of Coolant Liquid on Heat Transfer
Mita Sarkar, R. Panneer Selvam and Rengasamy Ponnappan

56148 Jet Impingement Melting with Vaporization: A Numerical Study
Jayesh Jain, Subhrajit Dey, L. Muralidharan, Andrew M. Leach and Jan Henrik Ardenkjaer-Larsen

56003 Experimental Measurements and Numerical Modeling for the Air-Mist Cooling of a Heated Cylinder
Roy J. Issa, Emily M. Hunt and Freddie J. Davis

56371 Phenomenon Identification and Ranking Exercise and a Review of Large-Scale Spray Modeling Technology
Alexander L. Brown, Sam S. Yoon and Richard A. Jepsen

56384 Hysteresis in Spray Cooling of Micro-Structured Surfaces
Huseyin Bostanci, Daniel P. Rini, John P. Kizito and Louis C. Chow

WEDNESDAY August 13, 2008

PARALLEL SESSIONS /4:00 – 5:30 pm

City Terrace 7

2-2-2 General Papers II

Chair: Alpana Agarwal; *Co-Chairs:*
Fotouh Al-Raqom, *University of Florida*
Ayyoub Mehdizadeh, *University of*
Florida; A.M. Mahmoud, *University of*
Florida

56441 Statistical Model of Operational Parameters Influence over the Thermal Contact Resistance on Bimetallic L-Type Finned Tubes

Ignacio Carvajal-Mariscal, Florencio Sanchez-Silva, Georgiy Polupan and Yevgen Pysmenny

56054 Comparison of Vacuum Glazing Thermal Performance Predicted Using Two and Three Dimensional Models and Their Experimental Validation

Yueping Fang, Trevor J. Hyde, Neil Hewitt, Philip C. Eames and Brian Norton

56279 Single Impinging Slot Jet on a Concave Surface: Inlet/Outlet Influence

L.-E. Brizzi, T.K.D. Hoang, E. Dorignac and M. Fénot

56323 Effects of Channel Height and Bulk Temperature Considerations on Heat Transfer Coefficient of Wetted Surfaces in a Single Inline Row Impingement Channel

Mark Ricklick, Stephanie Kersten, V. Krishnan and J. S. Kapat

56173 An Analysis of a Direct Contact Ice Slurry Generator

M.A. Wahed and M.N.A Hawlader

56369 Experimental Analysis of Backward Facing Step Flow in Microchannels using Micro Particle Imaging Velocimetry (presentation only)

Ranganathan Kumar

City Terrace 8

1-3-1 Heat Transfer in Nanostructure and Naoporous Materials (K-6)

Chair: Ab Hashemi; *Co-Ch* Ingrid Cotoros, *Lockheed Martin air:*

56306 Thermal Management in the Measurement of Metal Hydride Kinetics

Tyler G Voskuilen, Yuan Zheng and Timothée Pourpoint

56311 Transient Plane Source Method for Thermal Property Measurements of Metal Hydrides

Scott Flueckiger, Yuan Zheng and Timothée Pourpoint

56385 Thermal Transport in Finite Sized Nanocomposites

Dhruv Singh, Jayathi Y. Murthy and Timothy S. Fisher

56403 Atomic-Scale Three-Dimensional Phononic Crystals with a Lower Thermal Conductivity than the Einstein Limit of Bulk Silicon

Jean-Numa Gillet, Yann Chalopin and Sebastian Volz

56412 Measurement of Near-Field Thermal Radiation between Two Closely-Spaced Glass Plates

Lu Hu, Arvind Narayanaswamy, Xiaoyuan Chen and Gang Chen

56450 Performance of Thermal Enhancement Materials in High Pressure Metal Hydride Storage Systems

Timothée L Pourpoint, Aaron Sisto, Kyle C Smith, Tyler G Voskuilen, Milan K Visaria, Yuan Zheng and Timothy S Fisher

City Terrace 9

WELCOME TO THE 2008 ASME ENERGY SUSTAINABILITY CONFERENCE

This 2nd International Conference on Energy Sustainability (ES2008) is an orchestrated effort by the American Society of Mechanical Engineers (ASME) to provide a prime technical forum for in-depth discussions of the sustainability of energy alternatives. This conference could not be more timely. As the world struggles with record high oil prices and clear signs of the effects of global warming, Energy Sustainability 2008 addresses these sensitive issues with technical depth and breadth. The range of relevant topics includes quantification methods of sustainability, application of sustainability indexes to energy solutions, impacts on climate, advances in energy efficiency techniques, and advances on clean and sustainable energy solutions, such as hydrogen, solar, and wind. The Conference brings together scientists, engineers, students, and faculty to address the broad topic of energy sustainability.

ES2008 is the result of joint efforts by two relevant technical divisions of the ASME, the Advanced Energy Division (AED) and the Solar Energy Division (SED), plus input from several affiliate organizations including the American Society of Heating, Refrigeration and Air Conditioning (ASHRAE), the Mexican Solar Energy Society (ANES), and the Canadian Solar Energy Society. The initial ASME Energy Sustainability Conference (ES2007) was held last year in Long Beach, CA, USA, where more than 150 papers were presented. This year's ES2008 has grown to more than 175 technical papers and posters organized in concurrent technical sessions, poster sessions, and plenary talks. A student tutorial session and a workshop on combined heat & power both complement the Conference.

ES2008 is co-located with the ASME Heat Transfer, Nano Institute, and Fluids Conferences for a magnum event of more than 1000 technical papers. Attendees to the ES2008 Conference may attend any of the participating Conferences at no additional charge.

We invite you to attend the ES2008 social events to meet your colleagues in the energy sustainability field both at Sunday evening's Opening Reception, and at the Honors & Awards Dinner on Tuesday. We also invite you to get involved in future conferences by suggesting symposiums, sessions, authoring and/or reviewing papers, and by signing up to be a member of a technical committee or as session organizer for future conferences.

Welcome, and feel free to contact any of the below organizers to assist you in better enjoying ES2008!

Dr. Jeff Morehouse
General Program Chair
Solar Energy Division, 2007-2008

Dr. Sriram Somasundaram
General Program Chair
Advanced Energy Systems Division, 2007-2008

Dr. Jorge E. González
Technical Program Chair
Solar Energy Division, 2007-2008

Dr. Shiva Prasad
Technical Program Chair
Advanced Energy Systems Division, 2007-2008

ES2008-Track Chairs

Track 1 Exergy for Sustainability (Track)

Track Chair: Ibrahim Dincer, *University of Ontario Institute of Technology*

Track 2 Emerging Energy Policy Issues (Track)

Track Chair: Sriram Somasundaram, *Pacific Northwest National Laboratory*

Track Co-Chair: Michael Webber, *University of Texas at Austin*

Track 4 Life-cycle Costing of Energy Systems (Track)

Track Chair: Francesca Iacobone, *Università degli Studi ROMA TRE*

Track Co-Chair: Giovanni Cerri, *Università degli studi ROMA TRE*

Track 5 Emissions, Energy & Environment (Track)

Track Chair: Michael Webber, *University of Texas at Austin*

Track 6 Alternatives to Carbon-Based Energy Technologies (Track)

Track Chair: Bale V. Reddy, *University of Ontario Institute of Technology*

Track 7 Sustainable Energy Figures of Merit (Track)

Track Chair: Alexandre K. da Silva, *University of Texas at Austin*

Track Co-Chair: Birol Kilkis, *Exergy for Global Sustainability*

Track 8 Energy Systems Technologies, Analysis and Design (Track)

Track Chair: Mansour Zenouzi, *Wentworth Institute of Technology*

Track Co-Chair: Gregory J. Kowalski, *Northeastern University*

Track 9 Performance Results of Renewable Energy Systems (Track)

Track Chair: James Menart, *Wright State University*

Track 10 Advances in Transportation Fuels & Systems for the 21st Century (Track)

Track Chair: Roy E. Hogan, *Sandia National Laboratories*

Track Co-Chair: Alexander L. Brown, *Sandia National Labs*

Track 11 Advances in Fuel Cells and Hydrogen Energy Technologies (Track)

Track Chair: Ibrahim Dincer, *University of Ontario Institute of Technology*

Track 12 Heat Pump Systems & Technologies (Track)

Track Chair: Abdi Zaltash, *Oak Ridge National Laboratory*

Track Co-Chair: Hongxi Yin, *Carnegie Mellon University*

Track 13 Distributed & Combined cooling, Heating and Power Technologies (CHP, CCHP) (Track)

Track Chair: Abdi Zaltash, *Oak Ridge National Laboratory*

Track Co-Chair: Hongxi Yin, *Carnegie Mellon University*

Track 15 Thermodynamics for Energy Systems (Track)

Track Chair: Mehmet Kanoglu, *University of Gaziantep*

Track Co-Chair: James Menart, *Wright State University*

Track 16 Fluid-thermal Sciences for Energy Systems (Track)

Track Chair: Tim Marbach, *California State University Sacramento*

Track 17 Energy Systems Miniaturization (Track)

Track Chair: Terry Hendricks, *Battelle Memorial Institute*

Track 18 Climate Control (Track)

Track Chair: Vinod Narayanan, *Oregon State University*

Track 20 Low/Zero Emission Power Plants (Track)

Track Chair: Bale V. Reddy, *University of Ontario Institute of Technology*

Track 21 Zero Energy Homes (Track)

Track Chair: Andy Walker, *NREL*

Track 22 Advances in Solar Hydrogen, Solar Chemistry & Bioconversion (Track)

Track Chair: Christian Sattler, *German Aerospace Center*

Track 23 Solar Thermal and Photovoltaic Power (Track)

Track Chair: Alfonso Ortega, *Villanova University*

Track Co-Chair: Charles Andracka, *Sandia National Laboratories*

Track 24 Concentrating Solar Components and Systems (Track)

Track Chair: Charles Andracka, *Sandia National Laboratories*

Track Co-Chair: Carl Bingham, *NREL*

Track 25 Advances in Solar Heating and Cooling Systems (Track)

Track Chair: Jorge Gonzalez, *Santa Clara University*

Track Co-Chair: David H. Archer, *Carnegie Mellon University*

Track 26 Advances in Energy Storage (Track)

Track Chair: Stephen Harrison, *Queen's University*

Track 27 Wind Energy System Technologies and Design (Track)

Track Chair: Daniel Laird, *Sandia National Laboratories*

Track Co-Chair: Paul Veers, *Sandia National Laboratories*

Track 29 Water Desalination Systems (Track)

Track Chair: Jorge Gonzalez, *Santa Clara University*

Track 30 Energy and Global Climate Change (Track)

Track Chair: Robert H. Turner, *University of Nevada at Reno*

Track 31 Solar & Wind Resources Assessment (Track)

Track Chair: Robert H. Turner, *University of Nevada at Reno*

Track 32 Posters (Track)

Track Chair: James Menart, *Wright State University*

MONDAY August 11, 2008

7:00 – 8:00 am
Terrace Pavilion

Author's Breakfast
General Continental Breakfast

8:00 – 9:00 am
Grand Ballroom

Keynote: **The Role of Nuclear Energy in Our Future**
Dr. Kathryn A. McCarthy, Idaho National Laboratory

PARALLEL SESSIONS / 9:00 – 10:30 am

Grand Ballroom 1

2-3 Thermal and Power Issues in Industry

Chair: Sriram Somasundaram,
Pacific Northwest National Laboratory

54120 Utilization of Heat, Power and Recovered Waste Heat for Industrial Processes in the US Chemical Industry
Nesrin Ozalp,

54136 Sustainable Energy for Deployed Military Bases
Thomas J. Hartranft

54147 Water Intensity of Transportation Fuels: Water Projections for Fuel Adoption Rates of Light Duty Vehicles
Carey King, Michael Webber and Ian Duncan

Grand Ballroom 2

4-1 Life-Cycle Costing of Energy Systems

Chair: Marco Gazzino, *ENEL S.p.A*

54130 Net Energy for Concentrated Solar Power in Chile
Rodrigo Escobar and Teresita Larrain

54203 The Spark Spread as a Measure of Economic Viability for a Combined Heating and Power Application with Ideal Loading Conditions
Rhett D. Graves, B. K. Hodge and Louay M. Chamra

54245 Distillation Cost Calculations of Various Designs of Conventional Solar Still Systems
S.K.Shukl

54313 30 – Year Life Cycle Cost of Solar Based Domestic Hot Water Systems for Ontario
Gurjot S. Gill and Alan S. Fung

54329 Life Cycle Assessment of Hydrogen Production Using Nuclear Energy: An Application Based on Thermochemical Water Splitting
Luthfi L. Lubis, Ibrahim Dincer and Marc A. Rosen

Grand Ballroom 3

5-1 National Assessments and Approaches to Reducing Emissions

Chair: Marco Gazzino, *ENEL S.p.A*

54105 Greenhouse Gas Emission Reduction Potential in Iranian Electricity Generation Sector and Comparison with Canada
Farshid Zabihian and Alan S. Fung

54218 Numerical Modeling of an Automotive Catalyst for CO and NO Emissions
Juan C. Prince, César Treviño and Mario Diaz

54149 Cow Power: The Energy and Emissions Benefits of Converting Manure to Biogas
Amanda D. Cuéllar and Michael E. Webber

54225 Reducing Emissions and Improving Energy Efficiency in the Upstream Oil and Gas Industry
Harald Underbakke, Inge Brigit Gytri, Jon Jakobsen and Stig Hove

54355 Potential of Industrial Solid Wastes as an Energy Source and Gaseous Emissions Evaluation in a Pilot Scale Burner
Silvia L. Floriani, Elaine Virmond, Christine A. Althoff, Regina F.P.M. Moreira and Humberto J. José

Grand Ballroom 6

21-1 Advances in Zero Net Energy & Solar Buildings

Chair: Andy Walker, *NREL*

54255 Modelling of the Net Zero Energy Town House in Toronto uUsing TRNSYS, and an Analysis of the Impact Using Thermal Mass
Omar Siddiqui, Alan Fung, Humphrey Tse and Dahai Zhang

54290 Zero Energy Houses and Embodied Energy: Regulatory and Design Considerations
Patxi Hernandez and Paul Kenny

54327 Design, Simulation and Preliminary Results of an All Electric Netzero Energy Solar Home
Ty A. Newell and Patrick L. Chapman

54179 Technical Considerations in a Zero Energy Home
Dorothy S. Small

54044 Modeling and Validation of Building Thermal Performance of the 2007 Santa Clara University Solar Decathlon House
H. Elizando, B. Lebassi and J. E. Gonzalez

10:30 – 11:00 am

Break



MONDAY August 11, 2008

PARALLEL SESSIONS / 11:00 – 12:30 am

Grand Ballroom 1

6-1 Alternatives to Carbon-Based Energy Technologies
Chair: Bale V. Reddy,
University of Ontario Institute
of Technology

54007 The Study on the Characteristics of Fly Ash from CFB
Qian Yang, Yong Tao Yuan and
Li Qiang Qi

54177 Viable Tailored Organic Fertilizer Alternatives From Waste Produced by Bio-Diesel Extraction Process and Tobacco Industry
Shivani Chaturvedi,
Geetanjali Kaushik, Arvind
Chel and Santosh Satya

54239 Space Based Solar Collectors Constructed from Lunar Materials
David A. Renfroe

Grand Ballroom 2

8-1 Thermoeconomic Analysis of Energy Systems
Chair: Mansour Zenouzi,
Wentworth Institute of
Technology; Co- Chair:
Gregory J. Kowalski,
Northeastern University

54106 Energy and Exergy Analysis of Gasifier-Based Coal-to-Fuel Systems
Yunhua Zhu, Sriram
Somasundaram and James W.
Kemp

54220 Thermodynamic Design and Comparative Analysis Rankine, ORC, and Kalina Cycles for Low-Cost, Meso-Scale Power Generation Systems
Suzanne E. Price and J. Rhett
Mayor

54047 Energy Saving Studies in Industrial Facilities
Mehmet Kanoglu, Ilker
Karabay and Ibrahim Dincer

Grand Ballroom 3

16-1 Fluid-Thermal Sciences for Energy Systems I
Chair: Tim Marbach,
California State University
Sacramento

54086 An Analysis of the Heating and Heat Storage Problems in Passive Solar Heating Room with Greenhouse
Wei Chen

54129 Performance of Solid Particle Receivers with or Without the Protection of an Aerowindow
Taide Tan, Yitung Chen and
Zhuoqi Chen

54267 Energy Efficient Polymers for Gas-Liquid Heat Exchangers
Patrick Luckow, Avram Bar-
Cohen, Peter Rodgers and
Juan Cevallos

54146 Numerical Study of Temperature Field in BEPCII Interaction Region
Xunfeng Li, Li Wang, Lifang
Zheng and Quan Ji

Grand Ballroom 6

22-1 Solar Hydrogen I
Chair: Christian Sattler, DLR

54151 Reactivity of Iron-Containing YSZ for a Two-Step Thermochemical Water Splitting Using Thermal Reduction Temperatures Of 1400-1500°C
Tatsuya Kodama, Eiji Hiraiwa
and Nobuyuki Gokon

54281 Solar H₂ Production from a Two-Step Water Splitting Process with Metal (Fe, Ni) Doped Ceria
H. Kaneko, Y. Naganuma,
S. Taku, K. Ouchi,
N. Hasegawa and Y. Tamaura

54282 Simultaneous Production of H₂ and O₂ with Rotary-Type Solar Reactor (Tokyo Tech Model) For Solar Hybrid Fuel
Y. Tamaura, H. Kaneko,
Y. Naganuma, S. Taku,
K. Ouchi and N. Hasegawa

54170 Reactive Pellets for Improved Solar Hydrogen Production Based on Sodium Manganese Ferrite Thermochemical Cycle
Carlo Alvani, Mariangela
Bellusci, Aurelio La Barbera,
Franco Padella, Marzia
Pentimalli, Luca Seralessandri
and Francesca Varsano

