

The International Information Center for Multiphase Flow

NEWSLETTER

No.20

May 2003

The Japanese Society for Multiphase Flow

The Eighth International Temperature Symposium October 21-28, 2002, Chicago, IL, USA

by Dean Ripple

Since 1919, approximately once every 10 years, the International Temperature Symposia have provided a forum for the presentation and publication of work related to the measurement and control of temperature, with topics ranging from fundamental research on temperature scales to practical measurement or control solutions in a variety of fields. Continuing a tradition of joint sponsorship between the National Institute of Standards and Technology (NIST) and professional societies, the 2002 Symposium was cosponsored by NIST and the Instrumentation, Systems, and Automation Society (ISA). Organized in conjunction with ISA Expo 2002, a comprehensive exposition of advanced measurement and control technology, the 8th International Temperature Symposium was held in Chicago, from October 21 to 24, 2002. Over 210 presentations were delivered by scientists from 32 countries on five continents.

Highlighting the importance of interaction between the industry, standards development, and basic research, Hrach Semerjian of NIST delivered the Key-note Address on "Temperature Metrology and Its Impact on Industry."

Participants celebrated at an evening banquet at Harry Caray's Restaurant. Past editor-in-chief Jim Schooley delivered an after-dinner speech on "The End of Classical Gas Thermometry," in which he conveyed the challenges and triumphs of gas thermometry, along

with numerous personal anecdotes, with characteristic intelligence and wit.

The eighty years since the first Temperature Symposium have seen an increasing maturity in our abilities to both measure and control temperature in a wide variety of environments. What then is new in thermometry? Here is a sample from the Symposium, whose Proceedings are to be published as Volume Seven of *Temperature: Its Measurement and Control in Science and Industry* by the American Institute of Physics:

- Studies of the uncertainties in calibration and use of a wide variety of thermometer types,
- Novel thermometers, based on such techniques as fiber optics or miniature wireless circuits,
- Development and characterization of thermocouple and resistance thermometers for high-temperature applications,
- Commercialization of fixed-point apparatus,
- Development of high-temperature eutectic fixed points, for application to high-temperature radiation thermometry,
- Development and characterization of ever more sophisticated radiation thermometers and sources,
- Theoretical and experimental studies of the uncertainties of and instrumental corrections for radiation thermometers,

To Join ICeM:

Everybody, who is interested in "multiphase flow", can be a member of ICeM. You are welcome to join ICeM. Please contact one of the following to register as an ICeM member.

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- Careful measurements of the deviations of the present temperature scales from thermodynamic temperature,
- Comparisons of the realizations of temperature scales around the world, to establish the equivalence of temperature calibrations around the world in support of international trade,
- Descriptions of a number of realizations of the now-mature International Temperature Scale of 1990,
- Implementation of the new ultra-low temperature scale, the Provisional Low-Temperature Scale of 2000,
- The measurement of thermophysical properties at very high temperatures, and
- Applications in the semiconductor and metal processing industries, where temperature is critical for control of material properties.

The seven volumes of *Temperature: Its Measurement and Control in Science and Industry* offer a com-

prehensive education in the art of thermometry, and many of the topics covered can be found in no other publication. Publishing the Proceedings as hardbound volumes, with full Subject and Author Indexes, further adds to the archival character of this series. To continue this tradition, the papers of the Symposium were treated much like submissions to a scientific journal. Each paper was reviewed by two peers and carefully edited for grammar and consistent notation.

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Report of the 6th ASME-JSME Thermal Engineering Joint Conference (AJTEC-2003)

March 16-20, 2003, Hawaii, USA

by Shigefumi Nishio

The 6th ASME-JSME Thermal Engineering Joint Conference (AJTEC-2003) was held on March 16 to 20, 2003, in Hawaii Island, Hawaii. The American Society of Mechanical Engineers (ASME) and the Japan Society of Mechanical Engineers (JSME) have co-developed a successful series of joint conferences on thermal engineering at four-yearly intervals. The previous conferences in this series were held in: Honolulu, Hawaii (1983 and 1987); Reno, Nevada (1991); Maui, Hawaii (1995); and San Diego, California (1999).

