Heat Transfer

FRIDAY,9:30

HT 14C: RADIATIVE TRANSFER IN ENERGY SYSTEMS
sponsored by ASME Heat Transfer Division
Jointly sponsored by None

Chair: **KUNAL . MITRA**, Florida Institute of Technology
Co-Chair: **JOHN C. CHAI**, Nanyang Technological University

Combined Radiation and Conduction in Glass Foams—ANDREI -. FEDOROV, **Georgia Tech,** M J. VARADY, **Georgia Tech**

Apparent Radiative Properties and Radiation Scattering by a Semitransparent Hemispherical Shell—ANDREI G. FEDOROV, **Georgia Tech,** TAI-HSI . FAN, **Georgia Tech**

Consideration of the Scattering Effects in the Glass as a Participating Medium Using the Discrete Ordinates Method—SANDRA . COUTIN-RODICIO, **University of Puerto Rico, Mayaguez Campus,** BERNARDO . RESTREPO-TORRES, **University of Puerto Rico- Mayaguez**

Transient Radiation Element Method for Three-Dimensional Scattering, Absorbing and Emitting Media—SUNIL . KUMAR, **Polytechnic University,** Z . GUO, **Polytechnic University,** S. MARUYAMA, **Tohoku University**

A Procedure for View Factor Calculation Using the Finite-Volume Method — JOHN C. CHAI, **Nanyang Technological University,** JEFFREY P. MODER, **NASA Glenn Research Center,** KAILASH C. KARKI, **Innovative Research Inc**

THURSDAY,9:30 AM

HT8E-P: MULTISCALE TRANSPORT PHENOMENA IN ENERGY SYSTEMS
sponsored by K-6 Committee on Heat Transfer in Energy Systems
Jointly sponsored by None

Chair: **ANDREI G. FEDOROV**, Georgia Institute of Technology
Co-Chair: **FRANK M. GERNER**, University of Cincinnati

Heat and Charge Conductivities in Superlattices - Two-Scale Measuring and Modeling—N/A . TRAVKIN, **UCLA,** N/A . CATTON, **UCLA**

The peculiarities of heat transfer process at boiling in a liquid film—O I. MARDARSKI, **Institute of Applied Physics,** O V. MOTORIN, **Institute of Applied Physics,** S M. KLIMOV, **Institute of Applied Physics**

Exact Closure of Hierarchical VAT Capillary Thermo-Convective Problem for Turbulent and Laminar Regimes—N/A . HU, **UCLA,** N/A . TRAVKIN, **UCLA,** N/A . CATTON, **UCLA**

Thermocapillary Convection with Undeformable Flat or Curved Surface in Open Cylinders—N/A . SIM, **Rutgers University,** N/A . ZEBIB, **Rutgers University**

Theoretical Study of Electrohydrodynamic Conduction Pumping—S I. JEONG, **Texas A&M University,** J . SEYED-YAGOOBI, **Texas A&M University**

THURSDAY,2:00 PM

HT-10C: FUNDAMENTALS OF TURBULENCE AND MODELING IN HEAT TRANSFER
sponsored by K-8 (co-sponsored by K-20)
Jointly sponsored by None

Chair: **SUMANTA . ACHARYA**, Louisiana State University
Co-Chair: **N K. ANAND**, Texas A & M University

A New Two-Layer Turbulent Model for Natural Convection Applied to a vertical Slot Differentially Heated—T . HAMMAMI, **Universitie de Cergy-Pontosie,** R . BENNACER, **University de Cergy-Pontoise,** A A. MOHAMAD, **University of Calgary**

Semi-Analytical Modeling of Progressive Damage in Twill Woven Textile Composites—P. . CHAPHALKAR, **General Motors,** A. D. KELKAR, **Safety and Crashworthiness**

Transition to Weak Turbulence, Chaos and Hysterisis in Natural Convection—P . VADASZ, **University of Durban-Westville**

CMC-Based Stochastic Modeling of Scalar transport in Turbulent Flows—A Y. KLIMENKO, **University of Queensland,** A P. WANDEL, **University of Queensland,** N S. SMITH, **Aeronautical and Maritime Research Laboratory**

Swirling Effect on Thermal Fluid Transport Phenomena in a Strongly Heated Concentric Annulus—S . TORII, **Kagoshima University,** W J. YANG, **University of Michigan**

Resolution Requirement for Turbulent Flume Heat Transfer DNS at Prandtl Number of 5.4—R . BERGANT, **Institute Jozef Stefan,** IZTOK . TISELJ, **Institute Jozef Stefan,** GAD . HETSRONI, **Technion**

THURSDAY,2:00 PM

HT-10E-P: ENVIRONMENTAL HEAT TRANSFER
sponsored by K-19 Environmental Heat Transfer
Jointly sponsored by none

Chair: **JAMES A. LIBURDY**, Oregon State University

Removal of contaminants by induced air flow inside structures—GENNADY . ZISKIND, **Ben-Gurion University of the Negev**

A Heated-Thermnistor Air Velocity Sensor—DANIEL R. ROUSSE, **Universite Laval,** C -. LAPOINTE, **Universite Laval,** C C. IBARRA, **Universite Laval,** P -. JACQUET, **Universite Laval**

Numerical Modelling of Air Temperature and Velocity in Forced and Free Ventilation Piggery—R R. MOSSAD, **Universiy of Southern Queensland**

WEDNESDAY,2:00 PM

NANO-4B: NANOSCALE THERMAL MANAGEMENT OF ELECTRONIC DEVICES III
sponsored by K-16 Heat Transfer in Electronic Equipment
Jointly sponsored by none

Chair: **TIMOTHY S. FISHER**, Vanderbilt University
Co-Chair: **CRISTINA H. AMON**, Carnegie Mellon University

Computation of Sub-Micron Thermal Transport Using an Unstructured Finite Volume Method—JAYATHI Y. MURTHY, **Carnegie Mellon University,** S R. MATHUR, **Fluent Inc.**

Heat Dissipation in Current-Carrying Carbon Nanotubes—ARUN . MAJUMDAR, **University of California at Berkeley,** L . SHI, **University of California at Berkeley,** P . KIM, **University of California at Berkeley,** S . PLYASUNOV, **University of California at Berkeley,** A . BACHTOLD, **University of California at Berkeley,** P L. MCEUEN, **University of California at Berkeley**

Non-equilibrium Thermal Effects in SOI Power Transistors—TIMOTHY S. FISHER, **Vanderbilt University,** A . RAMAN, **Vanderbilt University,** D G. WALKER, **Vanderbilt University**

Ballistic-diffusive equations for transient heat conduction from nano- to macroscales—GANG . CHEN, **UCLA**

WEDNESDAY,

NANO-7I: NANOSCALE THERMAL MANAGEMENT OF ELECTRONIC DEVICES II
sponsored by K-16 Heat Transfer in Electronic Equipment
Jointly sponsored by none

Chair: **CRISTINA H. AMON**, Carnegie Mellon University
Co-Chair: **TIMOTHY S. FISHER**, Vanderbilt University

Bias-Dependent Seebeck Coefficient in Bipolar Devices—KEVIN P. PIPE, **MIT RLE,** RAJEEV J. RAM, **MIT,** ALI . SHAKOURI, **University of California, Santa Cruz**

Transient response of thin film SiGe micro coolers —ALBERTO G. FITTING, **UC Santa Cruz,** JAMES . CHRISTOFFERSON, **University of California, Santa Cruz,** ALI . SHAKOURI, **University of California, Santa Cruz,** XIOFENG . FAN, **University of California, Santa Barbara,** GEHONG . ZENG, **University of California, Santa Barbara,** CHRIS . LABOUNTY, **University of California, Santa Barbara,** JOHN E. BOWERS, **University of California, Santa Barbara,** ED . CROKE III, **HRL Laboratories**

Continued

SUNDAY *(continued)*

Nanoscale Thermal Transport in Superlattices—ARUN . MAJUMDAR, **UC Berkeley,** SCOTT T. HUXTABLE, **University of California at Berkeley,** CHRIS . LABOUNTY, **University of California, Santa Barbara,** GEHONG . ZENG, **University of California, Santa Barbara,** JOHN E. BOWERS, **University of California, Santa Barbara,** ALEXIS R. ABRAMSON, **University of California at Berkeley,** CHANG-LIN . TIEN, **University of California at Berkeley,** XIAOFENG . FAN, **University of California, Santa Barbara,** PATRICK . ABRAHAM, **University of California, Santa Barbara,** ALI . SHAKOURI, **University of California, Santa Cruz**

Real time sub-micron thermal imaging using thermoreflectance—JAMES N. CHRISTOFFERSON, **UC Santa Cruz,** DARYOOSH . VASHAEE, **University of California, Santa Cruz,** ALI . SHAKOURI, **University of California, Santa Cruz,** PHILIP . MELESE, **SRI International**

Small Heat Sources Effects in Sub-Micron Heat Conduction—S. . NARUMANCHI, **Carnegie Mellon University,** J. . MURTHY, **Carnegie Mellon University,** C.H. . AMON, **Carnegie Mellon University**

FRIDAY, 9:30 AM

HT14B: COMPUTATIONAL HEAT TRANSFER IN ELECTRO-MAGNETO-HYDRODYNAMICS

sponsored by ASME Heat Transfer Division
Jointly sponsored by None

Chair: **HUI . ZHANG**, SUNY at Stony Brook
Co-Chair: **GEORGE S. DULIKRAVICH**, University of Texas at Arlington

Numerical Simulation of RF Heating for a SiC Vapor Growth System—R. . MA, **State University of New York at Stony Brook,** H. . ZHANG, **State University of New York at Stony Brook,** S. . HA, **Carnegie Mellon University,** M. . SKOWRONSKI, **Carneige Mellon University,** V. . PRASAD, **State University of New York at Stony Brook**

Numerical Solution for Melting of Unfixed Rectangular Phase Change Material Under Electromagneticallly Simulated Low Gravity Environment —Y. . ASAKO, **University of Rhode Island,** M. . CHARMCHI, **University of Rhode Island,** E. . GONCALVES, **University of Rhode Island,** M. . FAGHRI, **University of Rhode Island**

A 3-D Model For Magntic Damping Of G-Jitter Induced Convection And Solutal Transport In A Simplified Bridgman Configuration —BEN Q. LI, **Washington State University,** J. . HONDA, **Washington State University,** C. . ZHANG, **Washington State University,** H. . DE GROH, **Washington State University**

Optimization of Locations, Intensities, and Orientations of Magnets Controlling Melt Flow during Solidification —GEORGE S. DULIKRAVICH, **The University of Texas at Arlington,** BRAIN H. DENNIS, **The University of Texas at Arlington**

FRIDAY,11:15 AM

HT15B: ADVANCED REACTOR THERMAL HYDRAULICS

sponsored by Heat Trasnfer Division, ASME
Jointly sponsored by N/A

Chair: **CHANG H. OH**, INEEL
Co-Chair: **YASSIN A. HASSAN**, Texas A&M University

Co-Chair: **CILA . HERMAN**, The Johns Hopkins University

Invited paper —Pool Boiling of Surfactant Solutions—GAD . HETSRONI, **Israel Institute of Technology,** M. . GUREVICH, **Israel Institute of Technology,** A. . MOSYAK, **Israel Institute of Technology,** R. . ROZENBLIT, **Israel Institute of Technology,** L. P. YARIN, **Israel Institute of Technology**

Effect of Surface Roughness and Oxidation on Quenching of Nuclear Fuel Rods—J . SINHA, **Penn. Sate University,** L. E. HOCHREITER, **Penn. State University,** F. B. CHEUNG, **Penn. State University**

Critical Heat Flux During Reflood Transients in Small Hydraulic Diameter Duct—M. J. HOLOWACH, **Penn. State Univ.,** L. E. HOCHREITER, **Penn. State Univ.,** F. B. CHEUNG, **Penn. State Univ.**

Numerical Simulation of Bubble Dynamics in the Presence of Boron in the Liquid—Q. .. BAI, **UCLA,** VIJAY K. DHIR, **UCLA**

Air Ingress Analyses on High Temperature Gas Cooled Reactor—CHANG H. OH, **INEEL,** RICHARD M. MOORE, **INEEL,** BRAD . MERRILL, **INEEL,** DAVID . PETTI, **INEEL**

WEDNESDAY,7:45 AM

HT1I: GAS TURBINE HEAT TRANSFER

sponsored by K-14 Gas Turbine Heat Transfer Committee
Jointly sponsored by K-12 Aerospace Heat Transfer committee

Chair: **SRINATH V. EKKAD**, Louisiana State University

Local Heat transfer Distribution on Smooth and Roughened Surfaces under an Array of Angled Impinging Jets—LAMYAA A. EL-GABRY, **General Electric Co.,** D. . KAMINSKI, **GE**

Analysis of Heat Exchanger Concepts for Use as Gas Turbine Intercoolers—BENGT . SUNDEN, **Lund Institute of Technology**

Effect of Deformed Rib Geometries on Cooling Performance—BENGT A. SUNDEN, **Lund Institute of Technology**

Effect of Dimples on Heat Transfer Enhancement for flow in Rectangular Channels—SRINATH V. EKKAD, **Louisiana State University**

Heat Transfer on Film Cooled Turbine Blades—MOURAD *. DERRAR, **RWTH-Aachen (JPL)**

Heat Transfer of a Chordwise-Oriented Internal Cooling Passage Around a Turbine Airfoil—MINKING *. CHYU, **Univ. of Pittsburgh**

Heat/mass Transfer Coefficient for a Single Row of Discrete Injection Holes - Influence of Hole Orientation, Shape, and Blowing—RICHARD J. GOLDSTEIN, **Univ. of Minnesota**

Film Cooling Effectiveness for a Single Row of Discrete Injection Holes - Influence of Hole Orientation, Shape, and Blowing Rate—RICHARD J. GOLDSTEIN, **Univ. of Minnesota**

THURSDAY, 9:30 AM

HT8C: ENGINEERING PROPERTY NEEDS AND SOLUTIONS—HIGHLIGHTS OF THE 14TH SYMPOSIUM ON THERMOPHYSICAL PROPERTIES

sponsored by K-7 Thermophysical Properties
Jointly sponsored by AIChE (Tentative)

Chair: **RICHARD T. JACOBSEN**, INEEL/BBWI
Co-Chair: **STEVEN G. PENONCELLO**, University of Idaho

Overview of the 14th Symposium of Thermophysical Properties—**Properties of Fluids and Solids**—W. MICKEY . HAYNES, **NIST**

U.S. Implementation of New International Water Property Standards—ALLAN H. HARVEY, **NIST**

Current Status of Properties of Refrigerants for Engineering Applications—STEVEN G. PENONCELLO, **University of Idaho**