Terrace Pavilion
12:05 – 1:00 pm

Lunch

Grand Ballroom 4&5
1:00 – 2:00 pm

Plenary: Thirty years of Naval Propulsor Hydrodynamic Research At the Naval Surface Warfare Center, Carderock Division
Dr. Stuart Jessup, Naval Surface Warfare Center

MONDAY August 11, 2008

PARALLEL SESSIONS / 2:00 – 3:30 am

Grand Ballroom 1

7-1 Building Energy Efficiency Metrics

Chair: Alexandre K. da Silva, University of Texas at Austin

54111 Energy Saving Potentials of All Cold Air Distribution System with Stratified Air Conditioning in Large Space Building

Wei Bing, Li Li, Gao Yuefen and Yang Xianliang,

54112 Indoor Environment Numerical Simulation of All Cold Air Distribution System with Stratified Air Conditioning

Wei Bing, Li Li, Jiang Lu and Zhang Wei

54004 Coping with the Obstacles in Harvesting the Energy of Sea Waves

S. Yedidiah

54062 Effects of High Figure of Merit Bi₂Te₃ Based Superlattices on Thermoelectric Power Generation

Christopher A. Howells, Cynthia Watkins and Rama Venkatasubramanian

Grand Ballroom 2

8-5 Solar Splash

Chair: Jeffrey Morehouse University of South Carolina

54259 Solar Splash: The ASME/IEEE Intercollegiate Solar Boat Competition -- Team Reports

Jeffrey H. Morehouse

54364 Team Report from the University of Arkansas

Kevin Campbell

54365 Team Report from the University of South Carolina

Jon Lowder

54366 Team Report from the University of Northern Iowa

Douglas Bechthold

Grand Ballroom 3

16-2 Fluid-Thermal Sciences for Energy Systems 2

Ch Yitung Chen, *University of Nevada, Las Vegas air:*

54351 A Simplified Model of Desiccant Wheel and Implementation in a Design Tool

Fatemeh Esfandiari Nia and Dolf van Paassen

54352 A Simplified Graphical Model of Air Cooler using Mollier Diagram and Implementation in a Design Tool

Fatemeh Esfandiari Nia and Dolf van Paassen

54072 Self-Entrainment Characteristics and Performance of a Compact Air Ejector

Kartik V. Bulusu and Charles A. Garris Jr

54153 Optimal Minimum Airflow for Air Circulation of Single Duct VAV Terminal Boxes

Young-Hum Cho and Mingsheng Liu

Grand Ballroom 6

24-1 Concentrating Solar Components and Systems

Chair: Charles Andraka, Sandia National Labs

54048 The Cost of Cheap Reflectors for Concentrating Dish Systems

C.E. Andraka

54101 CFD Analysis of the Cool-Down Behaviour of Molten Salt Thermal Storage Systems

Jan Schulte-Fischedick, Rainer Tamme and Ulf Herrmann

54248 Design and Operational Testing of a Lightweight, Inflated Concentrating Collector

Tom Filburn, Barry Lubin and Mike Costen

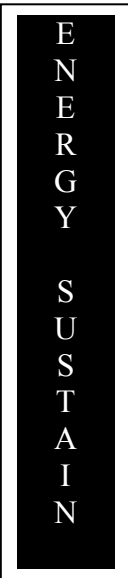
54258 Low-Cost Pyrometric Temperature Measurement in Concentrated Sunlight with Emissivity Determination

Nathan B. Crane

54347 Solar Concentrating Systems Using Small Mirror Arrays

Joachim Goettsche, Bernhard Hoffschmidt, Stefan Schmitz, Markus Sauerborn, Reiner Buck, Kathrin Badstübner, David Ifland and Christian Rebholz

3:30 – 4:00 pm Break



MONDAY August 11, 2008

PARALLEL SESSIONS / 4:00 – 5:30 am

Grand Ballroom 1

**9-1 Performance Results of
Renewable Energy Systems**

*Chair: James Menart, Wright State
University*

Grand Ballroom 2

Grand Ballroom 3

Grand Ballroom 6

**54030 Performance Evaluation of
Concentrating Solar Cooker under
Indian Climatic Conditions**

S.K.Shukla, S. K. Gupta and
S.K.Sharma

**54262 Assessment of a Biomass
Gasification Co-Generation Plant
Based on the UCS'S "Principles for
Bioenergy Development"**

Jeffrey H. Morehouse and Kenneth W.
Detwiler

**54284 Analysis of a Combined
Power and Refrigeration Cycle
Working on Solar Energy**

*Bijan Kumar Mandal, Kousik
Sadhukhan and Achin Kumar
Chowdhuri*

**54335 An Estimation of the
Performance Limits of Dry Cooling
on Trough-Type Solar Thermal
Plants**

Huifang Deng and Robert F Boehm

6:00-7:30

Grand Ballroom 4 and 5 **Max Jacob Memorial Award**

TUESDAY August 12, 2008

7:00 – 8:00 am
Terrace Pavilion

Author's Breakfast
General Continental Breakfast

8:00 – 9:00 am
Grand Ballroom

Plenary: **The Carbon Journey – The Nation's Need to Reduce Emissions and Increase Energy Security**
J. Michael Davis, Pacific Northwest National Laboratory

PARALLEL SESSIONS / 9:00 – 10:30 am

Grand Ballroom 1

22-2 Solar Hydrogen II

Chair Christian Sattler, DLR

54090 Design and On-Sun Testing of a Solid Particle Receiver Prototype
Nathan Siegel and Greg Kolb

54098 Design of a Quench Device for Synthesis and Hydrolysis of Zn Nanoparticles: Modeling and Experiments
Aiman Alshare, Tareq Abu Hamed, Marc Brühlhart and Jane H. Davidson

54156 Kinetics of CO₂ Reforming of Methane by Catalytically-Activated Metallic Foam Absorber for Solar Receiver-Reactor
Nobuyuki Gokon, Yusuke Osawa, Daisuke Nakazawa, Tsuyoshi Hatamachi and Tatsuya Kodama

Grand Ballroom 2

23-3 Solar Thermal Power Systems

Chair: Alfonso Ortega, Villanova University

54354 Solar Thermal Electric Panel (STEP): Thermal and Energy Testing
Joel A. Lamson and Stuart W. Baur

54176 Heat Conduction of Inert Gas-Hydrogen Mixtures in Parabolic Trough Receivers
Frank Burkholder, Michael Brandemuehl, Chuck Kutscher and Ed Wolfrum

54339 Modeling, Simulation and Optimization of a Solar System for Water Heating and Absorption Cooling
J. V. C. Vargas, J. C. Ordóñez, R. Hovsapian and F. G. Dias

Grand Ballroom 3

1-1 Exergy Analysis

Chair: Ibrahim Dincer, University of Ontario Institute of Technology

54033 Energetic and Exergetic Analysis of Building Cogeneration Systems
Yilmaz Yoru, T. Hikmet Karakoc, Arif Hepbasli and Enis T. Turgut

54159 Energy and Exergy Analysis of a Double Effect Series Flow and Parallel Flow Type Absorption Cooling System
M. Zeki Yilmazoglu and Ali Durmaz

54346 Exergy Analysis of dn Indirectly-Fired Combined Cycle Power Generation System
Kin F. Chui, Nirmal V. Gnanapragasam, Bale V. Reddy and Ramesh C. Prasad

Grand Ballroom 6

2-1 Electrical Power Sector Issues

Chair: Michael Webber, University of Texas at Austin

54148 An Assessment and Comparison of Installed Solar and Wind Capacity in Texas: a Regional Case Study
Erin Keys and Michael E. Webber

54169 Empirical Assessment of the Impact of Power Sector Reforms in Africa: A Study of the Generation, Transmission and Distribution Sectors
William Kwasi Gboney

54205 Impact of Adopting the Time-of-Use Rate Plans on the Electricity Cost in the Canadian Residential Sector
Ali M. Syed and Alan S. Fung

54296 Turning CO₂ Capture on and off in Response to Electric Grid Demand: A Baseline Analysis of Emissions and Economics
Stuart M. Cohen and Gary T. Rochelle

54155 Cost Competitive Implementation of Community Shared Microgrids
James S. Hammonds Jr

City Terrace 10

8-2 Energy Systems Analysis and Design

Chair: Gregory J. Kowalski, Northeastern University; Co-Chair: Mansour Zenouzi, Wentworth Institute of Technology

54140 Spreading an Integrated Design Process to Improve Residential Energy Efficiency
Matthew L. Hoffman

54269 The Energy Needs and Opportunities at Publicly Owned Wastewater Treatment Plants in the US
David C. Hoppock and Michael E. Webber

54221 Urban Building Energy Planning with Space Distribution and Time Dynamic Simulation
Lin Fu, Zhonghai Zheng, Hongfa Di and Yi Jiang

54272 Development of a Program in Innovative and Sustainable Design of Automotive and Building Technologies
Derrick Tate, Timothy Maxwell, Urs Peter Flueckiger, Kuhn Park and Michael Parten

E
N
E
R
G
Y

S
U
S
T
A
I
N

10:30 – 11:00 pm

Break

TUESDAY August 12, 2008

PARALLEL SESSIONS /11:00 – 12:30 am

Grand Ballroom 1 22-3 Solar Hydrogen III

Chair: Christian Sattler,
DLR

54085 Effect of Operation Conditions on Hydrogen Production by PSB in Immobilized-cells Packed Bed
Y. Z. Wang, Q. Liao and X. Zhu

54118 Experimental Investigation of a Packed-Bed Solar Reactor for the Steam-Gasification of Carbonaceous Materials
Nicolas Piatkowski, Christian Wieckert and Aldo Steinfeld

54202 A Solar Powered Microreactor for Hydrogen Production by Methanol Reforming
Raúl Zimmerman, Graham Morrison and Gary Rosengarten

54093 Kinetic Investigations of a Two-Step Thermochemical Water-Splitting Cycle Using Mixed Iron Oxides Fixed on Ceramic Substrates
Martina Neises, Martin Roeb, Christian Sattler and Robert Pitz-Paal

Grand Ballroom 2 29-1 Water Desalination Systems

Chair: Jorge E. González, *Santa Clara University*

54075 Solar Flash Desalination under Hydrostatically Sustained Vacuum
Mohammad Abutayeh and Yogi Goswami

54162 Conversion of Seawater to Fresh Water: An Experiment with a Solar Assisted Heat Pump
M N A Hawlader and Zakaria Mohd. Amin

54253 Experimental and Theoretical Investigations of Performance of Multi-Stage Solar Still Water Desalination Unit Coupled with an Evacuated Tube Solar Collector
M.I.M. Shatat, K. Mahkamov and K. Johnson

Grand Ballroom 3 1-3 Exergy and Sustainable Development

Chair: Ibrahim Dincer, University of Ontario Institute of Technology

54063 Piezoelectric Energy Conversion Using Locomotion
Christopher A. Howells

54089 Designing Environmentally Sustainable Electronic Cooling Systems Using Exergo-Thermo-Volumes
Amip J. Shah and Chandrakant D. Patel

54104 Integrated Energy Strategy – A Case for Sustainability
Raymond Hobbs

54181 Lifetime Exergy Consumption as a Sustainability Metric for Enterprise Servers
Christopher R. Hannemann, Van P. Carey, Amip J. Shah and Chandrakant Patel

54241 Comparing the Eco-Footprint of On-Site CHP vs. EPGS Systems
Milton Meckler, Lucas B. Hyman and Kyle A. Landis

Grand Ballroom 5 8-3 Power Plant and Thermodynamic Cycle Analysis

Chair: Mansour Zenouzi, *Wentworth Institute of Technology*; *Co-Chair:* Alexandre K. da Silva, *University of Texas at Austin*

54040 CBM Liquefaction Processes Integrated with Adsorption Separation of Nitrogen
Ting Gao, Wensheng Lin, Anzhong Gu and Min Gu

54121 Energy Process-Step Model of Hydrogen Production in the US Chemical Industry
Nesrin Ozalp

54276 Simulation of a Thermodynamic Cycle with Organic Absorbents and CO₂ as Working Fluids
Huijuan Chen

54196 CSULA Campus Energy Assessment Project
Rieson Chude, Hugo Gil, Jaime Hernandez, Brian Choi, Daniel Jarrous, Ryan Reyes, Heather Rudow and Sonu Upadhyay

Grand Ballroom 6 13-1 Design/Development of Integrated Energy Systems (IES)

Chair: Abdi Zaltash, *Oak Ridge National Laboratory*; *Co-Chair:* Hongxi Yin, *Carnegie Mellon University*

54131 Biodiesel Fueled Engine Generator with Heat Recovery
Fred Betz, David Archer, Christopher Damm and Brian Goodwin

54190 Integration of the Active Desiccant Wheel in CHP System Design
Chaoqin Zhai, David H. Archer and John C. Fischer

54042 Distributed Combined Cooling Heating and Power System and Its Development Situation in China
Jiang-Jiang Wang, You-Yin Jing, Chun-Fa Zhang and Bin Zhang

54113 Development Prospects of Distributed Energy System in China
Guohua Shi, Songling Wang, Youyin Jing and Yuefen Gao

54252 Study of Optimal Retrofit Design for BCHP System Equipped with Gas-Fired Absorption Chillers
Jiacong Cao and Cheng Liu

Terrace Pavilion 12:05 – 1:00 pm

Lunch

Grand Ballroom 4&5

1:00 – 2:00

Plenary: Energy for Sustainability
Trung Van Nguyen, National Science Foundation

Orlando

1:00 – 2:00

Plenary: Energy Research: Opportunities and Challenges
Mildred Dresselhaus, Massachusetts Institute of Technology

TUESDAY August 12, 2008

PARALLEL SESSIONS / 2:00 – 3:30 am

Grand Ballroom 1

25-1 Advances in Solar Cooling

Chair: David H. Archer, *Carnegie Mellon University*

54102 Simulation and Experimental Analysis of a Solar Driven Absorption Chiller with Partially Wetted Evaporator

Jan Albers, Giovanni Nurzia and Felix Ziegler

54127 Combined Solar Heating and Cooling Systems: Simulation and Design Optimization

Giovanni Nurzia, Giuseppe Franchini and Antonio Perdichizzi

54141 Performance Value Index of the Solar Air-Conditioning System—PVI

Yuefen Gao, Xutao Zhang and Guohua Shi

54200 Experiment Based Performance Analysis of a Solar Absorption Cooling and Heating System in the Intelligent Workplace

Ming Qu, David H. Archer and Hongxi Yin

54260 Efficiency Enhancement Using Cold Storage for Solar Powered Absorption Cooling of Data Centers

Russell Muren and Van P. Carey

Grand Ballroom 2

10-2 Performance and Optimization of Hybrid Vehicles

Chair: Alexander L. Brown, *Sandia National Labs; Co-Chair:* Lyle Pickett, *Sandia National Laboratories*

54025 Design Principles of a Four Bar Crank Continuously Variable Transmission

W. Allan Yates

54076 Analysis of Power Distribution and Sensitivity for the Power Synthesizer of Hybrid Electric Vehicle

Chunguo Zhou, Hongzhao Liu and Yahui Cui

54238 A Fuels Cost Comparison of Gasoline and Electric Powered Vehicles

George Ford and Paul Yanik

54286 Diesel Replacement Model for Dual Diesel-Natural Gas Engines under Urban Traffic Operation

Fabio A. Bermejo and Lesme A. Corredor

54308 Hybrid Electric Vehicle Fueled with E85 and Hydrogen

Neil McLemore, Matthew Harrison, Micheal Parten, Jeff David, Alan Falls and Timothy Maxwell

54326 Cost Optimization of d Plug-In Hybrid Electric Vehicle

Sam Golbuff, Elizabeth D. Kelly and Samuel V. Shelton

Grand Ballroom 6

13-2 Innovative Integrated Energy Systems (IES)

Chair: Abdi Zaltash, *Oak Ridge National Co-Chair:* Hongxi Yin, *Carnegie Mellon University Laboratory;*

54071 Predicted Performance of an Integrated Solar Thermal and Photovoltaic System with Hybrid Turbine-Fuel Cell Cogeneration System

Gregory J. Kowalski and Mansour Zenouzi

54095 Dynamic Modeling of a Novel Cooling, Heat, Power, and Water Microturbine Combined Cycle

ChoonJae Ryu, Aditya Srinivasan, David R. Tiffany, John F. Crittenden, William E. Lear and S.A. Sherif

54314 Operating Experience with w 240 KW Microturbine Combined Heating, Cooling and Power System

Hannu E. Jääskeläinen and James S. Wallace

54017 Energy Consumption and Technical Potential of Energy Saving in a Hospital

S. Okamoto

54157 The Performance Improvement of a 70kW Natural Gas CHP System

Lin Fu, Xiling Zhao, Shigang Zhang, Yi Jiang, Zuoliang Sun and Hui Li

3:30 – 4:00 pm Break

TUESDAY August 12, 2008

PARALLEL SESSIONS / 4:00 – 5:30 am

Grand Ballroom 1

25-2 Advances in Low Temperature Solar Heating Applications

Chair: Eduardo Rincon, Autonomous University of Mexico City

54053 Design of Regenerative Rechargeable Solar Stove System

Abera Melesse Ayalneh and A. Venkata Ramayya

54097 What Is the Best Solution to Improve Thermal Performance of Storage Tanks with Immersed Heat Exchangers: Baffles or a Divided Tank?