The 21st century may be symbolized by the phrase of "integration and collaboration." In the new century, thermal engineers should make continued efforts to attain a better understanding of fundamental phenomena in thermal and energy systems. At the same time, we must increase our efforts to integrate thermal engineering in more complex systems involving other disciplines, and broaden our perspective to include an ever-widening range of time scales (from ultra rapid to long term phenomena) and length scales (from nanoscale to global). Such efforts require our will to challenge new technologies and collaborate with people working in other disciplines. The 21st century is welcoming such directions because the new century is facing some issues which can only be overcome by collaboration.

To provide a forum of for the interchange of such new ideas and the presentation of the latest work in the field, the conference covered the following fundamental and applied topics in thermal engineering.

- Thermal Engineering in Topical Areas; Heat transfer Transfer and Transport Phenomena in Micro/

Nanoscale Systems, Heat and Mass Transfer Issues in Biotechnology, Thermal Engineering in Electronic Equipment and Information Technology, Thermal Engineering in New Energy Systems, Thermal Aspects of Environmental Engineering and Technology, Thermal Engineering in Manufacturing, Material Processing and Recycling

- Thermal Engineering in Mechanical and Energy Systems; Energy Systems and Equipment, Combustion Systems, Thermal Engineering in Cryogenic Systems, Thermal Engineering in Space Systems, Heat Transfer Equipment and Thermal Devices
- Fundamentals in Thermal Engineering; Thermodynamics and Thermal Properties, Heat Conduction, Thermal Radiation, Convective Heat and Mass Transfer, Turbulent Phenomena, Heat Transfer and Transport Phenomena in Multiphase Systems, Fire and Combustion Phenomena, Measurement and Diagnostics/Advances in Experimental Techniques, Computational Heat Transfer/Inverse Analysis and Design in Thermal Systems

Throughout the conference, the following eight keynote papers and 376 general papers (118 from US, 189 from Japan, and 69 from other countries) were presented:

- J.R. Howell (The Use of Inverse Methods for the Design and Control of Radiant Sources)
- P. Ayyaswamy (Three-dimensional Bone-like Tissue Generation in Rotating-wall Bioreactors)
- F. Issacci (Thermal Management and Transport Phenomena in Fuel Cell Systems – -Practical Is-

sues)

- A. Majumdar (Nanoscale Heat and Mass Transfer Issues in Energy Conversion and Biotechnology)
- S. Hirasawa (Knowledge Database of Thermal Control in Manufacturing (Including Micro-Manufacturing))
- M. Katsuki (Recent Advances in Combustion Technology for Heating Processes)
- M. Akai (Towards a Deep Reduction of GHG Emissions beyond Kyoto Target)
- H. Honda (Advances in Enhanced Boiling Heat Transfer from Electronic Components by Use)

JSME played was the lead society of the conferences in this series for the first time and the success of this conference was supported by voluntary efforts by the members of the organizing committee. The total of attendees was 385 (112 from US, 229 from Japan, 44 from other countries). We trust that the technical content of this conference brought about the new era with

“integration and collaboration” to thermal engineering and we look forward to the continued success of the ASME-JSME Thermal Engineering Joint Conference.

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**Sixth ASME/JSME Thermal Engineering Joint Conference
AJTEC 2003
March 16 to 20, 2003, Hawaii, USA**

by Yutaka Abe

The 6th ASME-JSME Thermal Engineering Joint Conference (AJTEC2003) was held in Hawaii Island, Hawaii in USA. The conference was held at Hapuna Beach Prince Hotel, Kohala Coast, Hawaii Island which has the most beautiful beach in USA.