Current Status of Properties of Solids for Engineering Applications—Measurements and Models—R. (TONY) A. OVERFELT, **Auburn University**

Measurement and Use of Thermophysical Properties in Computational Simulation of Manufacturing Processes—R. (TONY) A. OVERFELT, **Auburn University**

WEDNESDAY,

HT-2I: SYMPOSIUM ON POLYMER AND COMPOSITE MATERIALS PROCESSING I

sponsored by K-15 (HTD)
Jointly sponsored by Materials Division

Chair: **RANGA . PITCHUMANI**, University of Connecticut
Co-Chair: **SCOTT T. HOLMES**, Boeing

Co-Chair: **SURESH G. ADVANI**, University of Delaware

Application of Affordable Composite Materials and Processes on UCAV (INVITED TALK)—STEPHEN J. SCHWEDT, **The Boeing Company**

Resin Infusion of Triaxially Braided Preform with Through-the-thickness Reinforcement—ALFRED C. LOOS, **Virginia Tech,** JAY R. SAYRE, **Virginia Tech**

A Nonisothermal Healing Model for Processing of Thermoplastic Matrix Composites—FUZHENG . YANG, **University of Connecticut,** RANGA . PITCHUMANI, **University of Connecticut**

Flow Monitoring in Liquid Composite Moulding based on Linear Direct Current Sensing Technique—THIERRY . LUTHY, **Swiss Federal Institute of Technology (ETHZ),** PAOLO . ERMANNI, **Swiss Federal Institute of Technology**

WEDNESDAY,5:30 PM

HT-6A: SYMPOSIUM ON POLYMER AND COMPOSITE MATERIALS PROCESSING IV

sponsored by K-15 (HTD)
Jointly sponsored by Materials Division

Continued

SUNDAY *(continued)*

Chair: **RANGA . PITCHUMANI**, University of Connecticut
Co-Chair: **SCOTT T. HOLMES**, The Boeing Company

Co-Chair: **SURESH G. ADVANI**, University of Delaware

Steady and Transient Flow of a Non-Newtonian Chemically Reactive Fluid in a Twin-Screw Extruder—W. . ZHU, **Rutgers University,** YOGESH . JALURIA, **Rutgers University**

Experimental and Numerical Investigation of Polymer Preform Heating—ANN M. MESCHER, **University of Washington,** H. M. REEVES, **University of Washington,** ASHLEY F. EMERY, **University of Washington**

Modeling the Cure and Solidification of Polymer Composites Using a Fictitious Domain Method—ANDRE . BENARD, **Michigan State University,** SURESH G. ADVANI, **University of Delaware**

Transient Two-Dimensional Numerical Modeling of Asymmetric Heat-Activated Bonding Process—PATRICK F. MENSAH, **Southern University,** OMER . SOYSAL, **Southern University,** AMITAVA . JANA, **Southern University,** MICHAEL . STUBBLEFIELD, **Southern University**

FRIDAY,3:45 PM

HT17E: THERMAL INJURY AND TREATMENT

sponsored by K-17 Heat and Mass Transfer in Biotechnology
Jointly sponsored by BED

Chair: **RAM V. DEVIREDDY**, University of Minnesota
Co-Chair: **JOHN J. MCGRATH**, Michigan State University

Effect of Freezing on Cell Viability and Mechanical Properties of Bioartificial Tissues—RAMACHANDRA V. DEVIREDDY, **University of Minnesota,** MICHAEL R. NEIDERT, **University of Minnesota,** JOHN C. BISCHOF, **University of Minnesota,** ROBERT T. TRANQUILLO, **University of Minnesota**

Evaluation of freezing effects on human microvascular-endothelial cells (hMEC)—MARWANE S. BERRADA, **University of Minnesota,** JOHN C. BISCHOF, **Department of Mechanical Engineering, University of Minnesota**

Modeling the thermal histories of collagenous tissues subjected to different heating modalities—JOHN J. MCGRATH, **Michigan State University,** ALPTEKIN . AKSAN, **Michigan State University,** NIELUBOWICZ JR. S. DAVID, **Michigan State University**

In Vitro assessment of the efficacy of thermal therapy in human benign prostatic hyperplasia tissue—JIM . COAD, **University of Minnesota,** SANKHA . BHOWMICK, **University of Minnesota,** PRAGATI . BHOWMICK, **University of Minnesota,** JOHN C. BISCHOF, **University of Minnesota**

FRIDAY,11:15 AM

HT15C: A PRATICAL GUIDE TO BUILDING AND USING BEOWULF PC CLUSTERS

sponsored by Heat Transfer Division
Jointly sponsored by HTD

Chair: **DARRELL W. PEPPER**, University of Nevada Las Vegas
Co-Chair: **RODNEY . DOUGLASS**, Los Alamos National Laboratory

A Practical Guide to Building and Using Beowulf PC Clusters—DAVID . MOULTON, **Los Alamos National Laboratory**

FRIDAY,11:15 AM

HT15E: INNOVATION AND APPLICATION OF HEAT TRANSFER VISUALIZATION TECHNIQUES

sponsored by Heat Transfer Visualization Committee
Jointly sponsored by none

Chair: **KENNETH D. KIHM**, Texas A&M U.
Co-Chair: **KEITH D. HOLLINGSWORTH**, University of Houston

An error analysis of beam-averaged interferometric heat transfer—DAVID . NAYLOR, **Ryerson University**

Infrared thermal velocimetry—JAEWON . CHUNG, **UC Berkeley,** YOUNGSHIK . SHIN, **UC Berkeley,** COSTAS P. GRIGOROPOULOS, **same,** RALPH . GREIF, **uc berkely**, KENNETH D. KIHM, **Texas A&M University**

Application of a Two-Color Laser Induced Fluorescence Technique (LIF) for Temperature Mapping—KENNETH D. KIHM, **Texas A&M University,** HYUN J. KIM, **same**

Visualization of Supercritical Carbondioxide Pseudo-Boiling Inside a Rectangular Channel—KOZI . OKAMOTO, **University of Tokyo,** K . SAKURAI, **university of tokyo,** H . MADARAME, **s**

High Resolution PIV Measurement of Two-Point Flow Velocity Correlations—ERIC B. CUMMINGS, **Sandia National Laboratories,** R W. SCHEFER, **s**

Reconstruction of Transient Density Distribution for Downward Carbon Dioxide Flow Using Digital Speckle Tomography—HANSEO . KO, **Sung Kyun Kwan University,** KOZI . OKAMOTO, **s,** H . MADARAME, **s**

THURSDAY,2:00 PM

HT 10-E-P: HEAT TRANSFER PHOTOGALLERY:

PHOTOGRAPHS BASED ON EXPERIMENTAL AND NUMERICAL VISUALIZATIONS OF THERMAL FLOWS ARE SOLICITED FOR THE PHOTOGALLERY OF HEAT TRANSFER PHENOMENA SESSION, SPONSORED BY THE HEAT TRANSFER VISUALIZATION COMMITTEE, AT THE 2001 IMECE. THE PHOTOGALLERY WILL CONSIST OF PHOTOGRAPHIC DISPLAYS, WHICH ILLUSTRATE PHENOMENA THAT OCCUR IN THE PRESENCE OF A TEMPERATURE GRADIENT. THE PURPOSE IS TO PROVIDE A FORUM FOR DISPLAYING INNOVATIVE VISUALIZATION TECHNIQUES AND THEIR APPLICATIONS TO HEAT TRANSFER PHENOMENA. A SUBSET OF SUBMITTED ENTRIES, SELECTED ON THE BASIS OF ORIGINALITY, INNOVATIVE FEATURE OF THE VISUALIZATION TECHNIQUE, THE ABILITY TO CONVEY AND EXCHANGE INFORMATION, AND THE ARTISTIC BEAUTY OF HEAT TRANSFER, WILL BE PUBLISHED IN THE ASME JOURNAL OF HEAT TRANSFER.

AUTHORS INTERESTED IN PRESENTING AN ENTRY, PLEASE SEND A 100 WORD ABSTRACT TO:

KEN-KIHM@TAMU.EDU

TEL. 979-845-2143

FAX 979-862-2418

NOT LATER THAN OCTOBER 15, 2001.

sponsored by Heta Transfer Visualization Committee
Jointly sponsored by none

Chair: **KENNETH D. KIHM**, Texas A&M U.
Co-Chair: **JOHN . CREPEAU**, University of Idaho at Idaho Falls

THURSDAY,5:30 PM

HT12A: FIRE AND COMBUSTION SYSTEMS II

sponsored by ASME
Jointly sponsored by None

Chair: **RAJESH . RAWAT**, University of Utah

Temporally Resolved Radiation Spectra from a Sooting, Turbulent Pool Fires—SEAN P. KEARNEY, **Sandia National Laboratories**

Large Eddy Simulation and Experimental Measurements of a Methane-Air Fire Plume—PAUL E. DESJARDIN, **Sandia National Laboratories**

A Convection/radiation Heat Transfer Model for Massive Object Engulfed in a Pool Fire—MICHAEL A. KRAMER, **University of Nevada, Reno**

A Mixture FractionCombustion Model for Large Scale Fire Modeling Applications—KEVIN B. MCGRATTAN, **National Institute of Standards and Technology**

Heat Loss Analysis ofFlamelets in Near-Limit Flame—ROBERT . VANCE, **Michigan State University**

THE INFLUENCE OF THE FLUCTUATING RADIATION ON THE IGNITION PROCESS OF MELTING POLYMERS—INDREK S. WICHMAN, **Michigan State University**

THEORETICAL AND EXPERIMENTAL STUDY ON SMOLDERING COMBUSTION OF HORIZONTAL DUST LAYERS—ERHAN . BOKE, **Technical University of Istanbul**

Transient Measurementsof Gas Species Concentrations and Soot Properties in Pool Fires—JEFFREY J. MURPHY, **Sandia National Laboratories**

Continued

SUNDAY *(continued)*

FRIDAY,7:45 AM

HT-13C: FLOW AND HEAT TRANSFER IN MULTIPHASE SYSTEMS - I
sponsored by K-13
Jointly sponsored by HTD K-13

Chair: **BAO-WEN . YANG**, Columbia University
Co-Chair: **F. B. . CHENUG**, Pennsylvania State University

Co-Chair: **S. MOSTAFA . GHIAASIAAN**, Georgia Institute of Technology

Pool Boiling of High-Frequency Conductors—S. E. . WRIGHT, **Los Alamos National Laboratory**

An Experimental Investigation of Reflux Condensation Phenomena in Multiple U-Tubes With and Without Noncondensible Gas—M.H . CHUN, **KAIST**

FLUID FLOW AND HEAT TRANSFER IN A PACKED CHANNEL BETWEEN TWO PARALLEL GROOVED PLATES—J. H. . DU, **Tsinghua University**

Heat Transfer in Slug Air-Water Flow in a Slightly Upward Inclined Tube—JAE-YONG . KIM, **Oklahoma State University**

Flow boiling critical heat flux for subcooling in water flowing upward at a flow velocity with pressures for various test section configurations—KATSUYA . FUKUDA, **Kobe University of Mercantile Marine**

Cooling Characteristics of Two-Phase Impinging Jet—TAIKI . KAKUMOTO, **Tokyo University of Mercantile Marine**

THURSDAY, 9:30 AM

HT-8E-P: FORUM ON PARALLEL COMPUTING METHODS
sponsored by Aerospace Heat Transfer (K-12)
Jointly sponsored by Fluids Engineering, C. Freitas Co-Chair

Parallel Direct Numerical Simulation of Heat Transfer in Microstructures—FRANK . MULDOON, **Louisiana State University,** SUMANTA . ACHARYA, **Louisiana State University**

PARALLEL COMPUTING OF MAGNETICALLY-INDUCED FLOWS AND MICROSTRUCTURE FORMATION DURING SOLIDIFICATION PROCESSING—N. . GOVINDARAJU, **Washington State University,** BEN Q. LI, **Washington State University**

Implicit Time Evolution on Commodity Clusters with Multilevel Preconditioned Newton-Krylov Methods—J. D. MOULTON, **Los Alamos National Laboratory,** D. A. KNOLL, **Los Alamos National Laboratory,** V. A. MOUSSEAU, **Los Alamos National Laboratory**

THURSDAY,2:00 PM

HT-10A: FIRE AND COMBUSTION SYSTEMS IV
sponsored by Heat Transfer Division
Jointly sponsored by None

Chair: **WILLIAM L. GROSSHANDLER**, NIST

Turbulent Shear Effect on Transport Phenomena of Mass and Heat in jet diffusion flames—SHUICHI . TORII, **Kagoshima University**

THURSDAY,2:00 PM

HT10B: GAS TURBINE HEAT TRANSFER
sponsored by K-12 Aerospace Heat Transfer
Jointly sponsored by HTD K-14

Aerodynamics of Seal Flows in Turbomachinery Applications—GOCHA . CHOCHUA, **University of Florida,** S. THAKUR, **University of Florida ,** W . SHYY, **University of Florida**

Effect of Rotation on Heat Transfer in Two Pass Square Channels with Various Angle Rib Turbulators —JE-CHIN . HAN, **Texas A&M University,** LUAI M. AL-HADHRAMI, **Texas A&M University**

Flow and Heat Transfer in a Turbine Nozzle Guide Vane with End-Wall Contouring —YU-LIANG . LIN, **Michigan State University, Dept. of Mech. Eng. ,** HAROLD J. SCHOCK, **Michigan State University, Dept. of Mech. Eng.,** TOM I. SHIH, **Michigan State University, Dept. of Mech. Eng.**, RONALD S. BUNKER , **Michigan State University, Dept. of Mech. Eng.**

Turbulent heat transfer over a free rotating disk: analytical and numerical predictions using solutions of direct and inverse problems —IGOR V. SHEVCHUK , **Institute of Engineering Thermophysics, National Academy of Sciences**

Heat Transfer and Frictional Characteristics of Cooling Cavities Near the Trailing Edge of Turbine Airfoil —

Effect of Squealer Geometry Arrangement on Gas Turbine Blade Tip Heat Transfer —G S. AZAD, **Siemens Westinghouse Power Corp. ,** J C. HAN, **Siemens Westinghouse Power Corp. ,** R S. BUNKER, **Siemens Westinghouse Power Corp. ,** C P. LEE, **Siemens Westinghouse Power Corp.**

HEAT TRANSFER ENHANCEMENT WITH INCLINED BAFFLES AND RIBS COMBINATION —J A. KHAN, **University of South Carolina,Department of Mechanical Engineering ,** J . HINTON, **University of South Carolina,Department of Mechanical Engineering ,** S . BAXTER, **University of South Carolina,Department of Mechanical Engineering ,** S . DUTTA , **University of South Carolina,Department of Mechanical Engineering**