Aaron D. Wade, Jane H. Davidson and Julia F. Haltiwanger

54246 Experimental and Numerical Study of Mixing in a Horizontal Hot-Water Storage Tank

A. Aviv, S. Morad, Y. Ratzon, G. Ziskind and R. Letan

54285 A Domestic Solar/Heat Pump Heating System Incorporating Latent and Stratified Thermal Storage

Christoph Trinkl, Wilfried Zörner and Vic Hanby

Grand Ballroom 2

11-1 Hydrogen Energy Systems and Applications

Chair: Ibrahim Dincer, University of Ontario Institute of Technology

54031 Tank Design for on-Board Hydrogen Storage in Metal Hydrides

Karelle Couturier, Farida Joppich, Antje Wörner and Rainer Tamme

54171 Experimental Study on Sulfur Trioxide Decomposition in a Volumetric Solar Receiver-Reactor

Adam Noglik, Martin Roeb, Christian Sattler and Robert Pitz-Paal

54206 Economic Analysis of a Nuclear Reactor Powered High-Temperature Electrolysis Hydrogen Production Plant

E. A. Harvego, M. G. McKellar, M. S. Sohal, J. E. O'Brien and J. S. Herring

Grand Ballroom 3

10-1 Development and Production of Alternative Fuels

Chair: Nathan Siegel, Sandia National Laboratories

54189 Demonstrating the Use of High-Blend Ethanol (E85) in Snowmobiles

Gregory W. Davis

54215 Conversion of Wet Ethanol to Syngas and Hydrogen

Colin H. Smith, Daniel M. Leahey, Liane E. Miller, Janet L. Ellzey and Michael E. Webber

54227 Effect of Biodiesel-Ethanol Blended Fuel Spray Characteristics on the Reduction of Exhaust Emissions in a Common-Rail Diesel Engine

Seung Hyun Yoon, Su Han Park, Hyun Kyu Suh and Chang Sik Lee

54283 Performance and Emission Characteristics of Bio-Diesel as an Alternative Diesel Engine Fuel

Bijan Kumar Mandal, Samiddha Palit and Sudip Ghosh

54328 Ammonia as a Green Fuel for Transportation

Calin Zamfirescu and Ibrahim Dincer

Grand Ballroom 6

12-1 Emerging Technology Application

Chair: Abdi Zaltash, Oak Ridge National Laboratory; *Co-Chair:* Hongxi Yin, Carnegie Mellon University

54274 Frictional and Internal Leakage Losses in Rotary-Vane Two-Phase Refrigerating Expanders

A.M. Mahmoud, S.A. Sherif and W.E. Lear

54232 Computation of Air Flow in CMU's Intelligent Workplace and Its Effect on Occupant Health and Comfort

Rong Li, Yongjie Zhang and David Archer

54345 Research on Different Domestic Energy Consumption Patterns Based on Heat Pump and Their Exergy Analysis

Shuang Lu and Jingyi Wu

54223 Application of an Exhaust Heat Recovery System for Domestic Hot Water

Liu Lanbin, Fu Lin and Jiang Yi

WEDNESDAY August 13, 2008

7:00 – 8:00 am

Terrace Pavilion

Author's Breakfast

General Continental Breakfast

8:00 – 9:00 am

Grand Ballroom Keynote:

PARALLEL SESSIONS / 9:00 – 10:30 am

Grand Ballroom 1

23-1 Solar Photovoltaic and Hybrid Systems

Chair: Alfonso Ortega,
Villanova University

54124 Performance of a Small Network of Grid Interactive, Residential Solar Photovoltaic Systems

Joseph M. Prusa, John D. Morris and John D. Morris II

54122 Electricity Generation from a Compound Parabolic Concentrator Coupled to a Thermoelectric Module

Chigbo A. Mgbemena

54134 Evaluation of Solar Electric Power Technologies in Jordan Using Fuzzy Logic

Omar Badrana and Emad Abdulhadia

54016 Solar Nantenna Electromagnetic Collectors

Dale K. Kotter, Steven D. Novack, W. Dennis Slafer and Patrick Pinhero

Grand Ballroom 2

2-2 Intellectual Property and Related Policy Issues

Chair: Sriram Somasundaram, Pacific Northwest National Laboratory

54247 Successfully Eliminating the Barriers to Commercial-Scale Solar Photovoltaic Power

Stephen A Goodbody

54306 Fencing in Green - Intellectual Property Protection of Developments in Sustainability and Energy Efficient Systems

Robert E. Cannuscio

54361 Evolution of the Transition to a World Driven By Renewable Energy

Brian M. Fronk, Richard Neal and Srinivas Garimella

Grand Ballroom 3

12-2 Modeling/Diagnostics in Heat Pump/Chiller Technologies

Chair: Abdi Zaltash, Oak Ridge National Laboratory

54002 Comparison of Two Model Based Automated Fault Detection and Diagnosis Methods for Centrifugal Chillers

Agami Reddy

54027 Automated Fault Detection and Diagnosis for HVAC&R Systems: Functional Description and Lessons Learnt

T. Agami Reddy

54186 The Development of a Model for a Solar-Fired, Single-Effect, Absorption Chiller

Kevin E. Hinderliter, Isaac Y. Mahderekal and Robert F. Boehm

54209 The Heat Transfer Characteristics of a 16 KW Steam Driven Double Effect Absorption Chiller

Hongxi Yin and David H. Archer

Grand Ballroom 6

20-1 Low/Zero Emission Power Plants

Chair: Bale V. Reddy, University of Ontario Institute of Technology

54050 A Transcritical CO₂ Rankine Cycle with LNG Cold Energy Utilization and Liquefaction of CO₂ in Gas Turbine Emission

Meibin Huang, Wensheng Lin, Hongming He and Anzhong Gu

54073 Study on the Experiments of Flue Gas Denitrification and Desulfurization Using Nitric Acid Solution

Bao-Min Sun, Shui-E Yin and Zhong-Li Wang

54114 Study on Treated Wastewater from Power Plant as Circulating Supplementary Water

Songtao Liu, Xiaokun Zheng, Guohua Shi and Xutao Zhang

10:30 – 11:00 pm

Break

WEDNESDAY August 13, 2008

PARALLEL SESSIONS /11:00 – 12:30 am

Grand Ballroom 4 26-1 Advances in Energy Storage

Chair: Stephen Harrison, *Queens University*

54043 Analysis and Design of a Paraffin/Graphite Composite PCM Integrated in a Thermal Storage Unit
R. Pokhrel, J.E. González, T. Hight and T. Adalsteinsson

54174 Molten Nitrate Salt Development for Thermal Energy Storage in Parabolic Trough Solar Power Systems
Robert W. Bradshaw and Nathan P. Siegel

Grand Ballroom 5 8-4 Energy Systems and the Environment

Chair: Mansour Zenouzi, *Wentworth Institute of Technology*; *Co-Chair:* J.Rhett Mayor, *Georgia Institute of Technology*

54041 An Integrated Evaluation Method for Energy Supply System
Chun-Fa Zhang, Jiang-Jiang Wang, You-Yin Jing and Xu-Tao Zhang

54103 Synergization of Clean Energy Utilization, Clean Technology Development and Controlled Clean Environment through Thermally Activated Desiccant Cooling System
Napoleon Enteria, Hiroshi Yoshino, Akashi Mochida, Rie Takaki, Akira Satake, Ryuichiro Yoshie, Teruaki Mitamura and Seizo Baba

54191 Motion Energy Harvesting Using Catch-And-Release Mechanism
Brian S. Hendrickson and Stuart B. Brown

54312 Demonstration of an Energy Meter Using a Pump Flow Station
Gang Wang, Mingsheng Liu and David Claridge

Grand Ballroom 6 12-3 Innovative Heat Pump/Chiller Technologies

Chair: Abdi Zaltash, *Oak Ridge National Laboratory*; *Co-Chair:* Hongxi Yin, *Carnegie Mellon University*

54110 Design and Performance Evaluation of Gas Engine Driven Heat Pump (GHP)
Isaac Y. Mahderekal, Robert G. Gaylord, Tommis Young and Kevin Hinderliter

54125 Performance of a Constrained Microscale Film Bubble Absorber under System Operating Conditions
Ruander Cardenas, Jeromy Jenks, Myeong Chan Jo and Vinod Narayanan

54039 Trends in COP for Adsorption Cooling Cycles with Thermal Regeneration and Finite Number of Beds
Derek K. Baker and Bilgin Kaftanoğlu

St Johns Poster Session

Chair: James Menart, *Wright State University*

54010 Status and Issues of Hydrogen Energy R&D in Korea
Moon-Sun Chung and Jong-Won Kim

54018 Fast Pyrolysis of Safflower Seed in the Presence of Catalyst
Özlem Onay and Ö.Mete Koçkar

54099 Catalytic Pyrolysis of Biomass in Steam Atmosphere: Yields and Characterization of the Products
Funda Ates, Ayse Eren Putun and Ersan Putun

54230 Renewable Energy for Federal Land Management Agencies in Southern Nevada
Todd France, Eric Wiemers, Yahia Baghzou, Stephen E. Butterworth and Robert F. Boehm

54271 Simulation, Analysis and Systems Engineering of a Hybrid-Electric Race Car
Darris L. White, J. E. McKisson, William C. Barott, Craig Czlapinski, Michael Kuss and Vincent Sabatini

54279 Parametric Estimation of Heat and Water Management Strategy Preventing Condensed Water Formation in Polymer Electrolyte Fuel Cells
Hye-Mi Jung, Kwan-Soo Lee and Sukkee Um

54295 A More Direct and Cost Effective Use of Wind Power for Buildings in Cold Climates
Mark Pederson

54325 Modeling of Ultra Superheated Steam Gasification in Integrated Gasification Combined Cycle Power Plant with Carbon Dioxide Capture
Peng Pei and Manohar Kulkarni

54362 A High Standard Isolated Insolated Photovoltaic Egyptian Safari Rest Red Sea Area
Faten H. Fahmy

12:30 – 2:00
Terrace Pavilion

Lunch

WEDNESDAY August 13, 2008

PARALLEL SESSIONS / 2:00 – 3:30 am

Grand Ballroom 1 SED Student Session

Chairs: Charles Andraka,
Sandia National Labs, and
Allison Gray, NREL

Grand Ballroom 2 11-2 Fuel Cells and Fuel Cell Systems

Chair: Ibrahim Dincer, University of
Ontario Institute of Technology

**54197 CFD Modeling of PEM Fuel
Cell's Flow Channels**
Maria Grazia De Giorgi and Antonio
Ficarella

**54303 Flow Distribution in the
External Manifold of SOFC Stack**
Zuopeng Qu, PV Aravind, Adrian
Verkooijen and Nico Dekker

**54207 Pre-reformer Design and
Optimization for Solid Oxide Fuel
Cells**
Tae Seok Lee and Jacob N. Chung

Grand Ballroom 3 13-3 Performance/Modeling of CHP Systems

Chair: Abdi Zaltash, Oak Ridge National
Laboratory; *Co-Chair:* Hongxi Yin,
Carnegie Mellon University

**54096 Operation of a CCHP System
Using an Optimal Energy Dispatch
Algorithm**
Heejin Cho, Sandra D. Eksioğlu, Rogelio
Luck and Louay M. Chamra

**54256 Cogeneration System
Performance Modeling**
Flore Marion, Sophie Masson, Fred Betz
and David Archer

**54087 Application of Entropy
Method in Fuzzy Synthetic Evaluation
for Micro-Turbine Performance**
Guohua Shi, Youyin Jing, Songling
Wang and Yuefen Gao

**54080 Optimization for Heating
System Schemes Based on GRA
Method**
Wei Bing and Li Li

**54160 The Steady and Dynamic
Performance of an Innovative Natural
Gas CHP System**
Lin Fu, Xiling Zhao, Shigang Zhang, Yi
Jiang, Hui Li and Zuoliang Sun

3:30 – 4:00 pm Break

WEDNESDAY August 13, 2008

PARALLEL SESSIONS / 4:00 – 5:30 am

Grand Ballroom 1
SED Student Session

Chairs: Charles Andraka,
Sandia National Labs, and
Allison Gray, NREL

Grand Ballroom 2

**15-1 Thermodynamic Analysis of Fuel Cells
and Hydrogen Energy Systems**

Chair: Mehmet Kanoglu, *University of
Gaziantep;* *Co-Chair:* James Menart, *Wright
State University*

**54240 Analysis of Thermodynamics of
Two-Step Solar Water Splitting**

Martin Roeb, Nils Gathmann, Martina Neises,
Christian Sattler and Robert Pitz-Paal

**54287 Thermodynamic Modeling of an
Integrated DIR-SOFC/BIOMASS
Gasification System**

C. Ozgur Colpan, Ibrahim Dincer and Feridun
Hamdullahpur

**54336 Thermodynamic Performance of a
Gas Turbine Plant Combined with a Solid
Oxide Fuel Cell**

Yousef Haseli, Ibrahim Dincer and Greg F.
Naterer

**54342 Determination of Some
Thermodynamic Parameters for a Hybrid
Solar-Hydrogen System**

Ahmet Yilanci, Ibrahim Dincer and Harun
Kemal Ozturk

THURSDAY August 14, 2008

7:00 – 8:00 am

Terrace Pavilion

Author's Breakfast
General Continental Breakfast

PARALLEL SESSIONS / 9:00 – 10:30 am

Grand Ballroom 1

23-2 Thermal Systems for Power Generation

Chair: Alfonso Ortega, Villanova University

54216 Design of a 200 KW_e Solar Thermal Power Plant for Ontario
Thomas A. Cooper and James S. Wallace

54261 A Thermodynamic Similarity Framework for Assessment of Working Fluids for Solar Rankine Power Generation
Deborah A. Sunter and Van P. Carey

54067 Spacing Analysis of an Inclined Solar Collector Field
S. B. Sadineni, R. F. Boehm and R. Hurt

54307 Modeling Solar Impacts on Hydrogen Production from Electrolysis
Mark R. Campbell, Sachin S. Deshmukh, Robert F. Boehm and Rick Hurt

10:30 – 11:00 pm

Break

Grand Ballroom 2

17-1 Microscale Energy Conversion Systems

Chair: Deborah Pence, Oregon State University; *Co-Chair:* Terry Hendricks, Battelle Memorial Institute

54244 Microtechnology – A Key to System Miniaturization in Advanced Energy Recovery & Conversion Systems
Terry J. Hendricks

54266 A Micro Heat Engine Executing an Internal Carnot Cycle
Eli Lurie and Abraham Kribus

54277 The DSMC-IP Simulation of Microchannel Cross Flow over a Staggered Array of Square Cylinders
U. Kursun and J. S. Kapat

Grand Ballroom 3

15-2 Thermodynamic Analysis of Advanced Energy Systems

Chair: James Menart, Wright State University; *Co-Chair:* Mehmet Kanoglu, University of Gaziantep

54340 Thermodynamic Performance of a Photovoltaic System
Anand S. Joshi, Ibrahim Dincer and Bale V. Reddy

54344 Thermodynamic Analysis of a Novel Ammonia-Water Rankine Cycle
Calin Zamfirescu and Ibrahim Dincer

54036 Second Law Analysis of Evaporator for Organic Rankine Cycle System
Wei Gu and Yiwu Weng

E
N
E
R
G
Y

S
U
S
T
A
I
N

THURSDAY August 14, 2008

PARALLEL SESSIONS /11:00 – 12:30 am

Grand Ballroom 1

31-1 Solar & Wind Resources Assessment

Chairs: Robert Turner and Daniel Laird, Sandia National Labs

54128 Solar Energy Resource Assessment for Chile

Rodrigo Escobar, Alberto Ortega and Sergio Colle

54301 Offshore Wind Shear Estimations for Wind Power Assessment

Susan W. Stewart

54257 Measurement of Solar Radiation for Renewable Energy Systems

Andrea Padovan and Davide Del Col

54194 Development of a Wind Tunnel Test Apparatus for Horizontal Axis Wind Turbine Rotor Testing

Michael McWilliam and David A. Johnson

Grand Ballroom 2

18-1 Climate Control

Chair: Vinod Narayanan, Oregon State University

54081 Numerical Simulation of Indoor Air Flow in Capillary Plane HVAC Terminal System

Wei Bing, Li Li, Jiang Lu and Zhang Wei

54082 Numerical Calculation on Heat Transfer Performance of the Capillary Plane HVAC Terminal System

Wei Bing, Li Li, Zhang Shuping and Jiang Lu

54154 Optimal Terminal Box Control Algorithms for Single Duct Air Handling Units

Young-Hum Cho, Mingsheng Liu and Yuebin Yu

54185 Performance Modeling of Desiccant Wheels (1): Model Development

Chaoqin Zhai, David H. Archer and John C. Fischer

54292 Advanced Control of Indoor Thermal Environments Using Fan Coil Units

Viraj Srivastava and David Archer

Grand Ballroom 3

20-2 Low/Zero Emission Power Plants

Chair: Bale V. Reddy, University of Ontario Institute of Technology

54166 CO₂ Emission Abatement in CC-IGCC Power Plants: Energy and Economic Comparisons

Marco Gambini and Michela Vellini

54187 Immobilization of Calcium Oxide Absorbent on s Fibrous Alumina Mat for High

Temperature Carbon Dioxide Capture
Man Su Lee, D. Yogi Goswami, Nikhil Kothurkar and Elias K. Stefanakos

54268 Pressurised Oxy-Coal Combustion Rankine-Cycle for Future Zero Emission Power Plants: Process Design and Energy Analysis

Marco Gazzino and Giancarlo Benelli

FLUIDS ENGINEERING SYMPOSIA/FORA COORIDINATORS

8th International Symposium on Numerical Methods for Multiphase Flows (*Symposium*)

Symposium Coordinator: Malcolm Andrews, *Los Alamos National Laboratory*

Symposium Co-Coordinator: Francine Battaglia, *Virginia Tech*

Symposium Co-Coordinator: Arturo Fernandez, *CUA*

43rd Forum on Cavitation and Multiphase Flows (*Forum*)

Symposium Coordinator: William Straka, *Penn State University Applied Research Lab*

Symposium Co-Coordinator: Mohamed Farhat

3rd Forum on Biological Flows (*Forum*)

Symposium Coordinator: Kausik Sarkar, *University of Delaware*

Symposium Co-Coordinator: Arturo Fernandez, *CUA*

Open Forum on Multiphase Flows: Work in Progress (*Forum*)

Symposium Coordinator: Malcolm Andrews, *Los Alamos National Laboratory*

Forum Co-Coordinator: Dimitris E. Nikitopoulos, *Louisiana State University*

Symposium Co-Coordinator: Farzaneh Jebrail

Forum on Advances in Fluids Engineering Education (*Forum*)