The conference has been co-developed by the American Society of Mechanical Engineers (ASME) and the Japan Society of Mechanical Engineers (JSME) as a series of joint conferences on thermal engineering at four-yearly intervals. The previous conferences were held in: Honolulu, Hawaii (1983 and 1987); Reno, Nevada (1991); Maui, Hawaii (1995); and San Diego, California (1999). AJTEC2003 was held again in Hawaii Island, Hawaii. JSME was the lead society of the AJTEC2003 in this series for the first time.

The conference is well organized and is completely succeed by the delightful planning and execution. The conference Co-Chair in JSME side is Professor Shigefumi Nishio of the University of Tokyo and the conference Co-Chair in ASME side is Professor Adrienne Lavine of University of California, Los Angeles. The success of this conference was supported by voluntary efforts by the members of the organizing committee, especially Prof. Satoh as the Secretary General of the conference and the CD-ROM committee.

Throughout the conference, following eight keynote papers were presented.

(ASME Keynote Papers):

- J.R. Howell, “The Use of Inverse Methods for the Design and Control of Radiant Sources”
- P. Ayyaswamy, “Three-dimensional Bone-like Tissue

Generation in Rotating-wall Bioreactors”

- F. Issacchi, “Thermal Management and Transport Phenomena in Fuel Cell Systems Practical Issues”
- Majumdar, “Nanoscale Heat and Mass Transfer Issues in Energy Conversion and Biotechnology”

(JSME Keynote Papers):

- S. Hirasawa, “Knowledge Database of Thermal Control in Manufacturing (Including Micro-Manufacturing)”
- M. Katsuki, “Recent Advances in Combustion Technology for Heating Processes”
- M. Akai, “Towards a Deep Reduction of GHG Emissions beyond Kyoto Target”
- H. Honda “Advances in Enhanced Boiling Heat Transfer from Electronic Components by Use”

The topical areas of the conference were as follows.

It can be judged that the technical content of this conference will bring about the new era with integration and collaboration to thermal engineering.

(Thermal Engineering in Topical Areas):

- Heat Transfer and Transport Phenomena in Micro/Nanoscale Systems
- Heat and Mass Transfer Issues in Biotechnology
- Thermal Engineering in Electronic Equipment and Information Technology
- Thermal Engineering in New Energy Systems
- Thermal Aspects of Environmental Engineering and Technology
- Thermal Engineering in Manufacturing, Material Processing and Recycling

(Thermal Engineering in Mechanical and Energy Sys-

tems):

- Energy Systems and Equipment
- Combustion Systems
- Thermal Engineering in Cryogenic Systems
- Thermal Engineering in Space Systems
- Heat Transfer Equipment and Thermal Devices

(Fundamentals in Thermal Engineering):

- Thermodynamics and Thermal Properties
- Heat Conduction
- Thermal Radiation
- Convective Heat and Mass Transfer
- Turbulent Phenomena
- Heat Transfer and Transport Phenomena in Multiphase Systems
- Fire and Combustion Phenomena
- Measurement and Diagnostics/Advances in Experimental Techniques

(Computational Heat Transfer/Inverse Analysis and

Design in Thermal Systems)

In the conference, much efforts were paid to integrate thermal engineering in more complex systems involving other disciplines, and broaden the perspective to include an ever-widening range of time scales (from ultra rapid to long term phenomena) and length scales (from nanoscale to global). And the conference provide a forum for the interchange of such new ideas and the presentation of the latest work in the field, the conference covered the fundamental and applied topics in thermal engineering.

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**The Eurotherm Seminar No72: THERMODYNAMICS,
 HEAT and MASS TRANSFER of REFRIGERATION MACHINES and HEAT PUMPS
 March 31-April 2, 2003, Valencia, Spain**

by José M. Corberán

Contributions in any fundamental or applied topic concerned with the main subject of the Seminar were invited to participate. Close to 90 abstracts were submitted to the Seminar. Finally, 70 peer reviewed papers were accepted and are included in the book of proceedings which was also published on CD format. They represent an excellent overview of the state of the art of the field in general, and a good sample of the new advances and recent developments on it.