Analysis and Optimization of Internal Coolant Networks —THOMAS J. MARTIN , **The University of Texas at Arlington,Mechanical & Aerospace Eng. Dept ,** GEORGE S. DULIKRAVICH , **The University of Texas at Arlington,Mechanical & Aerospace Eng. Dept**

Perspectives in Modelling Film-Cooling of Turbine Blades by Transcending Conventional Two-Equation Turbulence Models —A . AZZI, **Institute of Energy Technology, ETH Zurich ,** D . LAKEHAL , **Institute of Energy Technology, ETH Zurich**

A Reliable Procedure for Testing the Accuracy of Numerical Algorithms in CFD and Heat Transfer —V D. MURTY , **University of Portland**

FRIDAY,2:00 PM

HT-16E: FREEZING AND MELTING PROCESSES IN LOW TEMPERATURE APPLICATIONS
sponsored by K-18 Low temeprature Heat Transfer Committee
Jointly sponsored by None

Chair: **YONG X. TAO**, Florida International University

Chair: **ROBERT W. BESANT**, University of Saskatchewan

Frost formation and its density behavior on various surfaces—CHEOLHWAN . KIM, **LG Electronics,** J. M. SHIN, **LG Electronics,** S. C. HA, **LG Electronics,** A. . TIKHONOV, **LG Electronics**

Frost Growth in Regerative Heat Exchanger—ROBERT . BESANT, **University of Saskatchewan**, H. . CHEN, **University of Saskatchewan,** W. . SHANG, **University of Saskatchewan,** R. . EVITTS, **University of Saskatchewan**

A 3D Icing Simulation Approach Based on Navier-Stokes Equations and Overset Boundary Conditions—GUANPENG . XU, **Tennessee State University,** YONG X. TAO, **Florida International University**

HEAT TRANSFER CHARACTERISTICS IN MELTING OF GRANULAR PACKED BEDS SUBJECT TO HORIZONTAL FORCED CONVECTION—YONG X. TAO, **Florida International University,** YINGLI . HAO, **Florida International University**

Natural Convection Influenced Ice-Water Systems Contained Between Concentric Spheres—BANTWAL R. BALIGA, **McGill University,** D. A. SINTON , **McGill University**

Modeling the Cooling Process Path of a Cooling and Dehumidifying Coil Under Frosting Conditions—S. A. SHERIF, **University of Florida,** P. J. MAGO, **University of Florida**

FRIDAY,11:15 AM

HT-15A: FIRE AND COMBUSTION SYSTEMS III
sponsored by K-11 Fire and Combustion
Jointly sponsored by ASME divisions, other societies

Heat Flux from Process Burners—R . HAYES, **John Zink Co. LLC**

On the Effect of Pyrolysis Kinetics on Ignition Delay Times of Poly(methyl methacrylate)—JOSE L. TORERO, **Department of Fire Protection Engineering**

Self-Preserving Properties of Unsteady Round Nonbuoyant Turbulent Starting Jets and Puffs in Still Fluids—GERARD M. FAETH, **University of Michigan**

Effects of Combustion on Sound Emission by a Round Jet—JAY P. GORE, **Purdue University**

Simultaneous drop size, velocity and temperature measurements in a spray flame with a Phase-Doppler/Rainbow Refractometer System—SUMANTA . ACHARYA, **Lousiana State University**

Turbulent Shear Effect on Transport Phenomena of Mass and Heat in—SHUICHI . TORII, **Kagoshima University**

Extinction Limits of Nonadiabatic, Catalyist-Assisted Flames in Stagnation-Point Flow—STEPHEN B. MARGOLIS, **Sandia National Laboratories**

Continued

SUNDAY *(continued)*

WEDNESDAY,2:00 PM

HT4CI: TRANSPORT PHENOMENA IN NOVEL SPRAY AND COATING PROCESSING

sponsored by K-15

Jointly sponsored by n/a

Chair: **WILSON K. S. . CHIU**, University of Connecticut
Co-Chair: **JON P. LONGTIN**, State University of New York at Stony Brook

A Model to Evaluate Heat Transfer to a Particle from Thermal Plasma—MILIND A. JOG, **University of Cincinnati,** S. D. SAMUDRA, **University of Cincinnati**

INVITED PAPER: Thermal Spray: A Case History for the Integration of Materials Science and Thermo-Fluid Dynamics—CHRISTOPHER C. BERNDT, **State University of New York, Stony Brook**

A Micro/Macro Integrated Solidification Model for Melt Flow and Non-Equilibrium Kinetics for Splat Formation and Coating Build-up during thermal spraying—HUI . ZHANG, **SUNY at Stony Brook,** X. Y. WANG, **SUNY at Stony Brook,** S. . SAMPATH, **SUNY at Stony Brook**

Heat Transfer in Chemical Vapor Deposited Optical Fiber Coatings—PATRICIA O. IWANIK, **University of Connecticut,** WILSON K. S. . CHIU, **University of Connecticut**

Micromachining of Vias through Thermal-Sprayed Multilayer Structures Using Ultrafast Lasers—J. . SUN, **State University of New York at Stony Brook,** C. H. FAN, **State University of New York at Stony Brook,** JON P. LONGTIN, **State University of New York at Stony Brook,** S. . SAMPATH, **State University of New York at Stony Brook**

Experiments on Deposition of Nano-Structured Alumina-Titania Coatings by Normal Detonation Waves—SERGEY Y. SEMENOV, **University of Connecticut,** BAKI M. CETEGEN, **University of Connecticut**

THURSDAY,3:45 PM

HTD - 11B: INNOVATIONS IN HEAT TRANSFER EDUCATION - INTEGRATING THE THERMAL/FLUIDS CURRICULUM

sponsored by Education Committee

Jointly sponsored by None

Chair: **RICHARD S. FIGLIOLA**, Clemson University
Co-Chair: **PAMELA . NORRIS**, University of Virginia

Introduction to Thermofluids —a first course for engineering students in all curricula—R . GAGGIOLI, **Marquette University**

An Integrated Thermal Fluids Curriculum - Advantages of Change—D A. KAMINSKI, **Renssaeler Polytechnical Institute**

Course Consolidation in Fluid Mechanics and Heat Transfer—F A. KULACKI, **University of Minnesota**

Survey Results on Current Curricula in Thermal Fluids Within ME Programs—R S. FIGLIOLA, **Clemson University**

THURSDAY,3:45 PM

HT-11A: FIRE AND COMBUSTION SYSTEMS I

sponsored by Fire and Combustion, K-11

Jointly sponsored by none

Chair: **SEAN P. KEARNEY**, Sandia National Laboratories
Co-Chair: **WILLIAM . GROSSHANDLER**, National Institute of Standards and Technology

Large-Scale Fire Whirls and Their Numerical Simulations—S. -. SATOH, **University of Notre Dame,** N. =. LIU, **University of Notre Dame,** M. -. SHINOHARA, **University of Notre Dame,** W.C. -. FAN, **University of Notre Dame,** K.T. -. YANG, **University of Nore Dame**

Combustion-Driven Flows with Circulation—F. -. BATTAGLIA, **Iowa State University,** R.G. -. REHM, **Iowa State University**, H.R. . BAUM, **Iowa State University,** M.I. . HASSAN, **Iowa State University,** K. . SAITO, **Iowa State University**

Fire Behavior in a Poorly Ventilated Compartment—B. . RINGWELSKI, **University of Maryland,** K. . WAKATSUKI, **University of Maryland,** J.G. . QUINTIERE, **University of Maryland**

A New LES Pool Fire Simulation Tool—R. . RAWAT, **University of Utah,** J. . SPINTI, **University of Utah,** P. . SMITH, **University of Utah,** W. . YEE, **University of Utah**

Structure of the Saito/Cremers Type Fire Whirl—M.I. . HASSAN, **University of Kentucky,** A. . HELALI, **University of Kentucky,** K. . SAITO, **University of Kentucky**

Production of Diffusion Flames in the Near Extinction Limit Regime Using a Hele-Shaw Apparatus in a Simulated Low-Gravity Environment—L.A. . ORAVECZ-SIMPKINS, **Michigan State University,** I.S. . WICHMAN, **Michigan State University,** S. . OLSON, **Michigan State University**

A Comparison of Diffusion Flame Stability in One and Two Spatial Dimensions Near Cold, Inert Surfaces—R. . VANCE, **Michigan State University,** I.S. . WICHMAN, **Michigan State University**

Forest Fire Propagation in Inclined Terrains—K. . SATOH, **University of Notre Dame,** K.T. . YANG, **University of Notre Dame**

Physical Scaling of Fire Suppression by Water Mist—J.G. . QUINTIERE, **University of Maryland,** N. . SCHLUTZ, **University of Maryland**

FRIDAY,7:45 AM

HT-13A: TRANSPORT PHENOMENA IN MATERIALS PROCESSING AND MANUFACTURING

sponsored by K-15 Transport Phenomena in Manufacturing and Materials Processing

Jointly sponsored by None

Chair: **TIEN-CHIEN . JEN**, University of Wisconsin, Milwaukee
Co-Chair: **M. K. ALAM**, Ohio University

Analysis of the Effect of Heating-Control Conditions on Temperature Ditribution in a Wafer during Rapid Thermal Processing with Lamp Heaters—S. . HIRASAWA, **Hitachi, Ltd.,** T. . SUZUKI, **Hitachi, Ltd.,** S. . MARUYAMA, **Hitachi, Ltd.,** Y . TAKEUCHI, **Hitachi, Ltd.**

On the Design of Continuum Transport Sysstems with Applications to Solidification Processes—NICHOLAS . ZABARAS, **Cornell University**

Numerical Solutions of Alloy Solidification and Columnar Eutectic Growth in Multidimensions using a Phase Field Model—W. . JUDSON, **Delhi Automotive Systems,** S. . PAOLUCCI, **Delphi Automotive Systems**

Direct Chill Casting of Aluminum Alloys: Modeling and Experiments on Industrial Scale Ingots—C. J. VREEMAN, **Purdue University,** D. . SCHLOZ, **Purdue University,** M. J. KRANE, **Purdue University**

FRIDAY,7:45 AM

HT-13B: HT-13B: TRANSPORT PHENOMENA IN FUEL CELL SYSTEMS

sponsored by K6 Heat Transfer in Energy Systems

Jointly sponsored by K12 Aerospace Heat Transfer

Chair: **CHAO-YANG . WANG**, PENNSYLVANIA STATE UNIVERSITY
Co-Chair: **STEFAN T. THYNELL**, NSF DIV CHEMICAL & TRANSPORT SYSTEMS

MODELING OF TRANSPORT PROCESSES WITHIN A MOLTEN CARBONATE FUEL CELL STACK—Z. . MA, **H POWER CORPORATION,** S. M. JETER, **G.W. WOODRUFF SCHOOL OF MECHANICAL ENGINEERING,** S. I. ABDELKHALIK, **G.W.WOODRUFF SCHOOL OF MECHANICAL ENGINEERING**

ANALYSIS FOR THE EFFECT OF INVERTER RIPPLE CURRENT ON FUEL CELL OPERATING CONDITION—RANDALL S. GEMMEN, **NATIONAL ENERGY TECHNOLOGY CENTER**

APPLICATION OF A NEW CFD ANALYSIS TOOL FOR SOFC TECHNOLOGY—MICHAEL T. PRINKEY, **FLUENT, INC.,** RANDALL S. GEMMEN, **NATIONAL ENERGY TECHNOLOGY CENTER,** WILLIAM A. ROGERS, **FLUENT, INC.**

PERFORMANCE MODELLING OF SOLID OXIDE FUEL CELLS—RICHARD J. COOPER, **UNIVERSITY OF BIRMINGHAM,** JOHN . BILLINGHAM, **UNIVERSITY OF BIRMINGHAM,** ANDREW C. KING, **UNIVERSITY OF BIRMINGHAM,** KEVIN . KENDALL, **UNIVERSITY OF BIRMINGHAM**

THURSDAY,

HT-8DI: POOL FIRE MEASUREMENT, MODELING AND SIMULATION

sponsored by K-11

Jointly sponsored by

Chair: **PAUL E. DESJARDIN**, Sandia National Laboratories

Continued

SUNDAY *(continued)*

—HOWARD . BAUM**, National Institute of Standards and Technology,** BAKI . CETEGEN**, University of Connecticut,** GERARD . FAETH**, University of Michigan,** BAKHTIER . FAROUK**, Drexel University,** JAYAVANT . GORE**, Purdue University,** MILES . GREINER**, University of Nevada, Reno,** KULDEEP . PRASAD**, Naval Research Laboratory,** RAJESH . RAWAT**, University of Utah,** PHILIP . SMITH**, Universtiy of Utah,** SHELDON . TIESZEN**, Sandia National Laboratories,** JOSE . TORERO**, University of Maryland**

THURSDAY,11:15 AM

HTD-9B: SYMPOSIUM ON MULTIPHASE TRANSPORT IN POROUS MEDIA I

sponsored by K-8 Theory and Fundamentals Research
Jointly sponsored by FED Multiphase Flow Technical Committee

Chair: **MARIO J. MARTINEZ**, Sandia National Laboratories
Co-Chair: **MASSOUD . KAVIANY**, University of Michigan

Analytical Investigation of the Effect of Thermal Dispersion on Forced Convection in Heterogeneous PorousMedia—ANDREY V. KUSNETSOV**, Dept. of Mech. & Aero. Engn., North Carolina State Univ.**

EXPLICIT ANALYTICAL SOLUTIONS OF NATURAL CONVECTIVE HEAT TRANSFER IN HUMID POROUS MEDIUM—NA . ZHANG**, Institute of Engineering Thermophysics,** REN . CAI**, Institute of Engineering Thermophysics,** WEI . WANG **, Institute of Engineering Thermophysics**

Numerical simulation for the process of recovery of a planar reservoir with non-newtonian petroleum—ZHU . ZUOJIN**, Univ. of Science & Tech. of China,** Q S. WU**, Univ. of Sci. & Tech. of China,** C . GAO**, General Oil Corp. of China**

Theoretical prediction of the thermal conductivity of soils—F . GORI**, University of Rome, Tor Vergata,** S . CORASANITI**, University of Rome, Tor Vergata**

Forced Convection in a Channel Limited by Permeable Boundaries—L M. SEGRILO**, Universidade Federal Fluminense,** L M. MARTINS-COSTA**, Universidade Federal Fluminense**

The Axial Mixing Characteristics of the Liquid Phase in the G-L-L System—REN . XIAOGUANG**, Beijing Institute of Petro-Chemical Technology,** L . CHANGHOU**, Dalian University of Technology**

THURSDAY,2:00 PM

HT-10E-P: STUDENT HEAT TRANSFER RESEARCH AND DESIGN

sponsored by Heat Transfer Education Committee
Jointly sponsored by None

Chair: **EDWARD E. ANDERSON**, Texas Tech University
Co-Chair: **ALI . KHOUNSARY**, Argonne National Laboratory