Forum Coordinator: Ray Taghavi, *University of Kansas*

Forum Co-Coordinator: Ganesh Raman

7th Symposium on Transport Phenomena in Manufacturing Processes (*Symposium*)

Symposium Coordinator: Dennis A. Siginer, *Wichita State University*

Symposium Co-Coordinator: Sayavur Bakhtiyarov

4th Symposium on Fundamental Issues and Perspectives in Fluid Mechanics (*Symposium*)

Symposium Coordinator: Khaled J. Hammad, *Dantec Dynamics*

Symposium Co-Coordinator: David Davis, *Aerojet*

Symposium Co-Coordinator: Pavlos Vlachos, *Virginia Polytechnic Institute and State University*

Symposium Co-Coordinator: Ivana Milanovic, *University of Hartford*

Symposium Co-Coordinator: Barton Smith

Symposium Co-Coordinator: Karman Ghia

Symposium Co-Coordinator: Francine Battaglia, *Virginia Tech*

Symposium Co-Coordinator: Wei-Jen Su, *US Army ARDEC*

2nd International Symposium on Flow Applications in Aerospace (*Symposium*)

Symposium Coordinator: Javid Bayandor, *Royal Melbourne Inst. of Tech.*

Symposium Co-Coordinator: David Davis, *Aerojet*

Location: Sacramento , CA , United States

Symposium Co-Coordinator: Jason Tyll, *ATK GASL*

3rd Symposium on Flow Manipulation and Active Control (*Symposium*)

Symposium Coordinator: Hassan Peerhossaini, *Laboratoire de Thermocinétique (CNRS)*

Symposium Co-Coordinator: Mihir Sen, *University of Notre Dame*

Symposium on the Transport Phenomena in Mixing (*Symposium*)

Symposium Coordinator: Khaled J. Hammad, *Dantec Dynamics*

Symposium Co-Coordinator: Ivana Milanovic, *University of Hartford*

Symposium Co-Coordinator: George Papadopoulos, *ATK GASL*

Symposium Co-Coordinator: Theodore J. Heindel, *Iowa State University*

Symposium Co-Coordinator: Chao-Hsin Lin, *The Boeing Company*

8th International Symposium on Fluid Power (*Symposium*)

Symposium Coordinator: Javid Bayandor, *Royal Melbourne Inst. of Tech.*

Symposium Co-Coordinator: Sylvester Abanteriba

Symposium Co-Coordinator: Adiel Guinzburg, *The Boeing Company*

Symposium on Transport Phenomena in Energy Conversion from Clean and Sustainable Resources (*Symposium*)

Symposium Coordinator: Khaled J. Hammad, *Dantec Dynamics*

Symposium Co-Coordinator: Jianhu Nie, *University of Nevada, Las Vegas*

Symposium Co-Coordinator: Chaouki Ghenai, *Florida Atlantic University*

Symposium Co-Coordinator: Isam Janajreh, *MIT*

Symposium Co-Coordinator: Yassin A. Hassan, *Texas A&M University*

8th Symposium on Applications in Computational Fluid Dynamics (*Symposium*)

Symposium Coordinator: Mick Brzoska, *Eastern Washington University*

Symposium Co-Coordinator: Yassin A. Hassan, *Texas A&M University*

Symposium Co-Coordinator: Hisashi Ninokata, *Tokyo Institute of Technology*

Symposium Co-Coordinator: Jay M. Khodadadi, *Auburn University*

Symposium Co-Coordinator: Xia Wang, *Oakland University*

Symposium on DNS, LES and Hybrid RANS/LES Methods (*Symposium*)

Symposium Coordinator: Miguel Visbal, *Air Force Research Laboratory*

Symposium Co-Coordinator: Subrata Roy, *University of Florida*

Symposium Co-Coordinator: Karman Ghia

3rd Symposium on Uncertainty in Large-Eddy Simulations (LES) (*Symposium*)

Symposium Coordinator: Stephen A. Jordan, *Naval Undersea Warfare Center*

Symposium Co-Coordinator: Ismail B. Celik, Prof., *Mechanical & Aerospace Engineering, WVU*

Symposium Co-Coordinator: Peter A. Chang

9th International Symposium on Fluid-Structure Interaction and Flow-Induced Noise in Industrial Applications (*Symposium*)

Symposium Coordinator: Subrata Roy, *University of Florida*

Symposium Co-Coordinator: Raymond Gordnier, *Air Force Research Laboratory AFRL/RBAC*

Symposium Co-Coordinator: Miguel Visbal, *Air Force Research Laboratory*

Symposium Co-Coordinator: D. R. Reddy

Panel on Algorithmic Development in CFD (*Panel*)

Symposium Coordinator: Subrata Roy, *University of Florida*

Symposium Co-Coordinator: Datta V. Gaitonde

Symposium Co-Coordinator: Miguel Visbal, *Air Force Research Laboratory*

Symposium Co-Coordinator: D. R. Reddy

Forum on Automotive Flows (*Forum*)

Symposium Coordinator: Bahram Khalighi

Symposium Co-Coordinator: David Halt, *Visteon Corp*

Symposium Co-Coordinator: Kumar Rohatgi

11th International Symposium on Advances in Numerical Modeling of Aerodynamics and Hydrodynamics in Turbomachinery (*Symposium*)

Symposium Coordinator: Yu-Tai Lee, *Naval Surface Warfare Center, Carderock Div*

Symposium Co-Coordinator: chunill hah, *NASA/Glenn*

Symposium Co-Coordinator: Akira Goto, *Ebara Research Co., Ltd.*

Symposium Co-Coordinator: Keith Walters, *Mississippi State University*

Symposium Co-Coordinator: Ashvin Hosangadi

20th Forum on Fluid Machinery (Forum)

Forum Coordinator: Jinkook Lee, *Eaton Corporation*

Forum Co-Coordinator: Awatef Hamed

Forum Co-Coordinator: ShinHyoung Kang

Forum Co-Coordinator: Yu-Tai Lee, *Naval Surface Warfare Center, Carderock Div*

5th Symposium on Industrial Application of Swirling Flows (Symposium)

Symposium Coordinator: Ashvin Hosangadi

Forum on Fluid Measurements and Instrumentation (Forum)

Forum Coordinator: Joel Park, *Naval Surface Warfare Center Carderock Division*

Forum Co-Coordinator: Judith Bamberger, *Battelle at Pacific Northwest National Laboratory*

Symposium on Non-Invasive Measurements in Single and Multiphase Flows (Symposium)

Symposium Coordinator: Bahram Khalighi

Symposium Co-Coordinator: Judith Bamberger, *Battelle at Pacific Northwest National Laboratory*

Symposium Co-Coordinator: Yassin A. Hassan, *Texas A&M University*



ASME 2009 Fluids Engineering Division Summer Meeting
<http://www.asmeconferences.org/FEDSM09/>

August 2-5, 2009

Vail Cascade Resort and Spa

1300 Westhaven Drive, Vail, Colorado 81657-3890 USA

<http://www.vailcascade.com/>

CALL FOR PAPERS

You are cordially invited to participate in the ASME 2009 Fluids Engineering Summer Meeting (FEDSM2009) on August 2-5, 2009, at the Vail Cascade Resort and Spa in Colorado. The scenery in the Colorado Rocky Mountains is quite spectacular, and the location is readily accessible from Denver International Airport. The program will include technical paper sessions on current and relevant topics in fluid mechanics, committee meetings, seminars, and social events. Please make plans to attend and to submit papers for the following symposia and fora. Deadlines and other details will be posted on the web page.

-
- Pumping Machinery
 - Non-Invasive Measurements in Single and Multiphase Flows
 - Fundamental Issues and Perspectives in Fluid Mechanics
 - Cavitation Inception
 - Liquid-Solid Flows
 - Gas-Particle Flows
 - Flow Manipulation and Active Control
 - Flow Applications in Aerospace
 - Fluid Power
 - Transport Phenomena in Mixing
 - Transport Phenomena in Manufacturing Processes
 - Transport Phenomena in Energy Conversion from Clean and Sustainable Resources
 - Fluid Structure Interaction and Flow-Induced Noise
 - Numerical Modeling in Aerodynamics and Hydrodynamics in Turbomachinery
 - Applications in Computational Fluid Dynamics (CFD)
 - Algorithmic Developments in CFD
 - DNS, LES, and Hybrid LES/RANS Methods
 - Numerical Methods in Multiphase Flows
 - Micro-Fluidics
 - Fluid Measurements and Instrumentation
 - Cavitation and Multiphase Flows
 - Advances in Fluids Engineering Education
 - Automotive Flows
 - Fluid Machinery
 - Biological Flows

For additional information, please contact:
Dr. Joel T. Park
Naval Surface Warfare Center
joel.park@navy.mil
Conference Chair

Ms. Erin Dolan
ASME Headquarters
DolanE@asme.org
ASME Conference Manager

MONDAY August 11, 2008

7:00 – 8:00 am
Terrace Pavilion

Author's Breakfast
General Continental Breakfast

8:00 – 9:00 am
Grand Ballroom

Plenary: **The Role of Nuclear Energy in Our Future**
Dr. Kathryn A. McCarthy, Idaho National Laboratory

PARALLEL SESSIONS / 9:00 – 10:30 am

Grand Ballroom 7
8th International Symposium on Fluid Power

12-1: Flow Physics

Chair: Javid Bayandor, Royal Melbourne Inst. of Tech.; Co-Chairs: Sylvester Abanteriba and Adiel Guinzburg, Boeing

55326 Renewable Energy System with Wind Turbines
Ryo S. Amano, University of Wisconsin-Milwaukee

55211 Fluid-Power Harvesting by Pneumatic Bellow during Human Gait
Robin Chin, Elizabeth T. Hsiao-Weckler and Eric Loth

55091 A Model for Analyzing Flow Transients in a Single Closed Loop
Kazem Farhadi and Behrang Sadeghi Givi

55019 Analysis of Inner Flow inside Francis Turbine Runner Based on Dissipation Function
Xiaojing Wu, Yulin Wu and Shuhong Liu

55008 Conversion Methods of Efficiency for Hydraulic Machinery Using Model Under Influence of Roughness
Li Long, Wang Ze, Yang Xuelin and Li Dan

Grand Ballroom 8
20th Forum on Fluid Machinery

21-1: Forum on Fluid Machinery - I

Chair: Jinkook Lee, Eaton Corp.; Co-Chair: KwangYong Kim, Inha University

55098 The Effect of Casing Shape on Performance of Sirocco Fan Using Contra-Rotating Rotors
Junichiro Fukutomi, Toru Shigemitsu and Yutarou Shirai,

55141 Influence on the Axial Flow Fan Aerodynamic Characteristic Due to an Introduction of Internal Secondary Flow
Matjaž Eberlinc, Brane Širok, Marko Hočevcar and Matevž Dular

55149 The Effects of Reynolds Number on the Aerodynamic Performance of Geometrically Similar Fans
K. Hanly, R. Grimes, and P. Walsh

55317 Optimization of Stacking Line and Blade Profile for Design of Axial Flow Fan Blade
Abdus Samad, Ki-Sang Lee, and Kwang-Yong Kim

55015 Multi-Objective Optimization of an Axial Compressor
Hoda Maleki

City Terrace 11
8th Symposium on Applications in Computational Fluid Dynamics

14-1: Applications in Computational Fluid Dynamics - I

Chair: Xia Wang, Oakland University; Co-Chair: Jay M. Khodadadi, Auburn University

55009 Simulation of Airflow and Fuel Spray through an Axial Swirler for Gas Turbine Applications
Joshua E. Kempenaar, Kim A. Shollenberger and Gareth W. Oskam

55180 Analysis and Optimization of Flow Distribution Channels for Uniform Flow in Fuel Cells
Peiwen Li, Devasubramaniam Coopamah and Nikesh Dhar

55243 Numerical Investigations of Model Propeller Turbine Performance under Different Guide Vane Opening
Zhou Daqing, HQu Bo and Zheng Yuan

55144 Prediction on Meter Factor of the Turbine Flow Meter with Unsteady Numerical Simulation
Gang Chen, Yulin Wu, Guangjun Cao, and Mingjie Li

55183 Numerical and Experimental Investigation of Rotor-Stator Interactions in an Axial Turbine
Jean-Mathieu Gagnon and Gabriel D. Ciocan

City Terrace 12
9th International Symposium on Fluid-Structure Interaction and Flow-Induced Noise in Industrial Applications

Session 17-1: Fluid-Structure Interaction and Flow-Induced Noise - I

Chair: Raymond Gordnier, Air Forces Research Lab; Co-Chair, Subrata Roy, University of Florida

55348 Fluid Structure Interaction Deformation Measurement for Micro Air Vehicles
Peter Ijfu

55161 Analysis of Swashplateless Helicopter Rotor with Active Servopaddles
Anne Brindejonc, Eurocopter François Malburet, Ecole des Arts et Métiers Pierre-Antoine Aubourg, Eurocopter

55016 Wind Tunnel Tests on Flow-Induced Vibrations and Scattering of Japanese Slates
Satoru Okamoto, Shimane University

10:30 – 11:00 Break

MONDAY August 11, 2008

PARALLEL SESSIONS /11:00 – 12:30

Grand Ballroom 7

43rd Forum on Cavitation and Multiphase Flow (3-12)

Session 3-1: Cavitation and Multiphase Flow -1

Chair: William Straka, Penn State University; Co-Chair Mohamed Farhat, EPFL

55034 Numerical Modelling of Cavitation Erosion

Matevž Dular and Olivier Coutier-Delgosha

55050 Progress in Creating Stabilized Gas Layers in Flowing Liquid Mercury

Mark Wendel, David Felde, Bernard Riemer, David West, Brian D'Urso and Ashraf Ibrahim

55115 Cavitation Damage from an Induced Secondary Vortex

M. Moeny, M. Weldon, D. Stinebring, W. Straka and M. Pierzga

55122 Concept Verification of Rudder Gap Cavitation Suppression Device through Experiments and Computations

Jungkeun Oh, Changmin Lee, Hee Bum Lee, Shin Hyung Rhee, Jung-Chun Suh and Hyochul Kim

Grand Ballroom 8

Session 21-2: Forum on Fluid Power - 2

Chair: Awatef Hamed, University of Cinninnati; Co-Chair: KwangYong Kim, Inha University

55170 Cavitation in the Tip Region of the Rotor Blades within a Waterjet Pump

H. Wu, F. Soranna, T. Micheal, J. Katz and S. Jessup

55003 Effect of Fine Sediments on the Performance of Axial Pumps

Abdullah Saeed Al-Ghamd

55234 Analysis of the influence of passage components on the efficiency of bulb tubular pumps

YanJin, Chao Liu, Fangping Tang, Jiren Zhou and Li Cheng

55145 Experimental and Numerical Simulation on the Starting Period of a Centrifugal Pump

Gang Chen, Jie Shao, Yulin Wu and Guangjun Cao

City Terrace 11

Session 14-2: Applications in Computational Fluid Dynamics - 2

Chair: Yassin Hassan, Texas A&M University; Co-Chair: Hisashi Ninokata, Tokyo Inst. of Tech.

55067 Numerical Analysis of Geometric Effects on Pressure Drop In 180° Turning Channels

Sean Spivey and Kim A. Shollenberger

55191 Computational Studies on the Behavior of an Interface Separating Two Fluids under Uniform Electric Field

Payam Sharifi, and Asghar Esmaeeli

55235 CFD Simulation of the Whole Pump Station Inlet Flow Field

Zhou Daqing, Zheng Yuan, and Ge Xinfeng

55121 Study on the Hydraulic Performance of Elbow-Inlet Passage by CFD

Cheng Li, Liu Chao, Zhou Jiren, Tang Fangping and Jin Yan

55179 Effect of Blade Angle of Attack and Hub to Tip Ratio on Mass Flow Rate in an Axial Fan at a Fixed Rotational Speed

Mohammad Javad Izadi

City Terrace 12

Session 17-2: Fluid-Structure Interaction and Flow-Induced Noise - 2

Chair: Raymond Gordnier, Air Forces Research Lab; Co-Chair, Subrata Roy, University of Florida

55347 Reduced Order Description of Open Cavities and Their Control

Lawrence Ukeiley

55127 Fluid-Acoustics Interaction in Self-Sustained Oscillations over a Cavity in a Turbulent Boundary Layer

H. Yokoyama and C. Kato

55247 Removal of Particles from the Surface of a Droplet

N. Aubry, P. Singh, S. Nudurupati, and M. Janjua

12:30 – 1:00

Terrace Pavilion

Lunch

1:00 – 2:00 pm

Grand Ballroom

Plenary: **Thirty Years of Naval Propulsor Hydrodynamic Research at the Naval Surface Warfare Center, Carderock Division**
Dr. Stuart Jessup, Naval Surface Warfare Center

MONDAY August 11, 2008

PARALLEL SESSIONS / 2:00 – 3:30 pm

Grand Ballroom 7

Session 3-2: Cavitation and Multiphase Flow -2

Chair: William Straka, Penn State University; Co-Chair Mohamed Farhat, EPFL

55135 Rotordynamic Forces on Three-Bladed Inducer under Super-Synchronous / Synchronous Rotating Cavitation

Yoshiki Yoshida, Masato Eguchi, Taiichi Motomura, Masaharu Uchiumi, Hiroataka Kure and Yoshiyuki Maruta

55337 An Exploratory Investigation of Cavitation Inception on the Pressure Side of Propellers

Wim M. van Rees, Martijn X. van Rijsbergen, Gert Kuiper and Tom J.C. van Terwisg

55217 An Improvement of a Cavitation Model and the Application to LES

Shin-ichi Tsuda, Naoki Tani, Nobuhiro Yamanishi and Chisachi Kato

55002 Cavitation Intensity Measurement by Analysis of Pump Structure Oscillation- A New Parametric Method Approach

Hadi Arjmandi Tash, Morteza Sadeghi, Mohammad T. Shervani and M. Mohammad Etefagh