FRIDAY,3:45 PM

HT-17C: FLOW AND HEAT TRANSFER IN MULTI-PHASE SYSTEMS -III

sponsored by K-13
Jointly sponsored by NO

Chair: **F. B. . CHEUNG**, Pennsylvania State University
Co-Chair: **BAO-WEN . YANG**, Columbia University - HTRF

Co-Chair: **S. MOSTAFA . GHIAASIAAN**, Georgia Institute of Technology

UNSTEADY ANALYSIS OF PARTICLE-LADEN GAS FLOWS WHEN HIT BY A MOVING SHOCK WAVE —JUN SUNG . PARK**, Korea Advanced Institute of Science and Technoloty**

Numerical Modeling of Aerosol Transport and Deposition in Channels Using the Particle Tracking Method—X.M. . WU**, Georgia Institute of Technology**

Electrohydrodynamic Induction Pumping of a Stratified Liquid/Vapor Medium with Wavy Interface—K. . BRAND**, Texas A&M University**

A study of transient conjugate heat transfer in vertical two-phase flow—S. . BAUTISTA-FRAGOSO **, University of Mexico**

Experimental Research on the Instability Characteristic Analysis of Boiling Two-Phase Natural Circulation Systems by Time Series Methods—YAO . WEI**, Shanghai Jiaotong University**

Study on Enhancement of Critical Heat Flux by Supplying Liquid-Jets to Heating Surface (Mechanism on Enhancement of CHF and Measurement of Void Fraction near Heating Surface)—HIROYASU . OHTAKE**, Kogakuin University**

Three-Dimensional CFD Analysis of Gas Mixing in Large Volumes—BRIAN L. SMITH**, Paul Scherrer Institute**

FRIDAY,2:00 PM

HT-16A: FUNDAMENTALS OF SINGLE-PHASE CONVECTION V

sponsored by K-8 Theory and Fundamental Research
Jointly sponsored by none

Chair: **JOHN H. . LIENHARD V**, Massachusetts Institute of Technology
Co-Chair: **M. ALI . EBADIAN**, Florida International University

An Interferometric Study of Convective Heat Transfer from an Irradiated Complex Window Assembly—MICHAEL . COLLINS**, Queen's University,** STEPHEN J. HARRISON**, Queens University,** PATRICK J. OOSTHUIZEN**, Queens University,** DAVID . NAYLOR**, Ryerson University**

A Numerical Study of the Effect of Subcooling on Natural Convection in a Densified Cryogenic Propellant—KAZIM . AKYUZLU**, University of New Orleans,** ANDREAS . ANTONIOU**, University of New Orleans,** K. . NGUYEN**, Lockheed Martin Michoud Space Systems**

A Numerical Study of the Development of Unsteady Three-Dimensional Natural Convective Flow in a Horizontal Enclosure with a Uniform Heat Flux on the Lower Surface—PATRICK H. OOSTHUIZEN**, Queen' s University**

Natural Convection Heat Transfer and Flow Pattern in an Inclined Arc-Shape Enclosure—CHI-HSIANG . CHENG**, Tatung University,** CHIN-LUNG . CHEN**, Lee-Ming Institute of Technology**

Pressure Effects on the Buoyancy-Induced Convective Heat Transfer for Non-Boussinesq Fluid in a Rectangular Enclosure—CHI-HSIANG . CHENG**, Tatung University,** KUO-SHU . HUNG**, Tatung University**

A Numerical Study of Natural Convective Flow in a Narrow Open Top Enclosure with a Linearly Varying Side-Wall Attached to the Upper Surface of a Large Square Enclosure—PATRICK H. OOSTHUIZEN**, Queen' s University,** DAVID . SCOTT**, Queen' s University**

THURSDAY,7:45 AM

HTD 7C: MICROSCALE THERMAL PHENOMENA IN ENERGY SYSTEMS I

sponsored by K-6
Jointly sponsored by None

Chair: **WEI . TONG**, GE Power Systems
Co-Chair: **JOHN C. CHAI**, Nanyang Technological University

Ultrafast Deformation in Femtosecond Laser Heating on Metals—ROBERT D. Y. . TZOU**, University of Missouri Columbia,** J. E. BERAUN **, Air Force Research Lab,** J. K. . CHEN**, Air Force Research Lab**

Effective Flux Temperature Formulation for Energy Conversion Using Microscale Thermal Radiation—MACMURRAY D. WHALE**, University of Victoria**

Simultaneous Estimation of Thermal Contact Resistance and Other Thermophysical Properties with Photothermal Deflection Spectroscopy—JASON R. FOLEY**, Cornel University,** THOMAS . AVEDISIAN**, Cornell University**

High-Temperature Electron Emission from Diamond Films—S. H. . SHIN**, Vanderbilt University,** TIM S. FISHER**, Vanderbilt University,** D. G. WALKER**, Vanderbilt University,** A. M. STRAUSS**, Vanderbilt University,** W. P. KANG**, Vanderbilt Univeristy,** J. L. DAVIDSON**, Vanderbilt University**

Modeling of Microscale Recuperative Heat Exchanger in a Joule-Thomson Cooler—KIM C. NG**, National University of Singapore,** JINBAO . WANG**, National University of Singapore**, HONG . XUE**, California State Polytechnic University**

FRIDAY,7:45 AM

HT-13D: FUNDAMENTALS OF SINGLE-PHASE CONVECTION IV

sponsored by K-8 Theory and Fundamental Research
Jointly sponsored by none

Chair: **JOHN H. . LIENHARD V**, Massachusetts Institute of Technology
Co-Chair: **M. ALI . EBADIAN**, Florida International University

Particle Image Velocimetry Measurements of Confined Counter-Rotating Vortices in a Square Duct —HEATHER . LANGFORD**, Clemson University,** DONALD E. BEASLEY**, Clemson University**

Numerical Prediction of Flow and Heat Transfer in a Rectangular Channel with a Built-in Circular Tube—GAUTAM . BISWAS**, Indian Institute of Technology Kanpur,** V. . ESWARAN**, Indian Institute of Technology Kanpur,** S. . BASU**, Indian Institute of Technology Kanpur**

Continued

SUNDAY *(continued)*

Single-Phase Turbulent Rod Bundle Heat Transfer—MARY . ARMFIELD, **Clemson University,** HEATHER M. LANGFORD, **Clemson University,** DONALD E. BEASLEY, **Clemson University,** MICHAEL E. CONNER, **Westinghouse Nuclear Fuel**

Numerical Simulations and Experimental Investigations of Flow Field and Heat Transfer Fin-and-tube Heat Exchangers—JENS . BENDER, **Technical University of Braunschweig,** ROLAND . SCHMIDT, **Technical University of Braunschweig,** JUERGEN . KOEHLER, **Technical University of Braunschweig**

Local Heat Transfer and Pressure Drop for Finned-Tube Heat Exchangers using Oval Tubes and Vortex Generators—JAMES E. O' BRIEN, **Idaho National Engineering and Environmental Laboratory,** MANOHAR S. SOHAL, **Idaho National Engineering and Environmental Laboratory,** PHILIP C. WALLSTEDT, **Idaho National Engineering and Environmental Laboratory**

FRIDAY,3:45 PM

HT-17G: TRANSPORT PHENOMENA IN FUEL CELL SYSTEMS

sponsored by K6 HEAT TRANSFER IN ENERGY SYSTEMS

Jointly sponsored by K12 AEROSPACE HEAT TRANSFER

Chair: **CHAO-YANG . WANG**, PENNSYLVANIA STATE UNIVERSITY
Co-Chair: **STEFAN T. THYNELL**, NSF, DIV. OF CHEMICAL AND TRANSPORT SYSTEMS

DEVELOPMENT OF A MINIATURE DIRECT METHANOL FUEL CELL—MATTHEW M. MENCH, **PENNSYLVANIA STATE UNIVERSITY, DEPARTMENT OF MECHANICAL ENGINEERING ,** ZHAOHUI . WANG, **PENNSYLVANIA STATE UNIVERSITY, DEPARTMENT OF MECHANICAL ENGINEERING ,** KRISHAN . BHATIA, **PENNSYLVANIA STATE UNIVERSITY, DEPARTMENT OF MECHANICAL ENGINEERING ,** CHAO-YANG . WANG, **PENNSYLVANIA STATE UNIVERSITY, DEPARTMENT OF MECHANICAL ENGINEERING**

A TWO-PHASE FLOW AND TRANSPORT MODEL FOR PEM FUEL CELLS—LIXIN . YOU, **UNIVERSITY OF MIAMI,** HONGTAN . LIU, **UNIVERSITY OF MIAMI**

COMPUTATIONAL DESIGN OF AIR BREATHING PROTON EXCHANGE MEMBRANE FUEL CELLS—ZHAOHUI . WANG, **PENNSYLVANIA STATE UNIVERSITY, DEPARTMENT OF MECHANICAL ENGINEERING,** CHAO-YANG . WANG, **PENNSYLVANIA STATE UNIVERSITY, DEPARTMENT OF MECHANICAL ENGINEERING**

FRIDAY,

FE-12A: SYMPOSIUM ON MULTIPHASE TRANSPORT IN POROUS MEDIA II

sponsored by FED Multiphase Flow Committee

Jointly sponsored by HTD K-8 Theory and Fundamentals

Chair: **MASSOUD . KAVIANY**, University of Michigan
Co-Chair: **KAMBIZ . VAFAI**, Univ. of California, Riverside

A Mixture Theory Model for the Flow through an Unsaturated Wellbore—M L. MARTINS-COSTA, **Universidade Federal Fluminense,** R M. SALDANHA DA GAMA, **Universidade Federal Fluminense**

A pore network model for drying processing in porous media—ANDREAS G. YIOTIS, **National Technical University of Athens**

Tracer Dispersion in Stochastically Reconstructed Porous Media—A. N. GALANI, **National Center for Scientific Research ,** M E. KAINOURGAIKIS, **National Center for Scientific Research, Demokritos,** E S. KIKKINIDES, **Center for Research and Technology, Hellas**, A K. STUBOS, **National Center for Scientific Research, Demokritos**

Statistics of Mathematical Two-Scale Closure of Momentum, Heat and Charge Transport Problem with Stochastic Orientation of Porous Medium Capillaries—V S. TRAVKIN, **UCLA,** K . HU, **UCLA,** I . CATTON, **UCLA**

A Continuum Model for the Evolution of Gas in a Solution Gas-Drive or an Internal Steam Drive—I N. TSIMPANOGIANNIS, **University of Southern California,** Y C. YORTSOS, **University of Southern California**

FRIDAY,2:00 PM

HTD 16D: MICROSCALE THERMAL PHENOMENA IN ENERGY SYSTEMS II

sponsored by HTD K-6

Jointly sponsored by None

Chair: **WEI . TONG**, GE Power Systems
Co-Chair: **JOHN . CHAI**, Nanyang Technological University

Experimental Validation of Non-Fourier Thermal Behavior in Porous Structure—KENDALL T. HARRIS, **The University of Texas at Arlington,** AGBAI G. NNANNA, **The University of Texas at Arlington,** A. . HAJI-SHEIKH, **The University of Texas at Arlington,** M J. FISHER, **University of Virginia**

A Review of Micro Heat Exchanger Design Methods, Fabrication Methods and Applications—W J. BOWMAN, **Brigham Young University,** DANIEL . MAYNES, **Brigham Young University**

Using Amorphous Material Properties in Scattering-Mediated Acoustic Mismatch Model for Predicting Thermal Boundary Resistance—AMIT . DEVPURA, **Intel Corporation,** RAVI S. PRASHER, **Intel Corporation,** PATRICK . PHELAN, **Arizona State University**

Two-Phase Refrigerant Mixture (R-407C) Flow in Smooth Meso-Scale Heat Exchangers—YASIR M. SHARIFF, **Wichita State University,** T. S. RAVIGURURAJAN, **Wichita State University**

The P3 Micro Power Generation System—C. . RICHARDS, **Washington State University,** D. . BAHR, **Washington State University,** C-G. . XU, **Washington State University,** R. . RICHARDS, **Washington State University**

WEDNESDAY,2:00 PM

HT-4A: FUNDAMENTALS OF THERMAL PHENOMENA IN MICROELECTROMECHANICAL SYSTEMS (MEMS) I

sponsored by K-8 Theory and Fundamental Research

Jointly sponsored by None

Chair: **LESLIE M. PHINNEY**, University of Illinois, Urbana-Champaign
Co-Chair: **C. THOMAS . AVEDSIAN**, Cornell University

A Finite-Volume Based Time-Splitting Scheme for Computation Electrodeposition—CHUNMEI . XIA, **Carnegie Mellon University,** JAYATHI Y. MURTHY, **Carnegie Mellon University**

Nanoscale Thermal, Electrical, and Thermoelectric Measurements Using Batch-Fabricated Scanning Probes—ANDREW C. MINER, **University of California,** DEYU . LI, **University of California,** KWONG-LUCK . TAN, **University of California,** LI . SHI, **IBM T. J. Watson Research Center,** ARUN . MAJUMDAR, **University of California**

Two-Dimensional Nanoscale Heat Conduction Using Ballistic-Diffusive Equations—RONGGUI . YANG, **University of California,** GANG . CHEN, **University of California**

A Microdevice for Measuring Thermophysical Properties of Nanotubes and Nanowires—LI . SHI, **University of California,** P. . KIM, **University of California,** S. . PLYASUNOV, **University of California,** A. . BACHTOLD, **University of California,** P. L. MCEUEN, **University of California,** ARUN . MAJUMDAR, **University of California**

Design and Fabricaiton of an Optomechanical Uncooled Infrared Imaging System—Y. . ZHAO, **University of California,** J. . YAMOGUCHI, **Nippon Telegraph and Telephone Company,** J. . CHOI, **University of California,** ROBERTO . HOROWITZ, **University of California,** J. . VARESI, **Raytheon,** P. . NORTON, **IR Vision,** J. . KITCHING, **M.S. 847.10, NIST,** ARUN . MAJUMDAR, **University of California,** HUIYING . LIN, **CFD Research Corporation,** MAHESH M. ATHAVALE, **CFD Research Corporation,** SIMON . MORALES, **Unversity of California**

Rotation of Laser Opto Micro Actuator with Low Heat Conductivity Material—ATSUNOBU . NOGUCHI, **Tokyo Metropolitan University,** MASAHIRO . OTA, **Tokyo Metropolitan University**

THURSDAY,7:45 AM

HT7B: FUNDAMENTALS OF HEAT TRANSFER IN ELECTRONICS COOLING

sponsored by K16 Heat Transfer in Electronic Equipment

Jointly sponsored by None

Chair: **ERIC B. ZIMMERMAN**, United States Military Academy
Co-Chair: **AFSHIN J. GHAJAR**, Oklahoma State University

EFFECTS OF AN AUXILIARY PLATE POSITION ON NATURAL CONVECTION IN A VERTICAL CHANNEL WITH RADIATION—ASSUNTA . ANDREOZZI, **Seconda Università di Napoli,** ARONZIO . MANCA, **Seconda Università di Napoli,** BIAGIO . MORRONE, **Seconda Università di Napoli**

Instability and Heat Transfer in Mixed Convection Flow in A Horizontal Duct with Discrete Heat Sources—QINGHUA . WANG, **Rutgers University,** YOGESH . JALURIA, **Rutgers University**

TRANSIENT CONVECTIVE HEAT TRANSFER OF AIR JET IMPINGING ONTO A Confined Ceramic-Based MCM Disk—YING-HUEI . HUNG, **National Tsing Hua University,** Y H. HUNG, **National Tsing Hua University**

Optimum Longitudinal-Plate Heat Sinks for Horizontal Natural Convection—KAMAL K. SIKKA, **IBM Microelectronics,** C . GEORGE, **IBM Microelectronics**

Continued

SUNDAY *(continued)*

Prediction of Thermal Contact Conductance by Surface Deformation Analysis—SURESH V. GARIMELLA, **Purdue University,** VISHAL . SINGHAL, **Purdue University**

THURSDAY,

HT-8B: FUNDAMENTALS OF SINGLE-PHASE CONVECTION II

sponsored by K-8 Theory and Fundamental Research

Jointly sponsored by none

Chair: **JOHN H. . LIENHARD V**, Massachusetts Institute of Technology
Co-Chair: **M. ALI . EBADIAN**, Florida International University

Higher-Order Boundary Element Methods for Unsteady Convective Transport—GARY F. DARGUSH, **State University of New York at Buffalo,** MIKHAIL M. GRIGORIEV, **State University of New York at Buffalo**

Slip-Flow Constant-Wall-Temperature Nusselt Number in Circular Tubes in the Presence of Axial Heat Conduction—NICOLAS G. HADJICONSTANTINOU, **Massachusetts Institute of Technology,** OLGA . SIMEK, **Massachusetts Institute of Technology**

Forced Convection Heat Transfer in the Combined Entry Region of Non-Circular Ducts—YURI S. MUZYCHKA, **Memorial University of Newfoundland,** M.M. . YOVANOVICH, **University of Waterloo**

Nusselt Number in Micro and Nano Channels Under Conditions of Constant-Wall-Temperature —NICOLAS G. HADJICONSTANTINOU, **Massachusetts Institute of Technology,** OLGA . SIMEK, **Massacusetts Institute of Technology**

Fundamental Heat Transfer Correlations for Natural Convection from a Uniformly Heated Vertical Plate—LAILA . GUESSOUS, **Oakland University,** ORHAN . AYDIN, **Karadeniz Technical University**

WEDNESDAY,3:45 PM

HT-5A: FUNDAMENTALS OF THERMAL PHENOMENA IN MICROELECTROMECHANICAL SYSTEMS (MEMS) II

sponsored by K-8 Theory and Fundamental Research

Jointly sponsored by ——

Chair: **C. THOMAS . AVEDISIAN**, Cornell University
Co-Chair: **LESLIE M. PHINNEY**, University of Illinois

Heat Transfer in a MEMS for Determination of Fluid and Flow Characterisitcs—NICOLAE . DAMEAN, **University of Twente, EL/MI,** PAUL P. L. REGTIEN, **University of Twente, EL/MI**

Compressible Gas Flow through Smooth and Rough Microchannels—STEPHEN E. TURNER, **University of Rhode Island,** HONGWEI . SUN, **University of Rhode Island,** MOHAMMED . FAGHRI, **University of Rhode Island**, OTTO J. GREGORY, **Unversity of Rhode Island**

Modeling of Flow Characteristic and Heat Transfer for Micro Couette Flow—HONG . XUE, **California State Polytechnic University,** LING . XIE, **National University of Singapore,** SIAW KIANG . CHOU, **National University of Singapore**

Thermal Non-Equilibrium Effects at the Stagnation Wall in the Unsteady Micro-Flow—SEUNG WOOK . BAEK, **Division of Aerospace Engineering,** JAE HYUN . PARK, **Divison of Aerospace Engineering**

Photonic and Radiative Properties of Bubble Arrays—BAO . YANG, **University of California,** GANG . CHEN, **University of California**

THURSDAY,

HT-8E-P: FORUM ON PARALLEL COMPUTING METHODS

sponsored by Aerospace Heat Transfer (K-12)

Jointly sponsored by Fluids Engineering Division, Dr.Chris Freitas

Chair: **CHRISTOPHER J. FREITAS**, Southwest Research Institute
Co-Chair: **ROD W. DOUGLASS**, Los Alamos National Laboratory

THURSDAY,2:00 PM

HT 10D: SYMPOSIUM ON FLUID-PHYSICS AND HEAT TRANSFER FOR MACRO- AND MICRO-SCALE GAS-LIQUID AND PHASE-CHANGE FLOWS

sponsored by Heat Transfer Division

Jointly sponsored by Applied Mechanics Division, Heat Transfer Division

Chair: **AMITABH . NARAIN**, Michigan Technological University
Co-Chair: **SATISH G. KANDLIKAR**, Rochester Institute of Technology

Parallelized DSMC Modeling of Transport Near Liquid-Vapor Interfaces in a Micro Bubble Heat Pipe—PING . JIANG, **University of California - Berkeley,** VAN P. CAREY, **University of California - Berkeley**

On Measuring Bubble Nucleation Temperature of Water/Methanol Mixtures Using Ink-Jet Printer Technology—THOMAS C. AVEDISIAN, **Cornell University,** W S. OSBORNE, **Hewlett Packard Corporation,** F D. MCLEOD, **Cornell University**

Intermolecular and Surface Forces and Their Role in Nanoscale Liquid Transport and Phase Change—JIANGANG . WENG, **University of California, Berkeley,** CHANG-LIN . TIEN, **University of California - Berkeley,** ARUNAVA . MAJUMDAR, **University of California - Berkeley**

A macro- and micro- scale model for detached solidification in a Bridgman system—H . ZHANG, **SUNY-Stony Brook,** D J. LARSON, **SUNY-Stony Brook,** T H. CHEN, **SUNY-Stony Brook,** J . XU, **SUNY-Stony Brook**

FRIDAY,7:45 AM

HT-13E: FLUID-PHYSICS AND HEAT TRANSFER FOR MACRO- AND MICRO-SCALE GAS-LIQUID AND PHASE-CHANGE FLOWS

sponsored by Heat Transfer Division

Jointly sponsored by Applied Mechanics Division, Heat Transfer Division

Chair: **SATISH G. KANDLIKAR**, Rochester Institute of Technology
Co-Chair: **AMITABH . NARAIN**, Michigan Technological University

Mass quality, void fraction and slip ratio in bulk boiling flow—FRANCISCO J. COLLADO, **CPS-Universidad de Zargoza**

Small Diameter Effects in Internal Flow Boiling—MICHAEL . PIERNO, **Seaholm High School,** MAUREEN . DIMMER, **Seaholm High School,** PETER . GRIFFITH, **MIT,** JOHN H. LIENHARD, V, **MIT,** GAIL E. KENDALL, **MIT**

Dynamics of a Capillary Flow with Evaporation Through a Micro-channel—H I. LEE, **Samsung Advanced Institute of Technology,** H J. CHO, **Samsung Advanced Institute of Technology**

Shape Factor in the Latent-Heat-Thermal-Energy-Systems—SERGEI . FOMIN, **School of Aeronautical Engineering**

Controlling Drop Rebound With Solid Target Motion—HO-YOUNG . KIM, **Thermal/Flow Control Research Center,** HEON J. LEE, **Thermal/Flow Control Research Center**

FRIDAY,11:15 AM

HT-15D: FLUID-PHYSICS AND HEAT TRANSFER FOR MACRO- AND MICRO-SCALE GAS-LIQUID AND PHASE-CHANGE FLOWS

sponsored by Heat Transfer Division

Jointly sponsored by AMD, FED

Chair: **SATISH G. KANDLIKAR**, Rochester Institute of Technology
Co-Chair: **AMITABH . NARAIN**, Michigan Technological University

Heat Transfer and Critical Heat Flux of Forced Flow Boiling in Vertical, Narrow, and Annular Passages—YASUO . KOIZUMI, **Kogakuin University,** H . OHTAKE, **Kogakuin University,** Y . FUJITA, **Kogakuin University**

Numerical Simulation of Capillary-tube Behavior for Pure and Mixed Refrigerants Under Adiabatic and Non-adiabatic Flow Conditions—O V. GARCIA, **Energy Research Center,** C D. PEREZ-SEGARRA, **Energy Research Center,** A . OLIVA, **Energy Research Center**

The Measurement of Condensation Heat Transfer Coefficients in Microchannel Tubes—SRINIVAS . GARIMELLA, **Iowa State University,** TODD M. BANDHAUER, **Iowa State University**

Measurements of the Velocity Field during the Solidification of an Alloy Analog with Mushy Region—C . LUM, **Michigan State University,** M M. KOOCHESFAHANI, **Michigan State University,** J J. MCGRATH, **Michigan State University,** A R. DIAZ, **Michigan State University,** A. . BENARD, **Michigan State University**

FRIDAY,2:00 PM

HT-16C: FLOW AND HEAT TRANSFER IN MULTI-PHASE SYSTEMS - II

sponsored by K-13

Jointly sponsored by no

Continued

SUNDAY *(continued)*

Chair: **MOSTAFA . GHIAASIAAN**, Georgia Institute of Technology
Co-Chair: **BAO-WEN . YANG**, Columbia University-HTRF

Co-Chair: **F. B. . CHEUNG**, Pennsylvania State University

DEVELOPMENT OF PRESSURIZER TRANSIENT THERMODYNAMICS ANALYSIS CODE FOR CHASHMA NUCLEAR POWER PLANT—ARSHAD . MAHMOOD**, Shanghai Jiao Tong University**

Air-water transient heat transfer in a stirred tank—V. . DUBOVSKY**, Ben-Gurion University of the Negev**

NUMERICAL STUDY OF LATERAL MERGER OF VAPOR BUBBLES DURING NUCLEATE POOL BOILING —A. . MUKHERJEE**, UCLA**

Pool Boiling of Water in a Bed of Unconfined Particles over Horizontal Surface—H. . KUCUK**, Istanbul Technical University**

Simulating analysis for small break LOCA test facilities by applying the volume scaling with reduced pressure and reduced height—S.K. . MOUSSAVIAN **, Mechanical Eng. Department**

Numerical simulation of the oil-gas flow adjacent to an eletrical submersible pump engine—A.J. . MELENDEZ **, Universidad Simon Bolivar**

THURSDAY,5:30 PM

HT-12B: FUNDAMENTALS OF SINGLE-PHASE CONVECTION III

sponsored by K-8 Theory and Fundamental Research
Jointly sponsored by none

Chair: **JOHN H. . LIENHARD V**, Massachusetts Institute of Technology
Co-Chair: **M. ALI . EBADIAN**, Florida International University

A Numerical Study of Three-dimensional Natural Convective Heat Transfer from a Vertical Plate with a "Wavy" Surface—PATRICK H. OOSTHUIZEN**, Queen's University,** MATT . GARRETT**, Queen's University**

Natural Convection on a Vertical Isoflux Plate with a Downstream Unheated Extension and a Parallel Shroud—ORONZIO . MANCA**, Seconda Universita degli studi di Napoli,** MARILENA . MUSTO**, Seconda Universita degli studi di Napoli,** VINCENZO . NASO**, Universitadi degli Studi di Napoli Federico II**

Parametric study of conjugate heat transfer in a plate-fin and tube heat exchanger—RICARDO . ROMERO-MENDEZ**, Univerisdad Autonoma de San Luis Potosi,** RAFAEL . ADAME**, Universidad Autonoma de San Luis Potosi,** MIHIR . SEN**, University of Notre Dame**

Flow Reversal in Laminar Mixed Convection—A. . BEHZADMEHR**, Universite de Sherbrooke,** NICOLAS . GALANIS**, Universite de Sherbrooke,** ANDRE . LANEVILLE**, Universite de Sherbrooke**

Natural Convective Heat Transfer from a Discrete Internal Heat Source in a Partially Open Cavity—I. YALCIN . URALCAN**, Istanbul Technical University**

WEDNESDAY,11:15 AM

NANO-3: NANOSCALE TRANSPORT: FUNDAMENTALS AND APPLICATIONS

sponsored by K-8
Jointly sponsored by None

Chair: **GANG . CHEN**, University of California at Los Angeles
Co-Chair: **ARUNAVA . MAJUMDAR**, University of California at Berkeley

FRIDAY,

HT-14D: FUNDAMENTALS OF HEAT TRANSFER IN ELECTRONICS COOLING

sponsored by K16
Jointly sponsored by NONE

Chair: **RICHARD . WIRTZ**, University of Nevada, Reno
Co-Chair: **ANN M. ANDERSON**, Union College

Measurement and Modeling of the Time and Pressure Dependence of Junction-Spreader Thermal Resistance for Integrated Circuits—PENG . ZHOU**, Stanford University,** KEN . GOODSON**, Stanford University**

A Simplified Modeling Scheme for Design Sensitivity Study of Thermal Solution Utilizing Heat Pipe and Vapor Chamber Technology—RAVI S. PRASHER**, Intel Corporation,** JAMES . SHIPLEY**, Intel Corporation,** AMIT . DEVPURA**, Intel Corporatio**

Effect of Particle Volume Fraction on the Thermal Conductivity and Mechanical Rigidity of Particle-Laden Polymeric Thermal Interface Material—RAVI S. PRASHER**, Intel Corporation,** PAUL . KONING**, Intel Corporation,** JAMES . SHIPLEY**, Intel Corporation,** AMIT . DEVPURA**, Intel Corporation**

Integrated Heterogeneous Design of Semiconductor Heat Sink via Scaled Direct Micro-Modeling, Upper Scale VAT Simulation and Experiment. Comparison and Verification of Properties—VS. TRAVKIN**, University of California, Los Angeles,** K . HU**, University of California, Los Angeles**, M . CANINO**, University of California, Los Angeles,** L . CATTON**, University of California, Los Angeles,** E.D. . SERGIEVSKY**, Moscow Power Engineering Institute, Russia,** E.V. . KRINITSKY**, Moscow Power Engineering Institute, Russia,** M . RIZZI**, University of California, Los Angeles**

A NOVEL COOLING ENHANCEMENT IN MICROELECTRONIC DEVICES AND SYSTEMS USING OSCILLATORY IMPINGING AIR JETS—VICTOR A. CHIRIAC**, Motorola, Inc,** TIEN -YU TOM . LEE**, Motorola, Inc.**