Grand Ballroom 8
20th Forum on Fluid Machinery

Session 21-3: Forum on Fluid Machinery - 3

Chair: Yu-Tai Lee, Naval Surface Warfare Center; Co-Chair: Jinkook Lee, Eaton

55258 Numerical Study of the Pulsating Flow at the Tongue Region of a Centrifugal Pump for Several Flow-Rates

Raúl Barrio, Jorge Parrondo, and Eduardo Blanco

55303 Transient Calculations of Pump Performance Parameters

Mikhail P. Strongin

55291 Vibration-Based Fault Diagnosis of Pump Using WPT

Pan Hong, and Zheng Yuan

55257 Numerical Investigation on Impeller-Volute Interaction in the Centrifugal Pump with Radial Gap and Tongue Profile Variation

Pengcheng Guo, Xingqi Luo, Weili Liao and Guojun Zhu

City Terrace 11

Session 14-3: Applications in Computational Fluid Dynamics - 3

Chair: Hisashi Ninokata, Tokyo Inst. of Tech.; Co-Chair Yassin Hassan, Texas A&M University

55059 A Condensed Phase Computational Fluid Dynamics Model for Polymer Melt Flow

Qing Tang and Michael Bockelie

55174 CFD Solution of a Two-Canopy Parachute in a Top-To-Top Formation with a Vent of Air from One of Its Canopy

Mohammad Javad Izadi

55057 Effects of Endplates on Secondary Streaming of Oscillating Flows Past a Circular Cylinder

C.T. Hsu and Yan Su

55103 CFD Modeling Of Slurry Flows in Horizontal Pipes

Franz H. Hernández, Armando J. Blanco and Luis Rojas-Solórzano

55221 Effect of Dissipative Terms on the Quality of Two and Three Dimensional Euler Flow Solutions

Seyed Saied Bahrainian

City Terrace 12

Session 17-3: Fluid-Structure Interaction and Flow-Induced Noise - 3

Chair: Raymond Gordnier, Air Forces Research Lab; Co-Chair, Subrata Roy, University of Florida

55350 Controlling and Harnessing Flow-Acoustic Resonance in High-Speed Flows

Farukh S Alvi

55209 Analysis of Passive Wake Mixing Techniques Using Time Resolved Digital Particle Image Velocimetry

Christopher Weiland, Christopher Michie, Scott Bressers and Pavlos Vlachos

Daytona
2nd International Symposium on Flow Applications in Aerospace

Session 9-1: Aerospace Applications - I

Chair: Javid Bayandor, Royal Melbourne Inst. Of Tech.; Co-Chair: David Davis, Aerojet

55284 Laminar-Turbulent Transition Modeling Strategies for Thermally Protected Airfoils

Luiz Tobaldini Neto, Guilherme Araujo Lima da Silva and Marcos de Mattos Pimenta

55178 Experimental Investigations of the Onset of Rotating Stall

P. B. V. Johansson and M. Henriksson

55006 Experimental Investigation on Quenching Distance for Aluminum Dust Flames

M.R. Habibzadeh and M.H. Keyhani

3:30 – 4:00 Break

F
L
U
I
D
S

E
N
G
I
N
G

MONDAY August 11, 2008

PARALLEL SESSIONS /4:00 – 5:30

Grand Ballroom 7

Session 3-3: Cavitation and Multiphase Flow -3

Chair: William Straka, Penn State University; Co-Chair Mohamed Farhat, EPFL

55171 Observation of a Critical Time Scale for Supercavitation Development and the Effect of Gas Leakage
Chris Weiland and Pavlos Vlachos

55031 A Comparative Study between the Various Methods of Measuring Void Fraction in Air-Water Two-Phase Flow
Abdullah Abbas Kendoush and Banipal N. Yaqob

55165 Break Up of Viscous Crude Oil Droplets Mixed with Dispersants in Locally Isotropic Turbulence
Balaji Gopalan and Joseph Katz

55275 Spatiotemporally-Resolved Dynamics of Dispersing Ferrofluid Aggregates
Alicia M. Williams and Pavlos P. Vlachos

Grand Ballroom 8

20th Forum on Fluid Machinery

Session 21-4: Forum on Fluid Machinery - 4

Chair: Shin Hyoung Kang; Co-Chair: Hans Josef Dohmen, University of Duisburg-Essen

55334 Estimation of Average Void Fraction for Gas-Liquid, Two-Phase Flow in an Industrial Nozzle Assembly Using a Quick-Closing-Valve
Mohammad A. Rahman Johana Gomez, Ted Heidrick, Brian A. Fleck and Jennifer McMillan

55342 Delay of Unsteady Flow in s Radial Diffuser
Saad A. Ahmed

55260 An Analytical and Experimental Study of Rotary-Vane Turbomachinery: Single-Phase Working Fluids
A. Mehdizadeh, M. Mahmoud, da S.A. Sherif and W.E. Lear

55341 The Rise of Complexity in Describing Fluid Flow in Rotating Cavities
Björn-Christian Will and Friedrich-Karl Benra

City Terrace 11

Session 14-4: Applications in Computational Fluid Dynamics - 4

Chair: Mick Brzoska, eastern Washington University; Co-Chair: Xia Wang, Oakland University

55084 Basin-Scale Internal Waves within the South Arm of the Great Salt Lake
Robert E Spall

55014 Modelling of Fluid Dynamics Interacting with Ductile Fraction Propagation in High Pressure Pipeline
M. Popescu and W. Shyy

55023 Urans Modeling of Three Airfoils with Different Stall Mechanisms
M. Elkhoury, J. Najem and Z. Nakad

55029 Hexahedral Block Topology and Its Decomposition to Generate Initial Tetrahedral Grids for Complex Aerodynamic Configurations
Seyed Saied Bahrainian

55186 Effect of Rotational Velocity and Blade Angle of Attack a Mass Flow Rate in an Axial Fan at a Fixed Hub to Tip Ratio
Mohammad Javad Izadi

City Terrace 12

3rd Forum On Biological Flows

Session 4-1: Biological Flows

Chair: Kausik Sarkar, University of Delaware; Co-Chair Arturo Fernandez, CUA

55113 3D omputational Modeling and Simulation of Cell Motion on Adhesive Surfaces in Shear Flow
Vijay Pappu and Prosenjit Bagchi

55252 A Multi-Level Bifurcation omputational Model for Analyzing Transport and Deposition Of Aerosol Particles in Human Tracheobronchial Tree
L. Tian and G. Ahmadi

55279 Quantification of Discretization Error in Wall Shear Stress Calculations for Aneurismal Flows Using CFD
Francisco A. Pino-Romainville, Jagannath R. Nanduri, Ismail B. Celik and Ansaar T. Rai

55319 Fundamental Investigations of Driving Force of a Neutrophile in Liquid Using Concentration Marangoni Effect for Developing Microcapsules in Drug Delivery Systems
Masaaki Tamagawa

55320 Development of Microcapsules Including a Gas Bubble for Shock Wave Based Drug Delivery
Masaaki Tamagawa and Norikazu Ishimatsu

Daytona

Session 9-2: Aerospace Applications - 2

Chair: David Davis, Aerojet; Co-Chair: Jason Tyll, ATK GASL

55325 Computational Study of a Subsonic Aircraft Design
Scott Winkelmann and Ryoichi S. Amano

55327 Basic Optimization Methods n Aircraft Design (CFD Methods and CAD Designs)
Scott Winkelmann, Ryoichi S. Amano, Ryan Trzebiatowski, Tyler Handel and Mitch Hinz

55068 3D Numerical Simulation of a Parachute with Two Air Vented Canopies in a Top-To-Top Formation
Mohammad Javad Izadi and Reza Baradaran Razzaz

55361 Investigation of Fluid-Structure Collisions in Advanced Aerostructures Using Discrete Lagrangian and Coupled Lagrangian-Eulerian Methods
Javid Bayandor

6:00-7:30

Grand Ballroom 4 and 5 Max Jacob Memorial Award

TUESDAY August 12, 2008

7:00 – 8:00 am

Terrace Pavilion

Author's Breakfast
General Continental Breakfast

8:00 – 9:00 am

Grand Ballroom

Plenary: **The Carbon Journey – The Nation's Need to Reduce Emissions and Increase Energy Security**
J. Michael Davis, Pacific Northwest National Laboratory

PARALLEL SESSIONS / 9:00 – 10:30 am

Grand Ballroom 7

20th Forum on Fluid Machinery

Session 21-5: Forum on Fluid Machinery - 5

Chair: Jinkook Lee, Eaton Corp.; Co-Chair: ShinHyoyoung Kang

55146 Fourier Decomposed Turbulence Measurements Downstream a High-Pressure Turbine Stage
Lars-Uno Axelsson, William K. George and T. Gunnar Johansson

55097 Study on the Effect of Blade Design with Blade Count for High Pressure Steam Turbine Using 3D CFD
J.H. Cheon, K.J. Lee, J.J. Park, J.H. Kim and M.Y. Ha

55021 The Effect of Annular Fluid Loss on Optimum Meridian Profile of Impeller and Guidevane
Takuji Tsugawa

55246 CFD-Based Match Design and Improving Performance for Francis Turbine Components
Pengcheng Guo, Xingqi Luo, Xiaobo Zheng and Shengzhu Liu

Grand Ballroom 8

Symposium on Transport Phenomena in Energy Conversion from Clean and Sustainable Resources

Session 13-1 Transport Phenomena in Energy Conversion from Clean and Sustainable Resources -1

Chair: Khaled Hammad, Dantec Dynamics; Co-Chair: Jianhu Nie, University of Nevada, Las Vegas

55189 Simulation of Flow Field on a Large Scale Wind Turbine
I. Janajreh and C. Ghenai

55204 Numerical Modeling of Coal/Biomass Co-Firing
C. Ghenai and I. Janajreh

55280 Numerical Evaluation and Comparison of Different Reduced Mechanisms for Predicting the Performance of a SOFC Operating on Coal Syngas
Francisco Elizalde-Blancas, Suryanarayana R. Pakalapati, Jose A. Escobar-Vargas and Ismail B. Celik

55134 U-RANS Simulation of Mixed-Convection around a Finite Wallmounted Heated Cylinder Cooled by Cross-Flow
Y. Lecocq, S. Bournaud, R. Manceau, B. Duret and L. Brizzi

City Terrace 11

8th Symposium on Applications in CFD

Session 14-5: Applications in Computational Fluid Dynamics - 5

Chair: Jay M. Khodadadi, Auburn University; Co-Chair: Mick Brzoska, Eastern Washington U

55177 Numerical Study of a Parachute in a Steady, Turbulent Flow Condition with a Vent of Air at the Top
Mohammad Javad Izadi and Mehdi Mohammadizadeh

55074 Effect of Airflow from the Lower Canopy in a Top-to-Top Two-Parachute Canopy Formation in Steady and Turbulent Condition
Mohammad Javad Izadi and Mehdi Mohammadizadeh

55256 Numerical Simulation of the Backlayer Critical Velocity in the Memorial Tunnel Test (MTFVTP)
Eduardo Blanco, Javier Cueto, Joaquín Fernández and Raúl Barrio

55281 Numerical Study of Smoke Propagation in a Simulated Fire in a Wagon within a Subway Tunnel
Felipe Vittori, Luis Rojas-Solórzano, Armando J. Blanco and Rafael Urbina

55277 Numerical and Experimental Investigations on Hood Capture and Protection Efficiencies
Ertan Karaismail, Ismail Celik, Steven E. Guffey and William H. Dodrill

City Terrace 12

4th Symposium on Fundamental Issues and Perspectives in Fluid Mechanics

Session 8-1: Fundamental Issues and Perspectives in Fluid Mechanics -Vortex Flows

Chair: Khaled J. Hammad, Dantec Dynamics; Co-Chair: Wei-Jen Su, US Army ARDC

55055 Identification and Analysis of Vortical Structures in a Ribbed Channel
Lei Wang, Mirko Salewski and Bengt Sundén

55096 The Impact of a Vortex Induced by a Baffle on the Turbulent Structure
Shivani T. Gajusingh, Kamran Siddiqui and Nasiruddin Shaikh

55116 Vortex Flow behind a Heaving Elastic Flat Plate
Masaki Fuchiwaki and Kazuhiro Tanaka

55190 Developing and Fully Developed Turbulent Flow in Ribbed Channels
N. D. Cardwell, P. P. Vlachos and K. A. Thole

10:30 – 11:00 Break

TUESDAY August 12, 2008

PARALLEL SESSIONS /11:00 – 12:30

Grand Ballroom 7

7th Symposium on Transport Phenomena in Manufacturing Processes

Session 7-1: Transport Phenomena in Manufacturing Process 1: Electromagnetohydrodynamics

Chair: Dennis Siginer, Wichita State University

55296 Investigating Behavior of Hydrogen Bubbles in Electro-Chemical Machining
Ryo Tsuboi, Makoto Yamamoto and Dai Kato

55128 Fully Developed Flow of Power-Law Fluid through a Cylindrical Microfluidic Pipe: Pressure Drop and Electroviscous Effects
Ram P. Bharti, Dalton J.E. Harvi and Malcolm R. Davidson

55185 Electrohydrodynamic (EHD) Pump in a Square Channel
C. C. Ngo and F. C. Lai,

55114 Electrohydrodynamic Gas Pump in a Vertical Tube
N. M. Brown and F. C. Lai

55169 Numerical Issues Associated with the Full-Zone Model of the Optically Heated Floating-Zone Used in Semiconductor Processing
Han Li and Brent C. Houchens

12:30 – 1:00

Terrace Pavilion

Grand Ballroom 8

Session 13-2 Transport Phenomena in Energy Conversion from Clean and Sustainable Resources -2

Chair: Jianhu Nie, University of Nevada, Las Vegas; Co-Chair: Khaled Hammad, Dantec Dynamics

55187 Explorations of Improving Flow Uniformity in the Bipolar Plate of a PEM Electrolysis Cell Using Different Designs
J. H. Nie, Y. T. Chen, J. F. Wu and K. M. Veepuri

55308 Numerical Study of Dead-end Micro Polymer Electrolyte Membrane Fuel Cell
Yan Ling Wu, Hee Joo Poh, Kah Wai Lum and Xiu Qing Xing

55188 Numerical Simulations of Coupled Flow and Heat Transfer Distributions in a Bipolar Plate of the Pem Electrolysis Cell
Jianhu Nie, Jianfei Wu, Steve Cohen and Blake Carter

55040 Optimization of Fluid Flow in 3D Bipolar Plates
Jianfei Wu, Jianhu Nie and Yitung Chen

Lunch

City Terrace 11

Session 14-6: Applications in Computational Fluid Dynamics - 6

Chair: Mick Brzoska, Eastern Washington University; Co-Chair: Jay M. Khodadadi, Auburn University

55181 Simulations to Determine Laminar Loss Coefficients for Flow in Circular Ducts with Arbitrary Planar Bifurcation Geometries
Tim A. Handy, Evan C. Lemley, Dimitrios V. Papavassiliou and Henry J. Neeman

55230 Modeling for a High Bandwidth-High Flow Valve Design Based on Hörbiger Plate Operation
David T. Branson, Fengcai Wang, D. Nigel Johnston, Derek G. Tilley, Chris R. Bowen, Kevin A. Edge and Patrick S. Keogh

55259 Two-Objective Shape Optimization of Sewers
T. Karvinen and R. Karvinen

55266 Turbulence Modeling in the Numerical Estimation of Hemolysis in Hemodialysis Cannulas
Felix A. Salazar and Luis R. Rojas

55360 Numerical Modeling of Turbulent Surface Wave Motion Using a Coupled Boundary Element-Finite Difference Technique
Mirmosadegh Jamali

City Terrace 12

Session 8-2: Fundamental Issues and Perspectives in Fluid Mechanics - Unsteady and Boundary Layer Flows

Chair: Barton Smith, University of Utah

55042 Wave-Induced Effect on the Airside Velocity Field above the Wind-generated Water Waves
Nasiruddin Shaikh and Kamran Siddiqui

55075 Experiment Study on the Bursting Phenomenon in the Turbulent Flow Boundary Layer on the Compliant Wall
Yui Owaku, Isao Misu and Nobuyoshi Fujimatsu

55205 Flow in Rectangular Cavities with Two Vertical Oscillating Walls
Guillermo E. vando, Alberto Beltran and Sandy L. Ovando

Daytona

Symposium on DNS, LES and Hybrid RANS/LES Methods

Session 15-1: DNS, LES and Hybrid RANS/LES Methods -1

Chair: Donald Rizzetta, U.S Air Force; Co-Chair: Miguel Visbal, Air Force Research Lab

55356 Discrete Filtering in Large-Eddy Simulation on Unstructured Grids
Andreas Haselbacher

55354 Recent Progress in LES/DNS Modeling and Simulation for Chemically Reacting Flows
Houshang Ebrahimi

55107 Inlet Conditions for LES of Swirl Flows
Mohammad H. Baba-Ahmadimand Gavin R. Tabor

TUESDAY August 12, 2008

Grand Ballroom 4&5

1:00 – 2:00

Plenary: Energy for Sustainability
 Trung Van Nguyen, National Science Foundation

Orlando

1:00 – 2:00

Plenary: Energy Research: Opportunities and Challenges
 Mildred Dresselhaus, Massachusetts Institute of Technology

PARALLEL SESSIONS / 2:00 – 3:30 pm

Grand Ballroom 7

Session 7-2: Transport Phenomena in Manufacturing Processes 2: Complex Fluids

Chair: Makoto Yamamoto, Tokyo University of Science

55066 Forced Convection in Cross Flow of Power Law Fluids over a Pair of Circular Cylinder in Tandem Arrangement
 Rahul C. Patil, Ram P. Bharti and Raj P. Chhabra

55172 Role of Hydraulic and Capillary Radii in Improving the Effectiveness of Capillary Model in Wicking
 Krishna M. Pillai, Reza Masoodi and Padma prabod Varanasi

55213 Natural Convection Heat Transfer in Nanofluids - A Numerical Study
 W. Rashmi, A. F. Ismai, W. Asrar, M. Khalid and Y. Faridah