Unsteady Temperature Distribution in Conjugated Heat Transfer Problems Using Green's Functions—ARAFA M. OSMAN**, Kuwait University,** F . AL-JUWAYHEL**, ,** M . HAJI**,**

THURSDAY,11:15 AM

HT-9FI: INDUSTRIAL APPLICATIONS OF COMPUTATIONAL HEAT TRANSFER

sponsored by K-20 Computational Heat Transfer
Jointly sponsored by n/a

Chair: **RANDY L. CLARKSEAN**, Clarksean and Associates
Co-Chair: **THERESE E. RHODES**, Engineous Software Inc

Correlations of Fin-Tube Heat Exchanger Performance Data using Genetic Algorithms, Simulated Annealing and Interval Methods—ARTURO . PACHECO-VEGA**, ,** MIHIR . SEN**, ,** K T. YANG**, University of Notre Dame,** RODNEY . MCCLAIN**,**

Thermal Analyses and Frequency Shift Design Studies for the Spallation Neutron Source Drift Tube Linac—LUCIE M. PARIETTI**, Los Alamos National Laboratory**

An Advanced Multiblock Grid Technique and Its Application for Large Diameter Silicon Tube Growth by EFG Technique—D . SUN**, University at Stony Brook,** HUI . ZHANG**, University at Stony Brook**, V . PRASAD**, University at Stony Brook**

Studies on Natural Convection Induced Flow and Thermal Behavior Inside Electronic Equipment Cabinet Model—MASARU . ISHIZUKA**, Toyama Prefectural University,** G . PENG**, ,** S. HAYAMA**,**

Implementation of the compressible flow solution methodology for solving 2D shallow-water flow problems—JOAQUIN E. MORAN**,** J A. RINCON**,**

THURSDAY,5:30 PM

HT12EI: INDUSTRIAL APPLICATIONS IN AEROSPACE HEAT TRANSFER

sponsored by K-12 Aerospace Heat Transfer
Jointly sponsored by none

Chair: **CHING-FEN . TSAI**, The Boeing Company

1. On The Optimiza Of Circular Radiating Fins

2. Inverse Design of a Three Dimensional Furnace With Moving Design Environmant—HAKAN . ERTURK**, The University of Texas at Austin**

THURSDAY,5:30 PM

HT-12EI: NONTRADITIONAL MANUFACTURING RESEARCH AND APPLICATIONS

sponsored by K-15 Transport Phenomena in Manufacturing and Materials Processing
Jointly sponsored by Manufacturing Engineering Division

Chair: **RICHARD N. SMITH**, Rensselaer Polytechnic Institute
Co-Chair: **JAMIL A. KHAN**, University of South Carolina

Intensity and Uniformity of Gallium Nitride Deposition in Sublimation Sandwich Growth—B. . WU**, SUNY-Stony Brook,** H. . ZHANG**, SUNY-Stony Brook**

Characteristics of CVD of Silicon with a Moving Susceptor—HOSEON . YOO**, Soongsil University,** YOGESH . JALURIA**, Rutgers University**

Investigation of Air Plasma in Ultra-Short Laser Processing of Crystalline Silicon—TAEYOUL . CHOI**, UC-Berkeley,** DAVID . HWANG**, UC-Berkeley**

COSTAS P. GRIGOROPOULOS**, UC-Berkeley**

Continued

SUNDAY *(continued)*

Numerical Simulation of a Dielectric Material Exposed to Short Pulsed Laser Radiation—RICHARD A. WHALEN, **Northeastern University,** GREGORY J. KOWALSKI, **Northeastern University**

Fundamentals and Applications of High Precision Laser Micro-Bending—XIANFAN . XU, **Purdue University,** X. R. ZHANG, **Purdue University**

WEDNESDAY,3:45 PM

HT-5CI: OPEN FORUM ON FIRE AND COMBUSTION

sponsored by K-11 Fire and Combustion

Jointly sponsored by None

Chair: **JIANN C. YANG**, N.I.S.T.

Open Forum—

THURSDAY,

HT-8E-P: CURRENT TRENDS/CHALLENGES IN THE THERMAL MANAGEMENT OF ELECTRONIC SYSTEMS

sponsored by K16-Heat Transfer in Electronic Equipment

Jointly sponsored by n/a

Chair: **MICHAEL J. ELLSWORTH**, IBM Corporation

Co-Chair: **KAMAL K. SIKKA**, IBM Corporation

Assessment of the Impact of Interconnect Strategies on Thermal Performance of GaAs Power Amplifier IC Devices—VANCE H. ADAMS, **Motorola, Inc.,** TIEN-YU . LEE, **Motorola, Inc.**

Thermal Design Analysis of Free Space Optical Interconnect (FSOI) Package Module—VICTOR A. CHIRIAC, **Motorola, Inc.,** TIEN-YU . LEE, **Motorola, Inc.**

A New Geopole Cooling Technique for Outdoor Electronic Enclosures—

Impact of Generator Acoustic Blankets on Generator Cooling Performance—WEI . TONG, **GE Power Systems**

Performance Evaluation of Serrated Plate Fins for Under-Carriage Electronics Cooling in Transportation Applications —IBRAHEEM K. SHWAISH , **Carnegie Mellon University ,** JAYATHI Y. MURTHY, **Carnegie Mellon University ,** CRISTINA H. AMON, **Carnegie Mellon University ,** DIEP . BAINS, **Bombardier Transportation**

FRIDAY,3:45 PM

HT-17H: INDUSTRIAL APPLICATIONS OF COMPUTATIONAL HEAT TRANSFER

sponsored by K-20 Computational Heat Transfer Committee

Jointly sponsored by

Chair: **RANDY L. CLARKSEAN**, Clarksean and Associates

Co-Chair: **THERESE E. RHODES**, Engineous Software Inc.

A SIMPLIFIED NUMERICAL MODEL TO PREDICT THE VELOCITY FIELD IN A CATALYTIC CRACKING UNITY IN OIL REFINERIES—JEFERSON A. SOUZA, **UFPR/DEMEC/LFT Laboratoria de Fenomenos de Transporte,** J.V.C. . VARGAS, , O F. VON MEIEN,

Temperature Prediction for Hydraulically Fractured Oil and Gas Wells—XINGHUI . LIU, **Pinnacle Technologies, Inc.,** H . YANG, , F . YUAN,

Thermal Modeling of a Liquid-Cooled Electric Machine—EDWARD C. JIH, **Ford Motor Company,** KANGHUA . CHEN, , THOMAS . ABRAHAM, , VENU . SIDDAPUREDDY,

Solution of Three-Dimensional Transient Heat Transfer During Polymer Injection Molding —FLORI . ILINCA, **Industrial Materials Institute, National Research Council,** J.-F. . HETU,

Radiation and induced convection in ventilated enclosures—GENNADY . ZISKIND, **Ben-Gurion Universityof the Negev,** V . DUBOVSKY, , R . LETAN,

A Numerical Investigation of the Free Surface Flow during Optical Fiber Coating Process—C.S.-L. . LIU, **The Hong Kong University of Science of Technology,** S. H.-K. . LEE,

THURSDAY,7:45 AM

HT-7A: FUNDAMENTALS OF SINGLE-PHASE CONVECTION I

sponsored by K-8 Theory and Fundamental Research

Jointly sponsored by none

Chair: **JOHN H. . LIENHARD V**, Massachusetts Institute of Technology

Co-Chair: **M. ALI . EBADIAN**, Florida International University

On Low-Dimensional Galerkin Modeling of Confined Twin-Jet Flow and Heat Transfer—HASAN . GUNES, **Istanbul Technical University,** K . GOCMEN, **Istanbul Technical University,** L . KAVURMACIOGLU, **Istanbul Technical University**

Experimental Flow Field and Heat Transfer Study of a Slot Jet Reattachment Nozzle Impinging on a Flat Plate—J . SEYED-YAGOOBI, **Texas A&M University,** V . NARAYANAN, **Texas A&M University,** R H. PAGE, **Texas A&M University**

Modeling of Continuous and Intermittent Gas Jet Impingement and Heat Transfer on a Solid Surface—DIMOS . POULIKAKOS, **Swiss Federal Institute of Technology,** ANDREAS K. CHANIOTIS, **Swiss Federal Institute of Technology**

The Effect of Forcing on Scalar Transport in a Co-axial Combustor Geometry—CHUN L. LAU, **McNeese State University,** PANJAK R. CHANDRA, **McNeese State University,** SUMANTA . ACHARYA, **Louisiana State University**

Numerical Simulations of Resonant Heat Transfer Augmentation at Low Reynolds Numbers—MILES . GREINER, **University of Nevada, Reno,** HENRY M. TUFO, **University of Chicago,** PAUL C. FISCHER, **Argonne National Laboratory**

THURSDAY,11:15 AM

HT-9C: MODELING OF BIOTRANSPORT PHENOMENA I

sponsored by K-17 Heat and Mass Transfer in Biotechnology

Jointly sponsored by BED

Chair: **LIANG . ZHU**, University of Maryland Baltimore County

Co-Chair: **OANA . CRACIUNESCU**, Duke University

Theory and Measurement of Interface Movement and Thermal Behavior during Freezing of Solute Laden Gels—XIAOMING . HE, **Dept. of Mech. Engr., Univ. of Minnesota**

Model for Suspensions of Gyrotactic Micro-organisms in Porous Media—N. . JIANG, **Dept. of Mech. & Aerospace Engr., North Carolina State University,** A. V. KUZNETSOV, **Dept. of Mech. & Aerospace Engr., North Carolina State University**

Numerical simulation of micro-scale thermosolutal transport in the freezing of cells—H. S. UDAYKUMAR, **Dept. of Mech. Engr., U. Iowa,** L. . MAO, **Dept. of Mech. Engineering, U. Iowa**

A Neoclassical Model for the Dynamics of Cell Growth in a Homogeneous Habitat—PETER . VADASZ, **University of Durban-Westville, Mechanical Engineering,** A. . VADASZ, **University of Durban-Westville, Mechanical Engineering**

A mathematical Model for the Regulation of Microvessel Permeability by cAMP—BINGMEI M. FU, **Dept. of Mech. Engr., Univ. of Nevada, Las Vegas,** B. . CHEN, **Dept. of Mech. Engr., Univ. of Nevada, Las Vegas**

Mass Transport from a Particle in a Linear Shear Flow—SATWINDAR S. SADHAL, **Aerospace & Mechanical Engineering, University of Southern California,** S. S. SADHAL, **Aerospace & Mechanical Engineering, University of Southern California,** P. S. AYYASWAMY, **University of Pennsylvania**

WEDNESDAY,7:45 AM

NANO-6I: NANOSCALE THERMAL MANAGEMENT OF ELECTRONIC DEVICES I

sponsored by K-16 Heat Transfer in Electronic Equipment

Jointly sponsored by There are no joint sponsors

Chair: **CRISTINA . AMON**, Carnegie Mellon University

Chair: **TIMOTHY . FISHER**, Vanderbilt University

Co-Chair: **SURESH . GARIMELLA**, Purdue University

Embedded Micro Spray Cooling System for Thermal Control of Electronics—S.C. . YAO, **Carnegie Mellon University,** J. Y. . MURTHY, **CMU,** D. . BOYALAKUNTLA, **CMU,** A. . JAIN, **CMU,** S.V.J. . NARUMANCHI, **CMU,** C.F. . WU, **CMU,** C.C. . HSIEH, **CMU,** CRISTINA H. AMON, **Carnegie Mellon University,** K. . GABRIEL, **CMU**

Nanoscale thermal imaging of thermionic devices using scanning thermal microscopy—A. . MAJUMDAR, **UC Berkeley,** K-L . TAN, **UC Berkeley,** C. . LABOUNTY, **UC Berkeley,** E. . CROKE III, **HRL Laboratories,** A. . MINER, **UC Berkeley,** A. . MINER, **UC Berkeley,** G. . ZHENG, **UC Santa Barbara,** A. . SHAKOURI, **UC Santa Cruz,** X. . FAN, **UC Santa Barbara,** J. . BOWERS, **UC Santa Barbara**

Three-Dimensional Flow and Heat Transfer Calculations in Micro-Channel Heat Exchangers—A. K. SAHA, **Louisiana State University,** SUMANTA . ACHARYA, **Louisiana State University**

Continued

SUNDAY *(continued)*

A NATURAL CIRCULATION MODEL OF THE CLOSED LOOP, TWO-PHASE THERMOSYPHON FOR ELECTRONICS COOLING.—S. IMAM . HAIDER, **University of Maryland, College Park,** WATARU . NAKAYAMA, **University of Maryland, College Park,** YOGENDRA . JOSHI, **University of Maryland, College Park**

THURSDAY,5:30 PM

HT-12C: MODELING OF BIOTRANSPORT PHENOMENON II

sponsored by K-17 Heat and Mass Transfer in Biotechnology
Jointly sponsored by BED

Chair: **LIANG . ZHU**, Unviersity of Maryland Baltimore County
Co-Chair: **OANA . CRACIUNESCU**, Duke University

A case study of hyperthermia induced temperature computations in human sarcomas using discrete vasculature and relative perfusion maps—OANA I. CRACIUNESCU, **Duke University Medical Center,** B W. RAAYMAKERS, **Duke University,** A N. KOTTE, **Duke University ,** S. K. DAS, **Duke University,** J. B. VAN DE KAMER, **Duke University ,** H . KROEZE, **Duke University,** A A. DE LEEUW, **Duke University,** T V. SAMULSKI, **Duke University,** J.J. W. LAGENDIJK, **Duke University**

Temperature difference between the body core and the arterial blood supplied to the brain during hyperthermia and hypothermia—LIANG . ZHU, **Depart. of Mechanical Engineering, University of Maryland Baltimore County,** M. . BOMMADEVARA, **Dept. of Mechanical Engineering, University of Maryland Baltimore County**

A Voxel-Based, Whole Body Model of Tissue Heating—D A. NELSON, **Michigan Technical University,** A. R. CURRAN, **Michigan Tech,** W D. HURT, **Michigan Tech,** P. A. MASON, **Michigan Tech,** J. M. ZIRIAX, **Michigan Tech**

Numerical analysis of heat transfer in dermatologic laser surgery of port wine stain birthmarks –GUILLERMO . AGUILAR, **Beckman Laser Institute and Medical Clinic,** SERGIO H. DIAZ VALDES, **Beckman Laser Institute and Medical Clinic, ,** STUART . NELSON, **Beckman Laser Insitute and Medical Clinic,** ENRIQUE . LAVERNIA, **Dept. of Chemical and Biochemical Engr. and Material Science**