55058 An Inverse Approach to Magnetorheological Damper Design: Hershel-Bulkley Model
 Mario F. Letelier, Juan S. Stockle, and Dennis A. Siginer

Grand Ballroom 8

Session Non-invasive measurements in Single and Multiphase Flows - 1

Chair: Bahram Khalighi, General Motors Corp; Co-Chair: Yassin A. Hassan, Texas A&M University

55196 A Study of Grazing Behavior of Copepods Using Digital Holographic Cinematography
 Siddharth Talapatra, Jiarong Hong, Jian Sheng, Becky Waggett, Pat Tester and Joseph Katz

55157 A Pressure Distribution Determination Algorithm Using PIV Velocity Data
 Kobra Gharali and David A. Johnson

55152 Improved DPIV Accuracy Using Advanced Windowing Techniques
 Adric Eckstein and Pavlos Vlachos

55330 Correlations of the Droplet Size-Velocity of the Two-Phase, Air/Liquid Spray Using a Particle-Dynamic-Analyzer
 Mohammad A. Rahman, Johana Gomez, Ted Heidrick, Brian A. Fleck, Jennifer McMillan and Edward W. Chan

55184 Optical Measurement of Base Film Thickness in Annular Two-Phase Flow
 DuWayne Schubrin, Andrea C. Ashwood and Timothy A. Shedd

Daytona

Symposium on DNS, LES and Hybrid RANS/LES Methods
Session 15-2: DNS, LES and Hybrid RANS/LES Methods - 2

Chair: Karman Guia, University of Cincinnati; Co-Chair: Subrata Roy, University of Florida

55355 Large-Eddy Simulation of Active Flow Control for a Transitional Highly Loaded Pressure Turbine Blade
 Donald Rizzetta

55359 Detached-Eddy Simulation of Full Aircraft at Fixed and Maneuvering Flight Conditions
 Scott Morton

City Terrace 11

Session 8-3: Fundamental Issues and Perspectives in Fluid Mechanics- Jets

Chair: Pavlos Vlachos, Virginia Polytechnic Institute and State University

55155 Study of Mixing Characteristics of Rectangular Turbulent Jets
 Tarek Abdel-Salam, and Gerald Micklow

55161 Spatiotemporal Development of Transitional Wall Jets
 Samuel Raben, Wing F. Ng and Pavlos P. Vlachos

55299 The Similarity of Ducted Jets with Low and High Pressure Gradients
 Marcos N. Arima, Marcos M. Pimenta and Guilherme A.L. Silva

55223 Simplified Computational Models for Particles Impacting and Layering under a High Temperature Jet
 Kh. Fataoui, B. Pateyron and M. Elganaoui

City Terrace 12

Session 13-2 Transport Phenomena in Energy Conversion from Clean and Sustainable Resources -2

Chair: Jianhu Nie, University of Nevada, Las Vegas; Co-Chair: Khaled Hammad, Dantec Dynamics
55187 Explorations of Improving Flow Uniformity in the Bipolar Plate of q PEM Electrolysis Cell Using Different Designs
 J. H. Nie, Y. T. Chen, J. F. Wu and K. M. Veepuri

55308 Numerical Study of Dead-end Micro Polymer Electrolyte Membrane Fuel Cell
 Yan Ling Wu, Hee Joo Poh, Kah Wai Lum and Xiu Qing Xing

55188 Numerical Simulations of Coupled Flow and Heat Transfer Distributions in a Bipolar Plate of the Pem Electrolysis Cell
 Jianhu Nie, Jianfei Wu, Steve Cohen and Blake Carter

55040 Optimization of Fluid Flow in 3D Bipolar Plates
 Jianfei Wu, Jianhu Nie and Yitong Chen

TUESDAY August 12, 2008

PARALLEL SESSIONS / 4:00 – 5:30 pm

Grand Ballroom 7

Session 7-3: Transport Phenomena in Manufacturing Processes 3: Linear Fluids

Chair: Brent Houchens, Rice University

55133 Pressure Loss of Gaseous Flow at Microtube Outlet
Y. Horii and Y. Asako

55004 Dimensional Analysis to Predict Dynamic Behavior of Sand Bulk under 2D Vibration

Hadi Arjmandi Tash, Morteza Sadeghi, Arash Ranjbaran and Esmaeel Esmaeel Zadeh

55069 On Negative Pressure Waves in Geological and Geophysical Processes

Sayavur Bakhtiyarov

55070 Foam Stability in In-Situ CO₂ Enhanced Oil Recovery Technology
Sayavur Bakhtiyarov

Grand Ballroom 5

Session 24-2 Non-invasive measurements in Single and Multiphase Flows - 2

Chair: Bahram Khalighi, General Motors Corp; Co-Chair: Yassin A. Hassan, Texas A&M University

55046 Effect of Gas-Liquid Ratio on Droplets Centricity and Velocity of an Effervescent Atomizer
S. Ghaemi, D. S. Nobes and P. Rahimi

55062 Gas-Liquid-Solid Three-Phase Flows through Pipes: Particle Velocity Measurement and Prediction

O. O. Bello, K. M. Reinicke, C. Teodoriu and M-Y Liu

55089 A Preliminary Study of the Transition of an In-Line Pipe Vortex to Slug Flow Using Particle Image Velocimetry

Benjamin J. de Witt and Ronald J. Hugo

55197 Near-wall Stereo and Tomographic-PIV Investigation of the Turbulent Channel Flow Over a Rough-wall
Jiarong Hong, Joseph Katz and Mike Schultz

55203 Surface Skin Friction Measurement and Visualization Based on Compliant Coatings
Nobuyoshi Fujimatsu and Isao Misu

City Terrace 11

Session 15-3: DNS, LES and Hybrid RANS/LES Methods - 3

Chair: Faure Malo-Molina; Co-Chair: Karman Guia, University of Cincinnati

55357 High-Fidelity Simulations of Transitional Flow over Plunging Airfoils
Miguel Visbal

55358 Low Reynolds Number Flow over Flexible Membrane Airfoils

Raymond Gordnier

City Terrace 12

Session 8-4: Fundamental Issues and Perspectives in Fluid Mechanics - 4

Chair: Francine Battaglia, Virginia Polytechnic Institute and State University

55071 Analytical Determination of Viscous Permeability of Fibrous Porous Media
A. Tamayol and M. Bahrami

55101 The Dynamics of Accumulating Ferrofluid Aggregates

Alicia M. Williams and Pavlos P. Vlachos

55248 Self-assembly of Particles into 2D Lattices with Adaptable Spacing

N. Aubry, S. Nudurupati, M. Janjua and P. Singh

55346 A Numerical Method For Damping Computation Of Rigid Cylindrical Containers

Yang Wei, Liu Shuhong and Wu Yulin

6:00 – 7:30

Grand Ballroom 4 and 5

Awards Banquet

WEDNESDAY August 13, 2008

7:00 – 8:00 am

Terrace Pavilion

Author's Breakfast
General Continental Breakfast

8:00 – 9:00 am

Grand Ballroom

Plenary: **Molecular Dynamic Simulation of Liquid Argon Film Evaporation and Colloidal Adsorption Characteristics in a Nanochannel**
J. N. Chung, University of Florida

PARALLEL SESSIONS / 9:00 – 10:30 am

Grand Ballroom 7

8th International Symposium on Numerical Methods for Multiphase Flows

Session 2-1: Numerical Methods and Results for Particle Laden Flows - 1

Chair: Arturo Fernandez, CUA;
Co-Chair: Francine Battaglia, Virginia Tech and Malcolm Andrews, Los Alamos

55159 Development and Validation of a Binary Collision Detection Algorithm for a Polydispersed Particle Mixture
Dirk Wunsch, Pascal Fed and Olivier Simonin

55158 A Validation Study for the Hydrodynamics of Biomass in a Fluidized Bed
Mirka Deza, Francine Battaglia and Theodore J. Heindel

55033 Smoothed Profile Method for Particulate Two-Phase Flow
Xian Luo, Martin R. Maxey and George E. Karniadakis

55104 Direct Numerical Simulation of 1000 Deformable Capsules in a Channel Flow at Finite Inertia
Sai K. Doddi, R. Murthy Kalluri and Prosenjit Bagchi

55207 LES Sub-Grid Diffusion for Lagrangian Particles
Michael Rybalko, Eric Loth and Dennis Lankford

Grand Ballroom 8

11th International Symposium on Advances in Numerical Modelling of Aerodynamics and Hydrodynamics in Turbomachinery

Session 20-1: Turbo CFD 1

Chair: Chunill Hah, NASA/Glenn; Co-Chair: Yu-Tai Lee, Naval surface Warfare Center

55202 Validations of Some Slip Factor Models for Mixed-Flow Impellers
Shengqin Huang, Zhenxia Liu, Yan Yan, Yaguo Lu and Xiaochun Lian

55237 Structure Vibration of Hydropower House Induced by Francis Turbine Basing on CFD Numerical Simulation
Liang Qin, Zhengwei Wang, Yongyao Luo, Guangjie Peng and Huijing Tian

55139 Transferring Methods of Efficiency for Hydraulic Machines Using Model Based on Smooth-Pipes Flow
Li Long, Wang Ze, Yang Xuelin and Li Dan,

55001 Three Dimensional Numerical Simulation of Flow Field inside a Reversible Pumping Station with Symmetric Aerofoil Blade
Cheng Li, Liu Chao, Zhou Jiren, Tang Fangping

City Terrace 11

Forum on Fluid Measurements and Instrumentation

Session 23-1: Fluid Measurements and Instrumentation - Miscellaneous Methods

Chair: Joel Park Naval Surface Warfare Center; Co-Chair: Judith Bamberger, Battelle at PNNL

55306 ND-YAG Monitoring for DGV Application)
G. L. Morrison and B. Nelson

55047 An Instrument for Measuring Orifice-Specific Fuel-Injection Rate from a Multi-Orifice Nozzle
Jason G. Kempenaar, Charles J. Mueller, Kim A. Shollenberger and Krishna Lakshminarasimhan

55309 Discharge Measurements Using the Classic Gibson Method with Instrumentation Installed Inside a Pipeline
Adam Adamkowski, Waldemar Janicki, Gustavo Urquiza, Janusz Kubiak and Miguel Basurto

55311 The Low Speed Wind Tunnel at Labinthap Preliminary Evaluation
Eslava R. Tolentino, Eslava G. Tolentino and Velázquez M. Toledo

City Terrace 12

Microfluidics Summer Forum 2008: Fluid Engineering in Micro- and Nanosystems

Session 25-1- Microfluidics - 1

Chair: Steve Wereley, Purdue University

55032 Development and Characterization of High Bandwidth Micro-Actuators
John T Solomon, Rajan Kumar and Farrukh S. Alvi

55037 Investigation of Two-Phase Flow in Rectangular Micro-Channels
Nam-Won Kim, Estelle T. Evans, Steven A. Soper, Michael C Murphy and Dimitris E. Nikitopoulos

55039 Investigation of Switching Time and Pressure Head Effects on Hydro Magnetic Micro-Pump and Flow Controller
Mahdi Esmaily Moghadam and Mohammad Behshad Shafii

55051 Hydrophobic and Oleophobic Surfaces with Micro-Posts and Nano-Particles
Adam Steele, Stephen Moran, Andrew Cannon, William King, Ilker Bayer and Eric Loth

City Terrace 10

Panel on Algorithm Development in CFD

Session 18-1: Algorithmic Developments for Multidisciplinary Problems in CFD
Chair: Subrata Roy, University of Florida; Co-Chairs: Datta Gaitonde

55351 Recent Progress in LES Modeling and Simulation for Chemically Reacting Flow
Houshang Ebrahimi

55352 The Method of Lattice Boltzmann Equation for Flow Computations
Renwei Mei

55353 The Interplay of CFD and Experiments: An Experimentalist's Viewpoint
Louis Cattafesta

Acquiring Data for CFD Benchmarking
Joseph Katz

55349 Massively Parallel Multiphysics Simulations
Andreas Haselbacher

and Jin Yan

WEDNESDAY August 13, 2008

10:30 – 11:00 Break

PARALLEL SESSIONS /11:00 – 12:30

Grand Ballroom 7

Session 2-2: Numerical Methods and Results for Particle Laden Flows - 2

Chair: Francine Battaglia, Virginia Tech ; Co-Chair: Malcolm Andrews, Los Alamos and Arturo Fernandez, CUA

55285 Numerical Analysis on the Performance of the Solid Solar Particle Receiver with the Influence of Aerowindow
Zhuoqi Chen, Yitung Chen and Taide Tan

55335 Multi-Scale Modeling for Granular Flows
Xiang Zhao and Sijun Zhang

55249 Direct Numerical Simulation of Four Way-Coupled Gas-Solid Flow and Deposition in a Turbulent Channel Flow
Goodarz Ahmadi, Hojjat Nasr and John B. McLaughlin

55254 New Thermal Stochastic Collision Model for Prediction of Heat Transfer in Heated Turbulent Gas-Solid Pipe Flows
F. Behzad, Z. Mansoori, M. Saffar-Avval, H. Basirat Tabrizi, and G. Ahmadi

55302 Large Eddy Simulation of Particle Deposition in a Turbulent Channel Flow
Mohammad Rahnama, Mazyar Salmanzadeh and Goodarz Ahmadi

Grand Ballroom 8

Session 20-2. Turbo CFD 2

Chair: Akira Goto, Ebara Research Co.; Co-Chair: Yu-Tai Lee, Naval Surface Warfare Center

55238 Experimental and Numerical Analysis of Pressure Pulsation in Francis Turbine
Yexiang Xiao, Yongyao Luo, Liang Qin, Zhengwei Wang, Ruofu Xiao and Guangjie Peng

55007 Contributions Concerning the Power Optimization of the Pumping Stations
Alexandrescu C. Aurora, Alexandrescu O. Simona Adina and Alexandrescu O. Constantin Adrian

55132 Rotating Stall Behavior in a Diffuser of Mixed Flow Pump and Its Suppression
Masahiro Miyabe, Akinori Furukaiwa, Hideaki Maeda and Isamu Umeki

55025 Numerical Simulation and PIV Measurement on the Internal Flow in a Centrifugal Mini Pump at Low Flow Rate Condition
Jie-Shao, Shuhong-Liu, Huijing-Yuan and Yuliun-Wu

City Terrace 11

Session 23-2: Fluid Measurements and Instrumentation - Particle Imaging and Tracking

Chair: Gerald L. Morrison, Texas A&M University; Co-Chair: Ali Etebari, NSWCCD

55151 Robust Gradient Estimation Using Radial Basis Functions
Satyaprakash Karri, John Charonko and Pavlos Vlachos

55340 On the Accuracy of Spectrum Analysis Using PIV Data
Jun Chen

55154 Flow Property Measurements of Stirred-Tank Flow Across three Reynolds Number Decades
Yihong Yang, Roe-Hoan Yoon and Demetri P. Telionis

55017 Development of Three-Dimensional Particle Tracking Velocimetry for the Investigation of Unsteady Flows
D. Homeniuk, D.S. Nobes and a D. Wilson

55024 Volume Particle Tracking in Three-Dimensional Micro-Channel Flows
David S. Nobes, Darren L. N. Homeniuk, Shahnawaz Molla and Subir Bhattacharjee

City Terrace 12

Session 25-2- Microfluidics - 2

Chair: Deborah V. Pence, Oregon State University

55112 Bubble Formation in a DC Electric Field
Feng Chen, Yaozu Song and Yao Peng

55117 Characteristics of Micro Pump Driven by Conducting Polymer Soft Actuator
Yoshitaka Naka, Masaki Fuchiwaki and Kazuhiro Tanaka

55118 Thermally Actuated Pumping by Rayleigh-Bernard Convection Using Surface Asymmetry
Myeong Chan Jo and Vinod Narayanan

55153 Compensating for the Phosphorescent Persistence in Intensified Cameras for Micro-PIV
Adric Eckstein and Dr. Pavlos Vlachos

55160 A Direct Numerical Simulation of the Unsteady Development of a Deformable Rising Bubble in a Quiescent Liquid
A. Agarwal, C.F. Tai and J.N. Chung

12:30 – 1:00

Terrace Pavilion Lunch

1:00 – 2:00 pm

Grand Ballroom

Plenary: **The 2008 Freeman Scholar Lecture**
William K. George, Chalmers University of Technology

WEDNESDAY August 13, 2008

PARALLEL SESSIONS /2:00 – 3:30

Grand Ballroom 7 Session 2-3: Micro-Multiphase Flows

Chair: Malcolm Andrews, Los Alamos; Co-Chair: Francine Battaglia, Virginia Tech and Arturo Fernandez, CUA

55083 Numerical Simulation of Bubble Formation in Co-Flowing Mercury

Ashraf Ibrahim, Mark Wendel, David Felde and Bernard Riemer

55123 Meniscus Shape and Optical Performance of a MEMS-Based Liquid Micro-Lens System

Shong-Leih Lee and Chao-Fu Yang

55136 A Numerical Study on Flow Boiling in Parallel Microchannels

Jinho Jeon, Woorim Lee, ty Youngho Suh and Gihun Son

55137 Numerical Study of Droplet Motion in s Hydrophilic/Hydrophobic Micro-Channel

Jiyoung Choi and Gihun Son

Grand Ballroom 8 Session 20-3: Turbo CFD 3

Chair: Keith Walters, Mississippi State University; Co-Chair: Yu-Tai Lee, Naval Surface Warfare Center

55126 Numerical Prediction Method of Cavitation Erosion

Motohiko Nohmi, Yuka Iga and Toshiaki Ikoahagi

55078 Prediction of Surface Roughness Effects on Centrifugal Compressor Performance

Tomoki Kawakubo, Ryusuke Numakura and Kanji Majima

55061 Numerical Experiments with Solid Handling Pumps

Hitesh Jogiya and J T Kshirsagar

55240 Computation of Static and Dynamic Stresses of a Bulb Tubular Turbine

Yongyao Luo, Lingjiu Zhou, Zhengwei Wang and Guangjie Peng

55245 The Alteration of Runner and Partial Vanes on a Fixed Blade Propeller Water Turbine Basing on the Full Passage Simulation

Lanjin Zhang, Zhengwei Wang and Liang Qin

City Terrace 11 Session 23-3: Fluid Measurements and Instrumentation- Measurements in the US Navy David Taylor Model Basin

Chair: Stuart D. Jessup, Office of Naval Research; Co-Chair Yu-Tai Lee, Naval Surface Warfare Center

55338 High Speed SPIV Measurements in the LCC Facility

Ali Etebari

55315 Infrared Global Laser Profilometry: Development and Applications

Jason Carneal

55313 Acoustic Doppler Current Profiler (ADCP) Measurements of Breaking Waves

Anne M. Fullerton and Thomas C. Fu

55316 Unsteady Bow Wave Dynamics of Simple Hull Geometries

Jason Carneal

55307 A New Methodology for the Evaluation of the Maneuvering Characteristics of Surface Ship Models

Joel T. Park, David D. Hayden, Joseph H. Kim and Mark P. Melendez

City Terrace 12 Session 25-3- Microfluidics - 3

Chair: Dimitris E. Nikitopoulos, Louisiana State University

55166 Experimental Studies of Pressure Drop and Flow Instability in Evaporative Micro-channels

Hee Joon Lee, Dongyao Liu and S. C. Yao

55175 Laser-Induced Fluorescence Thermometry for Joule Heating in AC Electrokinetic Chips

Stuart J. Williams, Pramod Chamarthy and Steven T. Wereley

55192 Single Droplet Impingement: Effect of Nanoparticles

Jian Shen, James Liburdy, Deborah Pence and Vinod Narayanan

55200 DNA Hybridization Enhancement in Microarrays Using AC-Electrothermal Flow

F. Bottausci, T. Neumann, M.A. Mader, I. Mezic, L. Jaeger and M. Tirrell,

55219 Microfluidic Device for Synthesis of Lipid Bi-Layers

B.M.R.U. Banneyake and Debjyoti Banerjee

3:30 – 4:00 pm Break

WEDNESDAY August 13, 2008

PARALLEL SESSIONS /4:00 – 5:30

Grand Ballroom 7

Session 2-4: Multiphase Flow and Turbulence

Chair: Francine Battaglia, Virginia Tech ; Co-Chair: Malcolm Andrews, Los Alamos and Arturo Fernandez, CUA

55026 An A Priori Study for the Modelling of Subgrid-Scale Phenomena in the Interaction between a Liquid Sheet and a Decaying Turbulence
Pierre Trontin, Stephane Vincent, Jean-Luc Estivalezes and Jean-Paul Caltagirone

55156 Direct Numerical Simulation of the Motion of Particles Larger than the Kolmogorov Scale in a Homogeneous Isotropic Turbulence
Cedric Corre, Jean-Luc Estivalezes, Stephane Vincent and Olivier Simonin

55063 Numerical Simulation of Rayleigh-Taylor Instability with Two-Fluid Model and Interface Sharpening
Luka Štrubelj and Iztok Tiselj

55304 A Material Interface Transition Algorithm for Multiphase Flow
Marianne M. Francois, Robert B. Lowrie and Edward D. Dendy

Grand Ballroom 8

Session 20-4: Turbo CFD 4

Chair: Yu-Tai Lee, Naval Surface Warfare Center; Co-Chair: Brian York, CRAFT Tech.; Ashvin Hosangadi

55232 Aerodynamic Study of Circumferential Grooves in a Transonic Axial Compressor
Chunill Hah, Martin Mueller and dt Heinz-Peter Schiffer

55045 Numerical Simulation of the Unsteady Flow in a High-Head Pump Turbine and the Runner Improvement
Hongjuan Ran, Xianwu Luo, Yao Zhang, Baotang Zhuang and Hongyuan Xu

55242 Numerical Simulation of Traveling Bubble Cavitating Flow in a Francis Turbine
Lingjiu Zhou and Zhengwei Wang

55228 Performance Improvement of a Vacuum Cleaner by Analysis of the Flow around Motor
J.W. Park and H.K. Park

City Terrace 11

Session 23-4: Fluid Measurements and Instrumentation- Flow Metrology

Chair: Joel Park, Naval Surface Warfare Center; Co-Chair: Gerlad L. Morrison, Texas A&M University

55324 Characteristic Research of Sonic Nozzles Using Step-down Procedure in Low Reynolds Number
J.M. Lim, K.A. Park, B.H. Yoon and H.M. Choi

55147 Effect of Inlet Curvature on the Discharge Coefficients of Critical-Flow Venturi Nozzle with a Toroidal Throat in the Laminar-Turbulent Transition
Tatsuya Funaki, Masahiro Ishibashi

55263 Study on Model of Measuring Flow Rate Basing on Ultrasonic Flow Meter in Complicated Flow Channel and Large Flow Condition
Yuan Zheng, Yu Huang and Chen-guang Tong

55225 The Improved Ultrasonic Flow Measuring Method
Iryna Gryshanova

City Terrace 12

Session 25-4- Microfluidics - 4

Chair: Steve Wereley, Purdue University

55214 Paper Microfluidics Platform for Gold Nano-Particle Synthesis
Debjyoti Banerjee

55216 Micro-Chamber Filling Experiments with Applications in Capillary Driven Microfluidics
Debjyoti Banerjee

55253 Gas-Liquid Flows in Flow Cells and Fracture Models
G. Ahmadi, D. Crandall and D.H. Smith

55294 Optimized High-Aspect-Ratio Diffusional Micromixers
Amit Maha, Vamsidhar Palaparthi, Steven A. Soper, Michael C Murphy and Dimitris E. Nikitopoulos

THURSDAY August 14, 2008

7:00 – 8:00 am

Terrace Pavilion

Author's Breakfast

General Continental Breakfast

PARALLEL SESSIONS / 9:00 – 10:30 am

Grand Ballroom 7

8th International Symposium on Numerical Methods for Multiphase Flows

Session 2-5: Applications Related to Numerical Methods for Multiphase Flows

Chair: Malcolm Andrews, Los Alamos; Co-Chair: Francine Battaglia, Virginia Tech and Arturo Fernandez, CUA

55044 A Continuum Model for Simulating Mine Water Inflow and Gas Emission

D.P. Adhikary and H. Guo

55119 Shape Optimization for Cryogenic Cavitating Flows past an Isolated Hydrofoil

Maria Grazia De Giorgi, Pietro Marco Congedo, Maria Giovanna Rodio and Antonio Ficarella

55100 Minimum Fluidization Velocity and Gas Holdup in Fluidized Beds with Side Port Air Injection

Nathan P. Franka, IJoshua B. Drake and Theodore J. Heindel

55143 Euler-Euler Large-Eddy Simulation Approach for Non Isothermal Particle-Laden Turbulent Jet

Enrica Masi, Benoît Bedat, e Mathieu Moreau and Olivier Simonin

Grand Ballroom 8

Symposium on Transport Phenomena in Mixing

Session 11-1: Transport Phenomena in Mixing

Chair: Khaled Hammad, Dantec Dynamics; Co-Chair: Chao-Hsin Lin, The Boeing Company

55220 Air Entrainment Studies for a Supersonic Micro-Ejector System

Jason Tyll, George Papadopoulos, s Alan Drake, Randy Chue, John D. Williams and Paul C. Galambos

55013 Bubble Formation in a Large Scale System

Robert A. Leishear, Jeanne K. Bernards and Michael L. Restivo

55120 Stretching Fields and Flow Mixing Enhancement of Rarified Gases in Micro-Grooved Channels by the Lattice Boltzmann Method

Amador M. Guzmán, Luis. E. Sanhueza, Andrés J. Díaz and Rodrigo A. Escobar

55267 An Active Micromixer Enhances Mixing by a Rotating Shuttlecock Rotor

Thien Xuan Dinh and Yoshifumi Ogami

55028 Large-Eddy Turbulent Flow Simulation of a Komax Static Mixer

Ramin K. Rahmani, Theo G. Keith and Anahita Ayasoufi

City Terrace 11

Forum on Fluid Measurements and Instrumentation

Session 23-5: Fluid Measurements and Instrumentation- Multi-Phase Flow

Chair: Yassin A. Hassan, Texas A&M University; Co-Chair: Joel Park, Naval Surface Warfare Center

55043 Application of s Fiber Optic Probe to High Void Fraction Air/Water Flow

A.J. Pertzborn and W.C Smith

55305 Annular Flow Experimental Study in Horizontal Pipes Using Radial Proximity Probes

Domitilo Libreros, Silva F. Sánchez, Mariscal I. Carvajal and G. Polupan

55334 Estimation of Average Void Fraction for Gas-Liquid, Two-Phase Flow in an Industrial Nozzle Assembly Using a Quick-Closing-Valve

Mohammad A. Rahman, Johana Gomez, Ted Heidrick, Brian A. Fleck and Jennifer McMillan

55331 Predicting the Two-Phase Flow Patterns Implementing the Froude Number Correlation

Mohammad A. Rahman, Ted Heidrick and Brian A. Fleck

City Terrace 12

3rd Symposium on Flow Manipulation and Active Control

Session 10-1: Flow Stability and Control

Chair: Hassan Peerhossaini, Laboratoire de Thermocinetique; Co-Chair: Mihir Sen, University of Notre Dame

55092 Stability of Concave Boundary Layers-Overview of Stability Mechanism and Recent Findings

L. Momayez, G. Delacourt, P. Dupont and H. Peerhossaini

55076 Flow Control in Serpentine Inlet Duct Using Vortex Generator Jets

R. K. Sullerey and S. Chandra

55130 Active Flow Control of Separated Turbulent Flow over a Hump Using RANS, DES, and LES

Subhadeep Gan

55035 Computational and PIV Analysis of the Fluid Flow in a Channel with an Oscillating Finned Surface

Bolaji O. Olayiwola, Gerhard Schaldach and Peter Walzel

10:30 – 11:00 Break

THURSDAY August 14, 2008

PARALLEL SESSIONS /11:00 – 12:30

Grand Ballroom 8

Forum on Advances in Fluid Engineering Education

Session 6-1: Forum on Advances in Fluid Engineering Education

Chair: Ray Taghavi, University of Kansas; Co-Chair: Ganesh Raman, Illinois Institute of Technology

55250 A CRCD Course on Particle Transport, Deposition and Removal
Goodarz Ahmadi, Suresh Dhaniyala, John McLaughlin, Cetin Cetinkaya, Stephen Doheny-Farina and Fa-Gung Fan

55108 Hands-On Water Purification Experiments Using the Adaptive Water Laboratory for Undergraduate Education and K-12 Outreach
Paul M. Boyle and Brent C. Houchens

55283 Effects of Ice Formation on the Flowfield of an Aircraft Engine Inlet
Ray R. Taghavi and Wonjin Jin

55053 Fluid Flow Modelling through Spatially Distributed Fracture Network
Shaik Abdul Ravoof

55054 Integrated-Tensor Approach for Fluid Flow in Stress Sensitive-Spatially Distributed Fractured Medium
Shaik Abdul Ravoof

City Terrace 11

Session 23-6: Fluid Measurements and Instrumentation- Transient Flow

Chair: Kyung-AM Park, Korea research Institute of Standards and Science; Co-Chair: Joel Park, Naval Surface Warfare Center

55286 Study on Setting of One-Way Surge Tank in Long Water Supply Engineering
Jianyong Hu, Jian Zhang, Weihua Lu and Shibo Ma

55300 The Probability Distribution of the Relative Highest Water Level in Surge Tank of Waterpower Station
Yongzhong Zhu, Jian Zhang, Yongsheng Yuan, Jieren Chen and Yuan Zheng

55288 Computer Simulation of the Hydropower Stations with Long Pressurized Pipelines and Far Transmission Line
Jianxu Zhou and Chengmin Bi

55261 Application of Pressure Regulating Valve in the Hydraulic Transients of Hydropower Plant
Jian Zhang, Shibo Ma, Jianyong Hu and Xiaodong Yu

55262 Study on Field Test and Simulating Calculation Following Load Rejections of Tongbai Pumped Storage Power Station
Jian Zhang, Delou Wang, Jianyong Hu Jie and Zhou Jie Fang

City Terrace 12

Session 10-2: Actuators and Drag Reduction

Chair: Hassan Peerhossaini, Laboratoire de Thermocinetique; Co-Chair: Mihir Sen, University of Notre Dame

55027 Analysis and Modelisation of a Fluidic Actuator
Caroline Braud, Arthur Dymont, Jim Kostas, Jean Marc Foucaut and Michel Stanislas

55020 Wall Normal Jet Produced by DBD Plasma Actuator with Doughnut-Shaped Electrode
Takehiko Segawa, Hiro Yoshida, Shinya Takekawa, Timothy Jukes and Kwing-So Choi

55081 Drag Reduction for Blunt Body with Cross Flow by Extremum-Seeking Control
Nobuhiko Kamagata, Susumu Horio and Koichi Hishida

55093 Effects of Car Inclination on Air Flow and Aerothermal Behavior in the Underhood Compartment
Mahmoud Khaled, Fabien Harambat and Hassan Peerhossaini

Energy Nano Track Chairs

Program Committee:

Zhixi Bian, *UC Santa Cruz*
Theodorian Borca-Tasciuc, *RPI*
Alexander Fridman, *Drexel*
Uwe Kortshagen, *Univ Minnesota*
Jennifer Lukes, *Univ Penn*
Navin Manjooran, *Siemens AG, Power Generation*
Arumugam Manthiram, *UT Austin*
M. Pinar Menguc, *Univ Kentucky*
Ryan O'Hayre, *Colorado School of Mines*
Laurent Pilon, *UCLA*
Dimos Poulikakos, *ETH Zurich*
Friedrich B. Prinz, *Stanford*
Ali Shakouri, *UC Santa Cruz*
Yang Shao-Horn, *MIT*
David S. Sholl, *CMU*
Sebastian Volz, *Ecole Centrale Paris*
Xianfan Xu, *Purdue*
Xinbing Zhao, *Zhejiang University, China*

Track 1 Nanotechnology for Solar Energy Utilization (Track)

Track Chair: Uwe Kortshagen, *University of Minnesota*
Track Co-Chair: M. Pinar Menguc, *University of Kentucky*

Track 2 Nanotechnology for Energy Storage (Track)

Track Chair: ARUMUGAM MANTHIRAM
Track Co-Chair: Ryan O'Hayre, *Colorado School of Mines*

Track 3 Nanotechnology for Efficient Energy Conversion (Track)

Track Chair: Ali Shakouri
Track Co-Chair: Zhixi Bian, *University of California Santa Cruz*

Track 4 Fundamental Issues of Nanoscale Energy Carrier Transport and Interaction (Track)

Track Chair: Jennifer Lukes, *University of Pennsylvania*
Track Co-Chair: Laurent Pilon, *University of California, Los Angeles*

Track 5 Nanotechnology for Carbon Capture (Track)

Track Chair: David Sholl, *Georgia Institute of Technology*

Track 6 Industry/Commercialization Track (Track)

Track Chair: Navin Manjooran

NOTES

MONDAY August 11, 2008

7:00 – 8:00 am

Terrace Pavilion

Author's Breakfast
General Continental Breakfast

8:00 – 9:00 am

Grand Ballroom 4&5

Plenary: The Role of Nuclear Energy in Our Future
Dr. Kathryn A. McCarthy, Idaho National Laboratory

9:00 – 10:10 am

Track 2 Nanotechnology for Energy Storage

(Chairs: Arumugam Manthiram, UT Austin; Ryan O'Hayre, Colorado School of Mines)

2_1 Keynotes (Chairs: Arumugam Manthiram, UT Austin; Ryan O'Hayre, Colorado School of Mines)

53081 Architectural Design, 1D Walls, 3D Plumbing, and Interior Design en route to Scaleable 3D Multifunctional Nanoarchitectures for Energy Storage

Debra Rolison

53083 Nanocomposites: Opening The Door to New Concepts in Energy Storage

Glenn G. Amatucci

10:10 – 10:20

Break

10:20 – 11:50 pm

Track 2 Nanotechnology for Energy Storage

(Chairs: Arumugam Manthiram, UT Austin; Ryan O'Hayre, Colorado School of Mines)

2_2 Batteries, Fuel Cells and Related Technologies (Chairs: Ryan O'Hayre, Colorado School of Mines; Arumugam Manthiram, UT Austin)

53078 Enhancement of Pt-Based Catalysts via N-Doped Carbon Supports

Ryan O'Hayre, Yingke Zhou, Robert Pasquarelli, Joe Berry and David Ginley

53071 Low Cost Palladium-based Nanoalloy catalysts for Fuel Cells

Arumugam Manthiram

53029 A Computational Study of Catalytic Platinum Nanoparticles with and without OH Chemisorption during Reactions

Mikhail Sekachev, Cheng-Xian (Charlie) Lin, Zhiyu Hu and Don Dareing

53042 Structural and Electrochemical Studies on Thin-Film Yttria-Doped Zirconia Electrolytes for Microscale Solid Oxide Fuel Cells

Alex C. Johnson and Shriram Ramanathan

53002 Forced Unsteady-state, Variable Volume Membrane Reactor: New Scalable Technology for Distributed Hydrogen Production

David Damm, Andrei Fedorov

53070 Rapid Microwave-solvothermal Synthesis of Nanostructured Phospho-Olivines for Energy Storage

Arumugam Manthiram

Terrace Pavilion

12:05 – 1:00 pm

Lunch

Grand Ballroom 4&5

Plenary: Thirty Years of Naval Propulsor Hydrodynamic Research at the Naval Surface Warfare Center,

MONDAY August 11, 2008

1:00 – 2:00

Orlando

Plenary: Multiple Exciton Generation in Semiconductor Quantum Dots and Novel Molecules:

Applications to Third Generation Solar Photon Conversion

Arthur Nozik, National Renewable Energy Laboratory & University of Colorado

2:00 – 3:40

Track 5 Nanotechnology for Carbon Capture

(Chair: David S. Sholl, Georgia Tech)