Adaptation of aerospace cool-suit technology to treatment of multiple sclerosis symptoms—K B. EMERTON, **Michigan Technological University,** DAVID . NELSON, **Michigan Tech**

THURSDAY,11:15 AM

HT-9D: ADVANCED SIMULATION METHODS FOR ELECTRONICS COOLING

sponsored by K-16 Heat Transfer in Electronic Equipment
Jointly sponsored by K-20

Chair: **JAYATHI Y. MURTHY**, Carnegie Mellon University
Co-Chair: **GERARD . JONES**, Villanova University
Co-Chair: **DEREJE . AGONAFER**, University of Texas at Arlington

Computation of Natural Convection in Channels with Staggered Pin Fins—DHANUNJAY . BOYALAKUNTLA, **Carnegie Mellon University,** JAYATHI . MURTHY, **Carnegie Mellon University**, CRISTINA . AMON, **Carnegie Mellon University**

Prediction of Thermal Performance of Flip-Chip Plastic Ball Grid Array (FC-PBGA) Packages: Effect of Die and Substrate Sizes—T. Y. TOM LEE, **Motorola, Inc.,** KONERU . RAMAKRISHNA, **Motorola, Inc.**

Impact of Die Attach Material and Substrate Design on RF GaAs Power Amplifier Devices Thermal Performance—VICTOR A. CHIRIAC, **Motorola Inc.,** T.-Y. TOM . LEE, **Motorola**

Relating Semiconductor Heat Sink Local and Non-Local Experimental and Simulation Data to Upper Scale Design Goals—V. S. TRAVKIN, **University of California Los Angeles**

Numeric Modeling of Ultrasonic Acoustic Streaming Cooling Effect on IC Chips—ANDREY V. KUZNETSOV, **North Carolina State University,** Q. . WAN, **North Carolina State University**

SPREADSHEET TOOL FOR QUICK-TURN 3D NUMERICAL MODELING OF PACKAGE THERMAL PERFORMANCE WITH NON-UNIFORM DIE HEATING—ABHAY A. WATWE, **Intel Corporation**, RAVI S. PRASHER, **Intel Corporation**

WEDNESDAY,11:15 AM

HT-3I: COMPUTATIONAL MODELING OF INDUSTRIAL COMBUSTION SYSTEMS - I

sponsored by Heat Transfer Divison (HTD)
Jointly sponsored by Fuels and Combustion Technologies Division (FACTD)

Chair: **CARY . PRESSER**, National Institute of Standards and Technology
Co-Chair: **ASHWANI K. GUPTA**, University of Maryland

A Study of the NOx Emission in an Industrial Furnace—Q. . JIANG, **The University of Western Ontario,** C. . ZHANG, **The University of Western Ontario**

Optimizing the Performance of a Fuel Induced Flue Gas Re-Circulation (FIR) System for Low NOx Boiler Burner Applications—M. . LORRA, **The John Zink Company,** W. . BUSSMAN, **The John Zink Company,** J. D. SMITH, **The John Zink Company**

NOx Emissions from a Steel Reheat Furnace Firing Coke Oven Gas—B. . ADAMS, **Reaction Engineering International,** D. . WANG, **Reaction Engineering International**

CFD for Failure Analysis of a Recuperative Flameless Thermal Oxidation Device—M. A. RYNEARSON, **Bechtel BWXT Idaho, LCC,** T. D. FOUST, **Bechtel BWXT Idaho, LCC**

Modeling of Oxidation of Liquid Aluminum-Magnesuim Alloys in a Direct-Fired Furnace Environment—A. . MUKHOPADHYAY, **University of Illinois at Chicago,** P. . BERTA, **University of Illinois at Chicago,** S. . ZELEPOUGA, **University of Illinois at Chicago,** I. K. PURI, **University of Illinois at Chicago,** D. M. RUE, **University of Illinois at Chicago**

Validation of the Combustion Space Simulation of a Glass Furnace Simulator—B. . GOLCHERT, **Argonne National Laboratory,** S. L. CHANG, **Argonne National Laboratory,** C. Q. ZHOU, **Purdue University Calumet,** M. . PETRICK, **Argonne National Laboratory**

Modeling Large-Size Boilers as a Set of Heat Exchangers: Tips and Tricks—C. . CORTES, **University of Zaragoza,** L. I. DIEZ, **University of Zaragoza,** A. . CAMPO, **University of Zaragoza**

THURSDAY,3:45 PM

HT-11-R1: INDUSTRIAL APPLICATIONS IN AEROSPACE HEAT TRANSFER

sponsored by K-12 Aerospace Heat Transfer
Jointly sponsored by Nil

Chair: **CHING F. TSAI**, The Boeing Company
Co-Chair: **KENDALL . HARRIS**, The University of Texas at Arlington

THURSDAY,3:45 PM

HT-11C: TRANSPORT PHENOMENA IN MATERIALS PROCESSING AND MANUFACTURING

sponsored by K-15 Transport Phenomena in Manufacturing and Materials Processing
Jointly sponsored by None

Chair: **UMESH . CHANDRA**, Modern Computational Technologies, Inc.
Co-Chair: **TIEN-CHIEN . JEN**, University of Wisconsin, Milwaukee

Mathematical Modeling of Transient Flow and Heat Transfer in Gas-Stirred Molten Steel—J. L. XIA, **Helsinki University of Technology ,** T . AHOKAINEN, **Helsinki University of Technology**

Comparison Between Thermal Conductive Models for Moving Heat Sources in Material Processing—N . BIANCO, **Seconda Universita degli Studi di Napoli,** O. . MANCA, **Seconda Universita degli Studi di Napoli**

Measurements of Carbon Fluxes during a Low Pressure Carburizing Treatment —PHILIPPE . JACQUET, **Ecole Nationale Superieure d' Arts et Metiers ,** DANIEL R. ROUSSE, **Universite Laval,** CLEMENTE C. IBARRA, **Universite Laval**

Three-Dimensional Simulation of Co-Injection Molding —FLORIN . ILINCA, **National Research Council,** J. F. HETU, **National Research Council**

THURSDAY,11:15 AM

HT-9A: COMPUTATIONAL MODELING OF INDUSTRIAL COMBUSTION SYSTEMS - II

sponsored by Heat Transfer Division (HTD)

Continued

SUNDAY *(continued)*

Jointly sponsored by Fuels and Combustion Technologies Division (FACTD)

Chair: **CARY . PRESSER**, National Institute of Standards and Technology
Co-Chair: **ASHWANI K. GUPTA**, University of Maryland

Steady-State Simulation of a Methane-Air Partially Premixed Turbulent Flame—G. M. GOLDIN**, Fluent, Inc.**, D. . CHOUDHURY**, Fluent, Inc.**

Numerical Simulation of Methane-Air Nozzle Burners for Aluminum Remelt Furnaces—A. . MUKHOPADHYAY**, University of Illinois at Chicago,** A. . JHALANI**, University of Illinois at Chicago,** S. . ZELEPOUGA**, University of Illinois at Chicago,** I. K. PURI**, University of Illinois at Chicago,** D. M. RUE**, University of Illinois at Chicago,** K. B. MCGRATTAN**, National Institute of Standards and Technology,** A. . HAMINS**, National Institute of Standards and Technology**

Simulation of Multi-Phase Glass-Melt Flows in a Glass Melter—S. L. CHANG**, Argonne National Laboratory,** C. Q. ZHOU**, Purdue University Calumet,** B. . GOLCHERT**, Argonne National Laboratory,** M. . PETRICK**, Argonne National Laboratory**

CFD Modeling and Comparison with Data for the NIST Reference Spray Combustor—D. S. CROCKER**, CFD Research Corporation,** J. F. WIDMANN**, National Institute of Standards and Technology,** C. . PRESSER**, National Institute of Standards and Technology**

Performance Analysis of Outer Cavity Trapped Vortex Spray Combustor—P. . CHAKKA**, Louisiana State University,** S. . ACHARYA**, Louisiana State University**

Models Evaluations of Combustion Process in a Cylindrical Furnace—A. O. NIECKELE**, Pontificia Universidade Catolica - RJ,** M. F. NACCACHE**, Pontificia Universidade Catolica - RJ,** M.S.P. . GOMES**, Pontifica Universidade Catolica - RJ,** J. E. CARNEIRO**, Pontificia Universidade Catolica - RJ,** R. . SERFATY**, Pontificia Universidade Catolica - RJ**

THURSDAY,

HT-8E-P: INVERSE PROBLEMS

sponsored by K-12 and K-20

Jointly sponsored by none

Chair: **BENNIE F. BLACKWELL**, Sandia Laboratory
Co-Chair: **KEITH A. WOODBURY**, University of Alabama

Co-Chair: **GEORGE S. DULIKRAVICH**, University of Texas at Arlington

Reconstruction of the Temperature Profile Along an Optical Fiber Thermometer—MATTHEW R. JONES**, Brigham Young University**

Geometric Optimization of Radiative Enclosures through Non-Linear Programming—KYLE J. DAUN**, University of Texas,** JACK R. HOWELL**, University of Texas,** D. P. MOON**, University of Texas**

Design of a Three-Dimensional Thermal Fin Using Reduced-Basis Output Bound Methods—DIMITRIOS V. ROVAS**, MIT,** CHRISTOPHE . PRUD' HOMME**, MIT,** THOMAS . LEURENT**, MIT,** LUC . MACHIELS**, MIT,** A. T. PATERA**, MIT**

Validation of Thermal Models: An Inverse Approach—KEVIN J. DOWDING**, Sandia National Laboratory**

Inverse Determination of Steady Surface Temperatures and Heat Fluxes on Arbitrary 3-D Objects—BRIAN H. DENNIS**, The University of Texas at Arlington,** GEORGE S. DULIKRAVICH**, The University of Texas at Arlington**

FRIDAY,3:45 PM

HT-17A: TRANSPORT PHENOMENA IN MATERIALS PROCESSING AND MANUFACTURING

sponsored by K-15 Transport Phenomena in Manufacturing and Materials Processing

Jointly sponsored by None

Chair: **M. K. ALAM**, Ohio University
Co-Chair **UMESH . CHANDRA**, Modern Computational Technologies, Inc.

Comparison of a Sharp Interface Dendritic Growth Simulation Technique with Microscopic Solvability—H. S. UDAYKUMAR**, University of Iowa,** R . MITTAL**, University of Florida,** L . MAO**, University of Iowa**

On the Effect of Expansivity in Transient Heat Conduction—Z. X. YUAN**, Southern Illinois Univ at Edwardsville,** X. T. YAN**, Southern Illinois Univ at Edwardsville,** R. X. CAI**, Academy of Sciences**

The Effect of Packing Microstructure on the Effective Conductivity of Random Sphere Packings for Sintering Applications—S. H. LEE**, HK Univ of Science & Technology,** W. W. SIU**, HK Univ of Scienc & Technology,** S. C. IP**, HK Univ of Science & Technology,** A. K. WU**, Hk Univ of Science & Technology**

An Effective Approach to Compute the Radiative Heat Transfer in the Packed Sphere System—S. C. IP**, HK Univ of Science & Technology,** S. H. LEE**, HK Univ of Science & Technology**

WEDNESDAY,6:45 PM

HT-6B: THERMAL INJURY AND TREATMENT I

sponsored by K-17 Heat and Mass Transfer in Biotechnology

Jointly sponsored by Bioengineering

Chair: **RAMACHANDRA . DEVIREDDY**, University of Minnesota
Co-Chair: **JOHN . MCGRATH**, Michigan State University

Use of Saline Injection to Create Large Thermal Lesions during Radio Frequency Ablation Therapy: 2. Experimental Results—LISSA . SILVER**, E. P. Limited,** PATRICK . HAMILTON**, E.P. Limited,** MICHAEL . CURLEY**, E.P. Limited,** ROBERTO . AIMI**, E.P. Limited,** ANGELA . NI**, E. P. Limited**

Comparison of Silver/Silver Chloride, Platinum, and Stainless Steel as Materials for Radio-Frequency Ablations—PATRICK . HAMILTON**, E.P. Limited,** LISSA . SILVER**, E. P. Limied,** MICHAEL . CURLEY**, E.P.Limited**

HIGH-SPEED PHOTOGRAPIC EVALUATION OF RETROPULSION MOMENTUM INDUCED BY A LASER CALCULI LITHOTRIPTOR—JEEYUN . KIM**, UT Austin,** BERNARD . CHOI**, UT Austin,** HO . LEE**, UT Austin,** JOEL . TEICHMAN**, Univ of Texas Healh Science Center**, A. . WELCH**, UT Austin**

Heat Generation in Bone Cutting - Implications for Thermal Necrosis—STEPHAN . LAPOINTE**, University of Vermont,** DEBRA . CHENET-MILLON**, University of Vermont,** DARREN . HITT**, University of Vermont,** ROBERTO . AIMI**, E.P. Limited**

USE OF SALINE INJECTION TO CREATE LARGE THERMAL LESIONS DURING RADIOFREQUENCY ABLATION THERAPY: 1. THERMAL MODEL—MICHAEL . CURTLEY**, E.P. Limited,** PATRICK . HAMILTON**, E.P. Limited**

THURSDAY,7:45 AM

HT-7DI: MULTIPHASE FLOW IN INDUSTRIAL APPLICATIONS

sponsored by K-13, Heat transfer Division

Jointly sponsored by Fluid Engineering Division

Chair: **YASSIN A. HASSAN**, Texas A&M University
Co-Chair: **EDWARD V. MCASSEY**, Villanova University

EXPERIMENTAL AND NUMERICAL MODELING OF GASEOUS CARBON DIOXIDE INTO AQUEOUS WATER IN BOTTLER FILLER SYSTEM—Y H. ZHENG **, University of Wisconsin-Milwaukee,** RYO S. AMANO**, University of Wisconsin-Milwaukee**

SOME NEW APPROACHES TO BUBBLE PLUME MODELLING USING CFD—MASSIMO . MILELLI**, Paul Scherrer Institute,** BRIAN L. SMITH**, Paul Scherrer Institute,** DJAMEL . LAKEHAL**, Swiss Federal Institute of Technology**

TRANSPORT CHARACTERISTICS OF A MULTI-SPECIES SLURRY IN A HORIZONTAL PIPELINE—P V. SKUDARNOV**, Florida International University,** H. J. KANG**, Florida International University,** C. X. LIN**, Florida International University,** M. A. EBADIAN **, Florida International University,** P. W. GIBBONS**, Numatec Hanford Corporation,** F. F. ERIAN **, Pacific Northwest National Laboratory,** M. . RINKER**, Pacific Northwest National Laboratory**

Experimental Verification of the Performance of a Droplet Injection System for Use in a Rod Bundle Heat Transfer Test Facility—A. J. IRELAND**, Pennsylvania State University,** E. . ROSAL**, Pennsylvania State University,** L. E. HOCHREITER**, Pennsylvania State Univesity,** F. B. CHEUNG**, Pennsylvania State University**

RBHT Steam Cooling And Droplet Injection Pre-test Analysis Using COBRA-TF—C. . FREPOLI**, Pennsylvania State University,** A. J. IRELAND**, Pennsylvania State University,** L. E. HOCHREITER**, Pennsylvania State University,** F. B. CHEUNG**, Pennsylvania State University**

THURSDAY,3:45 PM

HT-11DI: MULTIPHASE FLOW IN INDUSTRIAL APPLICATIONS II

sponsored by K-13, Heat transfer Division

Jointly sponsored by Fluid Engineering Division

Chair: **YASSIN A. HASSAN**, Texas A&M University
Co-Chair: **EDWARD V. MCASSEY**, Villanova University

Continued

SUNDAY *(continued)*

PREDICTION OF HEAT TRANSFER RATE AND PRESSURE DROP OF A HUMID FLUE-GAS FLOW ACROSS A TUBE BANK FOR WASTE HEAT RECOVERY—DONG WOON . JEONG, **Korea Advanced Institute of Science and Technology,** SANG YONG . LEE, **Korea Advanced Institute of Science and Technology,** BYUNG KYU . PARK, **Korea Institute of Machinery & Materials**

AN EXPERIMENTAL STUDY OF LIQUID ENTRAINMENT BY RAPID SURFACE SWELLING OF TWO-PHASE MIXTURE IN A VESSEL—MOON-HYUN . CHUN, **Korea Advanced Institute of Science and Technology,** KYONG-WON . SEO, **Korea Advanced Institute of Science and Technology**, HYENG-KUK . KIM, **Korea Advanced Institute of Science and Technology**

A FULLY-COUPLED TRANSIENT MODEL FOR PREDICTING INTERFACE CONTAMINATION IN PRODUCT PIPELINES—F. B. F. . RACHID , **Universidade Federal Fluminense,** J. H. CARNEIRO . DE ARAUJO, **Universidade Federal Fluminense,** RENAN MARTINS . BAPTISTA, **Cidade Universitaria**

The Flow Regime of oil-gas-water Three-phase Flow in Pipes—YUESHE . WANG, **Xi' an Jiaotong University,** FANGDE . ZHOU, **Xi' an Jiaotong University**

Flow Configure in Vertical 180 Degree Turning Duct—YUANWEI . LU, **Xi' an Jiaotong University ,** FANGDE . ZHOU, **Xi' an Jiaotong University ,** YUESHE . WANG, **Xi' an Jiaotong University ,** HUANQUN . QIAN, **Xi' an Jiaotong University**

THURSDAY,11:15 AM

HT-9EI: PANEL ON EMERGENT PROBLEMS IN THERMAL MANAGEMENT

sponsored by Heat Transfer Equipment (K-10)
Jointly sponsored by MEMS

Chair: **ALI . KHOUNSARY**, Argonne National Laboratory
Co-Chair: **PRABHAT . TEKRIWAL** , Maytag

Co-Chair: **PRABHAT . TEKRIWAL** , Maytag

Co-Chair **PRABHAT . TEKRIWAL** , Maytag

FRIDAY,

HT-14A: FUNDAMENTALS OF CONTACT ANGLE AND SURFACE TENSION EFFECTS ON PHASE CHANGE PHENOMENA - 1

sponsored by K-8
Jointly sponsored by none

Chair: **VAN P. CAREY**, University of California
Co-Chair: **SATISH G. KANDLIKAR**, Rochester Institute of Technology

Numerical Analysis on the Dropwise Condensation of a Binary Vapor Mixture—T. . NAGASAKI, **Tokyo Institute of technology,** H. . AKIYAMA, **Tokyo Institute of Technology,** Y. . ITO, **Tokyo Institute of Technology**

Boiling Curve Measurement for Water Containing Dissolved Carbon Dioxide Around a Temperature Controlled Heated Wire—ALI . HEYDARI, **University of California,** VAN P. CAREY, **University of California**

Assessment of Surface Wettability and Its Relation to Boiling Phenomena—NIRO . NAGAI, **University of California,** VAN P. CAREY, **University of California**

Controlled Contact Angle and Droplet Evaporation Using Photo-Induced Hydrophilic Surface—YASUYUKI . TAKATA, **Kyushu University**

A Numerical Study of Solidification in the Presence of a Free Surface Under Micorgravity Conditions—M. . GIANGI, **The University of New South Wales,** F. . STELLA, **The University of New South Wales,** E. . LEONARDI, **The University of New South Wales**

FRIDAY,3:45 PM

HT-17B: FUNDAMENTALS OF CONTACT ANGLE AND SURFACE TENSION EFFECTS ON PHASE CHANGE PHENOMENA - 2

sponsored by K-8
Jointly sponsored by none

Chair: **SATISH G. KANDLIKAR**, Rochester Institute of Technology
Co-Chair: **VAN P. CAREY**, University of California

High-Speed Photographic Investigation of Liquid-Vapor Interface and Contact Line Movement During CHF and Transition Boiling—M. E. STEINKE, **Rochester Institute of Technology,** SATISH G. KANDLIKAR, **Rochester Institute of Technology**

Effect of Fouling on Nucleate Pool Boiling and Critical Heat Flux—YUSUKE . FUKADA, **Tokyo University of Mecantile Marine,** IKUYA . HAZE, **Tokyo Univeristy of Mercantile Marine,** MASAHIRO . OSAKABE, **Tokyo Univeristy of Mercantile Marine**

Characteristics of Dehumidifying Fin and Tube Heat Exchangers for Various Wettability Surfaces—SEUNG P. AHN, **LG Electronics**

Measurement and Molecular Dynamics Modeling of Contact Angle of Water on a Plantinum Surface—SATISH G. KANDLIKAR, **Rochester Institute of Technology,** M. E. STEINKE, **Rochester Institute of technology,** S. . NARUYAMA, **Rochester Institute of Technology**

FRIDAY,3:45 PM

HT-17D: CRYOGENIC ENGINEERING

sponsored by Low-Temperature Heat Transfer
Jointly sponsored by PID Cryogenics Technical Committee; AESD Superconductivity Technical Committee

Chair: **PATRICK E. PHELAN**, Arizona State University
Co-Chair: **ROBERT . RUDLAND**, unknown

Co-Chair: **MING C. CHYU**, Texas Tech University

Cryogenic Heat Engines for Powering Zero Emission Vehicles—CARLOS A. ORDONEZ, **University of North Texas,** M C. PLUMMER, **University of North Texas,** R F. REIDY, **University of North Texas**

Second Law Analysis of a Stirling Cryocooler with Optimal Design of the Regenerator—EMMANOUIL . ROGDAKIS, **National Technical University of Athens,** N A. BORBILAS, **National Technical University of Athens**

Recent Developments in High-Performance Refrigeration for the First Compact Cryogenic Freeze-Dryer—L Y. REZNIKOV, **The Virtis Company,** T D. SUTHERLAND, **The Virtis Company**

Simulations, Analysis and Thermoeconomical Synthesis of Heat Transfer Elements—L Y. REZNIKOV, **Virtis Company,** T V. MOROSUK, **Virtis Company**

WEDNESDAY,3:45 PM

NANO-5B: TRANSPORT PHENOMENA IN PROCESSING FOR NANO-SYSTEMS AND MATERIALS

sponsored by K-15 Transport Phenomena in Manufacturing and Materials Processing
Jointly sponsored by NA

Chair: **GUO-XIANG . WANG**, The University of Akron
Co-Chair: **VISH . PRASAD**, State University of New York at Stony Brook

Analysis of Measuring Techniques for Superlattices Heat Conductivity Measurements—VLADI S. TRAVKIN, **University of California at Los Angeles,** I. . CATTON, **University of California at Los Angeles**

Localized Electron Evolution Induced by Femtosecond Laser Pulses in Water—C H. FAN, **State University of New York at Stony Brook,** JON P. LONGTIN, **State University of New York at Stony Brook,** J . SUN, **State University of New York at Stony Brook**

Laser recrystallization of a-Si thin films for flat panel display applications—COSTAS P. GRIGOROPOULOS, **University of California at Berkeley,** M . LEE, **University of California at Berkeley**, S . MOON, **University of California at Berkeley**

Nanolithography with a NSOM tip - Part I: Numerical Simulations—NICHOLAS . FANG, **University of California, Los Angeles,** M . XI, **University of California, Los Angeles,** X . ZHANG, **University of California, Los Angeles**

Nanolithography with a NSOM tip - Part II: Experiments—NICHOLAS X. FANG, **University of California at Los Angeles,** C . SUN, **University of California at Los Angeles,** Z . WAN, **University of California, Los Angeles,** X . ZHANG, **University of California, Los Angeles**

A Study of the Transport of Nanopowders in a Solidifying Solder Melt and its Influence on Microstructural Development—D C. LIN, **The University of Akron,** GUO-XIANG . WANG, **The University of Akron**, T S. SRIVATSAN, **The University of Akron,** S . LIU, **The University of Akron,** T M. GUO, **The University of Akron**

THURSDAY,

HT-8A: ARTFICIAL NEURAL NETWORKS FOR THERMAL ENGINEERING

sponsored by K-20, K-15, K-16, K-10
Jointly sponsored by None

Chair: **KWANG T. YANG**, U. of Notre Dame
Co-Chair: **CRISTINA H. AMON**, Carnegie Mellon University

Continued

SUNDAY *(continued)*

Co-Chair: **ROOP L. MAHAJAN**, U. of Colorado

Co-Chair: **LARRY W. SWANSON**, Heat Transfer Research, Inc

Simulation of a Range of Thermal Systems by Artificial Neural Networks—J. WARD, **U. of Glamorgan,** S. J. WILCOX, **U of Glamorgan,** O. H. TAN, **U of Glamorgan,** C. K. TAN, **U of Glamorgan,** R. . PAYNE, **U of Glamorgan,** D. R. GARWOOD, **U of Glamorgan**

Using Artificial Neural Networks to Develop a Predictive Method from Complex Experimental Heat Transfer Data—MATTHEW D. KELLEHER, **Naval Post Graduate School ,** THOMAS J. CRONLEY, **Naval Postgraduate School,** K.T. YANG, **University of Notre Dame,** MIHIR . SEN, **University of Notre Dame**

Mechanically Aspirated Solar Radiation Shields: A CFD and Neural Network Design Analysis—ROOP L. MAHAJAN, **U. of Colorado,** BRANDON M. FICHERA, **U. of Colorado,** TOM W. HORST, **NCAR**

Tuning of Membership Functions in a Fuzzy Rule Set for Controlling Convergence of Laminar CFD Solutions—ZORAN . DRAGOJLOVIC, **Applied Materials Inc,** DEBORAH A. KAMINSKI, **Rensselaer Polytechnic Institute,** JUNTAEK . RYOO, **Rensselaer Polytechnic Institute**

ANN based Module for the Prediction of Foundation Heat Transfer from Basements—MUSTAFA . SALEHI, **U. of Colorado,** MONCEF . KRARTI, **University of Colorado**

FRIDAY, 2:00 PM

HT-16B: VISUALIZATION AND IMAGING IN BIOTRANSPORT

sponsored by K-17 Heat and Mass Transfer in Biotechnology

Jointly sponsored by Bioengineering Division

Chair: **EDUARDO G. MOROS**, Washington University School of Medicine

Co-Chair: **CHARLES Y. LEE**, University of North Carolina-Charlotte

Measurement of Specific Heat of Biological Tissue Using IR Imaging and Spectroscopy—JOSHUA C. ABEL, **Purdue University,** S. S. KRISHNAN, **Purdue University,** LISA X. XU, **Purdue University,** JAY P. GORE, **Purdue University**

Numerical Model Study of the Field of View and Temporal Response of the Infrared Sense Organ in Crotaline Pit Vipers—JOHN A. PIERCE, **University of Texas-Austin,** ANKE . SCHMITZ, **Rheinische Friederich-Wilhelms Unversitaet**

Flow Dynamics During Machine Perfusion Preservation of Livers—SAURIN P. PUROHIT, **University of North Carolina-Charlotte,** JOSHUA . NELSON, **University of North Carolina-Charlotte,** JIAN X. ZHANG, **University of North Carolina-Charlotte,** MARK G. CLEMENS, **University of North Carolina-Charlotte,** CHARLES Y. LEE, **University of North Carolina-Charlotte**

Preliminary Study of Vascular Endothelial Ca2+ Response to Elevated Temperature—AARON . SCHEN, **Purdue University,** BAOGUO . CHEN, **Purdue University,** LISA X. XU, **Purdue University**

Portable Fluorometry for Kinetics Applications—MURUGESAN . VENKATAPATHI, **University of North Carolina-Charlotte,** CHARLES Y. LEE, **University of North Carolina-Charlotte**

THURSDAY, 5:30 PM

HT-12DI: HEAT PIPES AND MULTIPHASE HEAT TRANSFER IN ELECTRONIC SYSTEMS

sponsored by K-16

Jointly sponsored by none

Chair: **MARK . NORTH**, Thermacore

Co-Chair: **ELLIOTT . SHORT**, Raytheon

Experimental Demonstration of Heat Pipe/Two-Phase Flow Systems for Vehicle Passenger Cabin Cooling—TOM . THOENSEN, **National Renewable Energy Lab,** TERRY J. HENDRICKS, **National Renewable Energy Lab**

Effect of Condenser Location and Tubing Length on the Performance of a Compact Two-Phase Thermosyphon—LANG . YUAN, **University of Maryland,** YOGENDRA K. JOSHI, **Univ of Maryland,** WATARU . NAKAYAMA, **Univ of Maryland**

The Effect of Sink Temperature on a Capillary Pumped Loop System Employing a Shell and Tube Condenser—C R. HERRON, **US Naval Academy,** M . CERZA, **US Naval Academy,** M J. HARPER, **US Naval Academy**

Capillary Pumped Loop for Electronics Cooling—C P. GRIGOROPOULOS, **Univ of California,** JAEWON . CHUNG, **University of California,** Y . SHIN, **Univ of California,** R . GRIEF, **Univ of California**

Influence of Diameter and Height of Evaporators on the Boiling Heat Transfer in a Closed Advanced Two-Phase Thermosyphon Loop—RAHMATOLLAH . KHODABANDEH, **Royal Institute of Technology,** BJORN . PALM, **Royal Institute of Technology**

FRIDAY, 3:45 PM

HT-17F: FUTURE RESEARCH NEEDS IN CONTACT CONDUCTANCE HEAT TRANSFER

sponsored by Heat Transfer Division

Jointly sponsored by None

Chair : **PATRICK E. PHELAN**, Arizona State University

Co-Chair: **EGIDIO E. MAROTTA**, IBM

Continued