5_1 Keynotes Presentations (Chair: David S. Sholl, Georgia Tech; Georgia Tech)

53089 A Tutorial in Carbon Dioxide Capture Technologies
John Kitchin

53084 Design of a Stable, Low Cost, Nanostructured Aminopolymer-Silica Hybrid Materials for Post-Combustion CO₂ Capture
Christopher W. Jones

53026 Carbon Dioxide Capture from Flue Gas Using Ionic Liquids: A Combined Molecular Modeling and Experimental Study
Edward Maginn

3:40 – 3:50

Break

PARALLEL SESSIONS / 3:50 – 5:20 pm

Track 5 Nanotechnology for Carbon Capture
(Chair: David S. Sholl, Andrei G. Fedorov, Georgia Tech)

5_2 Contributed Presentations (Chair: David S. Sholl, Andrei G. Fedorov, Georgia Tech)

53014 Grain Boundary Diffusion of Hydrogen in Nano-Structured Pd/Ag Alloy Membranes (15 minute contributed)
Logan S. McLeod, Levent F. Degertekin and Andrei G. Fedorov

53061 Screening of Nanoporous Membranes for Carbon Dioxide Separations Using Atomically-detailed Simulations (15 minute contributed)
David Sholl

Track 4 Fundamental Issues of Nanoscale Energy Carrier Transport and Conversion

(Chairs: Jennifer Lukes, Univ Penn; Laurent Pilon, UCLA)

4_2 One-Dimensional Transport (Chair: Jennifer Lukes)

53064 Thermal Rectification by Ballistic Phonons
John Miller, Wanyoung Jang, and Chris Dames

53006 Thermal Conductivity of Polyethylene Chains Using Molecular Dynamics Simulations
Asegun Henry, and Gang Chen

53028 Thermal Conductance of Individual Single-Wall Carbon Nanotubes
Michael T. Pettes and Li Shi

53053 Thermal Diffusivity of Electrospun Polymer Nanowires
Alexis Abramson

53085 Transport Variations in Metal Molecule Junctions
Jonathan Malen

53011 Self-Healing in an Aluminum Alloy Reinforced with Microtubes
Jose Martinez Lucci, R.S. Amano, Pradeep Rohatgi and Benjamin Schultz

6:00-7:30

Grand Ballroom 4 and 5 Max Jacob Memorial Award

TUESDAY August 12, 2008

7:00 – 8:00 am

Terrace Pavilion

Author's Breakfast
General Continental Breakfast

8:00 – 9:00 am

Grand Ballroom 4&5

Plenary: The Carbon Journey – The Nation's Need to Reduce Emissions and Increase Energy Security
J. Michael Davis, Pacific Northwest National Laboratory

9:00 – 10:40 am

Track 1 Nanotechnology for Solar Energy Utilization

(Chairs: Uwe Kortshagen, Univ Minnesota; M. Pinar Menguc, Univ Kentucky)

1_1 Keynote Presentations (Chairs: Uwe Kortshagen, Univ Minnesota; M. Pinar Menguc, Univ Kentucky)

53021 In-situ Formation and Hydrolysis of Zn Nanoparticles for H₂ Production via a 2-step Solar thermochemical Cycle

Aldo Steinfeld

53018 Nanostructured Materials for Advanced Energy Conversion and Storage

Yiyang Wu

53072 ZnO Nanowire Dye Sensitized Solar Cells

Jason B. Baxter

10:40 – 10:50

Break

PARALLEL SESSIONS / 10:50 – 12:05 pm

Track 1 Nanotechnology for Solar Energy Utilization

(Chairs: Uwe Kortshagen, Univ Minnesota; M. Pinar Menguc, Univ Kentucky)

1_2 Contributed Presentations (Chairs: M. Pinar Menguc, Univ Kentucky; Uwe Kortshagen, Univ Minnesota)

53034 Photo-Enhanced Thermionic Emission from Potassium-Intercalated Carbon Nanotube Arrays

Tyler L. Westover, Timothy S. Fisher, Aaron D. Franklin and Ronald G. Reifengerger

53056 Surface-Plasmon Enhanced Near-Bandgap Light Absorption in Silicon Photovoltaics

Lu Hu, Xiaoyuan Chen and Gang Chen

53074 Hybrid Solar Cells from Polymers and Silicon Nanocrystals

Chin-Yi Liu, Uwe Kortshagen

53075 Doped Silicon Nanocrystal Inks for Solution-Processed Solar Cells

Xiaodong Pi, Ross Cram, David Rowe, Uwe Kortshagen

53076 Seed-Induced Recrystallization of Amorphous Si Films with Embedded Si Nanocrystals

Curtis Anderson, Uwe Kortshagen

Terrace Pavilion¹

2:05 – 1:00 pm

Lunch

Track 4 Fundamental Issues of Nanoscale Energy Carrier Transport and Conversion

(Chairs: Jennifer Lukes, Univ Penn; Laurent Pilon, UCLA)

4_3 Interfacial Phenomena (Chair: Laurent Pilon, UCLA)

53036 Nano-Droplet Impact on a Homogenous Surface Using Molecular Dynamics

Shalabh C. Maroo and Jacob N. Chung

53058 A Molecular Dynamics Study on Effects of Nanostructural Clearances on Thermal Resistance at an Interface between Liquid and Solid

Masahiko Shibahara and Kiyoshi Takeuchi

53049 Molecular Dynamics Simulation of Interfacial Thermal Resistance of Nanofins

Navdeep Singh, V.U. Unnikrishnan, J.N. Reddy and Debjyoti Banerjee

53082 Water-Evaporation Characteristics of Nano-Structure Surface

Shin-ichi Satake and Jun Taniguchi

53054 Understanding Thermal Contact Resistance between Nanoparticles: a Molecular Dynamics Study

Sebastian Volz, Gilberto Domingues, Jean-Numa Gillet and Yann Chalopin

TUESDAY August 12, 2008

Orlando

1:00 – 2:00

Plenary: Energy Research: Opportunities and Challenges
Mildred Dresselhaus, Massachusetts Institute of Technology

Grand Ballroom 4&5

1:00 – 2:00

Plenary: Energy for Sustainability
Trung Van Nguyen, National Science Foundation

2:00 – 3:10

Track 6 Industry/Commercialization Track

(Chair: Navin Manjoooran, Siemens AG, Power Generation)

PANEL A: Industrial Adoption of Energy Nanotechnology: Past, Present, and Future

Moderator: Dr. Navin Manjoooran, Research and Management, Siemens AG

Panelists:

Mr. Andrew Wang, Vice President (Product Development), Integran Technologies Inc.

Mr. Mike Leibowitz, Chair and Administrator, US Technology Advisory Group
(Nanotechnology)

Mr. Robert Shannon, Manager, Siemens Fossil Power Generation

3:10 – 3:20

Break

3:20 – 4:20

PANEL B: Inventing to the Market in Energy Nanotechnology

Moderator: David Danielson, Senior Associate, General Catalyst Partners

Panelists:

Matthew Trevithick, Partner, Venrock;

Dr. Daniel Wolfe, CFO/Managing Director, Harris & Harris;

Peter Hebert, Co-Founder/Managing Partner, Lux Capital)

4:20 – 4:30

Break

4:30 – 5:30

PANEL C: Plenty of Room at the Bottom – Nanotechnology Deployment from the Bottom Up: the Energy Nanotechnology Startup

Moderator: David Danielson, Senior Associate, General Catalyst Partners

Panelists:

Professor Gang Chen, MIT (Co-Founder, GMZ Energy – thermoelectrics);

Professor Mike Naughton, Boston College (Co-Founder/CTO, Solasta – solar);

Dr. Dennis Flood (Co-Founder/CTO, Vanguard Solar – solar))

6:00 – 7:30

Grand Ballroom 4 and 5

Awards Banquet

WEDNESDAY August 13, 2008

7:00 – 8:00 am

Terrace Pavilion

Author's Breakfast
General Continental Breakfast

8:00 – 9:10 am

Grand Ballroom

Plenary: **Molecular Dynamic Simulation of Liquid Argon Film
Evaporation and Colloidal Adsorption Characteristics in a Nanochannel**
J. N. Chung, University of Florida

9:00 – 10:40 am

Track 3 Nanotechnology for Efficient Energy

Conversion (Chairs: Ali Shakouri, UC Santa Cruz;
Zhixi Bian, UC Santa Cruz)

3_1 Keynotes (Chair: Zhixi Bian, UC Santa Cruz)

**53005 Nanogenerators for Self-Powered
Nanotechnology**
Zhong Lin (Z.L.) Wang

**53023 Metal/Semiconductor Superlattices as
Thermoelectric
Metamaterials for High-Temperature Direct Thermal
Energy
Conversion**
Timothy D. Sands

**53057 Nanostructured Thermoelectric Materials,
Devices, and
Their Potential Applications**
Gang Chen

10:40 – 10:50

Break

PARALLEL SESSIONS / 10:50 – 11:50 pm

**Track 3 Nanotechnology for Efficient Energy
Conversion** (Chairs: Ali Shakouri, UC Santa
Cruz; Zhixi Bian, UC Santa Cruz)

**3_2 Theory and Modeling of Thermoelectric Energy
Conversion** (Chair: Zhixi Bian, UC Santa Cruz)

**53003 Modeling the Thermoelectric Properties of
Nanocomposites**
Austin Minnich, Daryoosh Vashaee and Gang Chen

**53040 Multiscale Simulations of Thermoelectric
Properties of PBTE**
Bo Qiu, Hua Bao and Xiulin Ruan

**53052 Thermal Modeling of Atomic-Scale Three-
Dimensional Phononic Crystals for Thermoelectric
Applications**
Jean-Numa Gillet, Yann Chalopin and Sebastian Volz

53062 Optimization Method for a PV-TE Hybrid System
Daniel Kraemer, Lu Hu, Andy Muto, Matteo Chiesa and
Gang Chen

**Track 4 Fundamental Issues of Nanoscale Energy
Carrier Transport and Conversion**
(Chairs: Jennifer Lukes, Univ Penn; Laurent Pilon,
UCLA)

4_4 Fundamental Transport Processes (Chair: Laurent
Pilon, UCLA)

**53022 Monte Carlo Modeling of Phonon Transport Using
Scattering Phase Functions**
Neil Zuckerman and Jennifer R. Lukes

**53055 Fundamental Study of Energy Transport in Energy
Conversion Materials via Ultrafast Coherent Phonon
Excitation**
Xianfan Xu

**53016 Spatial and Temporal Coherent Emission from a
Fabry-Perot Resonance Cavity**
Bong Jae Lee

**53004 Near-Field Radiation between a Sphere and Substrates
of Different Materials**
Sheng Shen, Arvind Narayanaswamy and Gang Chen

Terrace Pavilion

12:05 – 1:00 pm

Lunch

Grand Ballroom 4&5

Plenary: **Energy for Sustainability**
Trung Van Nguyen, National Science Foundation

WEDNESDAY August 13, 2008

2:00 – 3:40

Track 4 Fundamental Issues of Nanoscale Energy Carrier Transport and Conversion

(Chairs: Jennifer Lukes, Univ Penn; Laurent Pilon, UCLA)

4_1 Keynotes (Chair: Jennifer Lukes)

53024 Fundamental Modeling of Transport Processes in Polymer Electrolyte Fuel Cells
Yun Wang

53033 Engineering Radiative Heat Transfer at Nanoscale Using Surface Waves

Emmanuel Rousseau, Marine Laroche, Jean-Jacques Greffet

53050 Electron-Phonon Interaction and Joule Heating In Nanostructures

Eric Pop

3:40 – 3:50

Break

PARALLEL SESSIONS / 3:50 – 4:50 pm

Track 3 Nanotechnology for Efficient Energy Conversion

3_3 Synthesis and Characterization of Thermoelectric Materials (Chair: Zhixi Bian, UC Santa Cruz)

53008 Characterization of Thermoelectric Properties and Power Generation Efficiency of Thermoelectric Materials

A. Muto, D. Kraemer, Q. Hao, A. Minnich, G. Chen, B. Poudel, Yi Ma, Bo Yu and Z.F. Ren

53044 Synthesis and Thermoelectric Properties of High-Purity Indium Antimonide Nanowires with Oxide-Free Surface

Jae Hun Seol, Yong J. Lee, Feng Zhou, Arden L. Moore, Li Shi

53038 Development of a Scanning Transient Harman Method for Thermoelectric Properties Characterization

Eduardo E. Castillo and Theodorian Borca-Tasciuc

Track 4 Fundamental Issues of Nanoscale Energy Carrier Transport and Conversion

(Chairs: Jennifer Lukes, Univ Penn; Laurent Pilon, UCLA)

4_5 Transport Phenomena in Devices and Fabrication (Chair: Laurent Pilon, UCLA)

53015 Modeling and Designing a Device using MuGFETs
Vijay kumar, Derick Engles and S. Malik

53025 A Two-Temperature Model of Narrow-Body Silicon Transistors under Steady State and Transient Operation

Zhun-Yong Ong and Eric Pop

53047 Carbon Nanotube Synthesis on Heated Scanning Probes Using Dip Pen Techniques

Debjyoti Banerjee

53048 Carbon Nanotube Synthesis using Thermal Scanning Microscopy Probe

Debjyoti Banerjee

SHTC and FED 2008 Committee Meetings Schedule

SUNDAY, August 10

<u>Boardroom 1</u>	2:30-4:00pm HTD EC (Closed)
<u>Boardroom 1</u>	4:00-5:30pm HTD EC (Open)
<u>Boardroom 2</u>	4:00 - 5:00 FED EC
<u>Boardroom 2</u>	5:00 – 6:30 FED EC with TC Chairs and Vice Chairs
<u>Boardroom 1</u>	5:30-7:00pm HTD Membership Development and Recognition
<u>Boardroom 3</u>	6:00-7:00pm Electronic Packaging Track/Topic Organizers
<u>Boardroom 1</u>	8:30-10:00pm HTD 2009 IMECE Planning

MONDAY, August 11

<u>Boardroom 2</u>	9:00 – 11:00am FED EC with ASME Staff
<u>Boardroom 1</u>	11:00am-1:00pm Max Jakob Board of Award
<u>Boardroom 1</u>	2:00-3:30pm HTD ASME/ISHMT Conference Planning
<u>Boardroom 2</u>	3:30-5:00pm HTD K-12
<u>Boardroom 3</u>	3:30-5:00pm HTD K-10
<u>Boardroom 4</u>	4:00-5:30pm 2009 SHTC Planning
<u>Boardroom 1</u>	3:30 – 4:30pm FED Honors/Awards
<u>Grand Ballroom 3</u>	3:30 – 5:30pm FED EC
<u>Grand Ballroom 2</u>	3:30-4:30 PM JFE Editorial Board
<u>Boardroom 2</u>	5:30 – 7:00pm FED CFDTTC
<u>Boardroom 3</u>	5:30 – 7:00pm FED FMITC
<u>Boardroom 4</u>	6:30 – 8:00pm FED FASTC
<u>Boardroom 1</u>	6:30 – 8:00pm FED FMTC
<u>Boardroom 2</u>	7:30 – 9:00pm FED MFTC
<u>Boardroom 3</u>	7:30 – 9:00pm FED MNFDTC
<u>City Terrace 10</u>	7:30-9:00pm HTD K-15
<u>City Terrace 11</u>	8:00-9:30pm HTD K-19
<u>City Terrace 12</u>	8:00-9:30pm HTD K-22

TUESDAY, August 12

<u>Boardroom 1</u>	10:30am – 12:30pm FED EC
<u>Boardroom 2</u>	10:30am – 12:00pm HTD 2011 ASME/JSME/KSME Planning
<u>Boardroom 3</u>	11:00am-12:00pm HTD 2008 IMECE Planning
<u>Boardroom 1</u>	2:00-3:30pm HTD K-3 Honors and Awards Committee
<u>Boardroom 2</u>	2:30-4:00pm HTD K-11
<u>Boardroom 3</u>	4:30 – 5:30pm FED YEP
<u>Boardroom 1</u>	8:00-10:00pm JHT Board of Associate Editors
<u>Boardroom 2</u>	8:30-10:00pm HTD K-8
<u>Boardroom 4</u>	8:30-10:00pm HTD K-13
<u>Boardroom 3</u>	8:30-10:00pm HTD K-18
<u>City Terrace 5</u>	8:30-10:00pm HTD K-20

WEDNESDAY, August 13

<u>Boardroom 1</u>	9:00 – 10:30am FED EC with JSME/KSME
<u>Boardroom 2</u>	9:00 – 10:30am HTD K-5
<u>Boardroom 3</u>	10:30am-12:00pm Council of Past HTD Chairs
<u>Boardroom 4</u>	10:30 – 11:30am FED Advisory Board
<u>Boardroom 1</u>	11:00am-1:00pm HTD K-6
<u>Boardroom 2</u>	11:30 – 1:00pm FED EC Calls Review
<u>Boardroom 1</u>	2:00 – 3:30pm FED EC with TC Chairs Calls Submission
<u>Boardroom 2</u>	2:00 – 3:30pm HTD K-2
<u>Boardroom 3</u>	2:00-3:30pm HTD/ICHMT Conference Planning

THURSDAY, August 14

Boardroom 1 10:30am – 12:00pm FED EC wrap-up

ENERGY SUSTAINABILITY MEETINGS

SUNDAY AUGUST 10, 2008

Boardroom 4 9-11 AM ASME SED Division Technical Committee Meeting

Boardroom 4 11 AM – 1 PM ASME JSEE Editorial Board Meeting

Boardroom 4 3 PM – 5 PM Opening Ceremony

Boardroom 4 7:30AM-4:30 PM AED CHP Workshop

MONDAY, AUGUST 11

City Terrace 8 6:30-10:30 PM SED Technical and Executive Committees Meetings

WEDNESDAY, AUGUST 13

Boardroom 4 6:30-8:00 PM Business Meetings