Finally, 60 papers were presented during the three days of duration of the Seminar, and around 90 experts from all over the world, but mainly from Europe, attended it: Algeria, Austria, Belgium, Brazil, Denmark, Finland, France, Germany, Ireland, Israel, Italy, Japan, Mexico, Norway, Poland, Portugal, Russia, Spain, Sweden, United Kingdom.

The Seminar program was organised along 4 main chapters/sessions: Heat and mass transfer in refrigeration equipment, Refrigerant properties, System analysis and modelling, and Innovative cycles and systems. The contents are summarised in the following:

- **Heat and mass transfer in refrigeration equipment** (19 papers)
 - **External Air** (3) Effect of the non-uniformity of the air flow through a plate and fin evaporator; Construction and test of an innovative evaporative cooler with ceramic tubes for A/C air cooling; A detailed CFD study about air flow through tube and fin geometries.
 - **Boiling and evaporators** (11) New data about heat transfer coefficients and pressure drop were pre-

sented for different refrigerants and situations, especially for enhanced tubes and plate heat exchangers.

- **Condensation** (1) Electrohydrodynamical enhancement of condensation.
- **Absorption** (4) Assessment of an intermittent solar solid absorption (SrCl₂/NH₃) system with a rotary pipe for cooling purposes in desert areas; Model of absorption of solvable gas growing from an orifice in the absorbent; Spray absorbers (LiNO₃-NH₃); Falling film desorber performance with reflux cooler.
- **Refrigerant properties** (3 papers)
 - New thermophysical properties data of some refrigerants, mixtures of refrigerants and mixture with oil.
- **System analysis and modelling** (22 papers)
 - **2nd law analysis of cycles** (3) Exergy efficiency analysis of air-refrigerating systems; General thermodynamic efficiency analysis with the numbers of irreversibility of the different processes involved; Three reservoirs refrigerator exergetic profit cost analysis.
 - **System modelling** (5) Several models of refrigeration equipment or components.
 - **Domestic refrigerators** (1) Air side heat transfer coefficient of the plate type evaporator of a domestic refrigerator.
 - **Ice and cold storage** (5) Different and innovative solutions for ice production and storage.
 - **Heat pumps** (3) A reversible air to water heat pump of commercial size; Year operation of a domestic

single house heat pump heating system; Advantages and disadvantages of different refrigerants for heat-pump application.

- **Large and complex systems** (4) Temperature Control of multi-zone refrigeration systems; A installation of concentration by evaporation with mechanical vapour recompression; High efficiency design of large direct expansion systems for supermarkets; Analysis of the importance of the heating mode for A/C units of fresh food transportation containers.
- **A/C systems** (1) On-off conventional operation of a room A/C system vs. compressor variable speed.
- **Innovative cycles and systems** (16 papers)
 - **CO₂** (5) Importance of high gas pressure on attainable COP; CO₂ heat transfer characteristics at supercritical pressure of pure CO₂ and with oil; Heat and mass transfer in a CO₂ refrigeration plants; Thermodynamic analysis of CO₂ blends with R41, R23 and R32 for cascade refrigeration cycles.
 - **Absorption, Waste heat recovery and heat transformer** (6) Directly coupled gas chiller/micro turbine combined system with waste heat recovery; Cooling system using geothermal energy recovery from hot water and solar energy; Absorption refrigeration cycle driven by low temperature heat sources; Best cycle and configuration for Ammonia absorption commercial machines with both cooling and heating capabilities; Absorption/Compression heat pump operating with organic fluid mixtures for industrial waste heat recovery; Adequate work-

ing mixtures with miscibility gap at low temperature for absorption heat transformers.

- **Others** (5) Liquid desiccant membrane dehumidification cycle for air conditioning; Novel barometric desalination plant; Steam jet ice storage system; Two-phase thermosiphon loop, Possible natural working fluids for solar-driven ejector refrigerator systems.

The final program, list of attendants, instructions to order the book of proceedings, and a gallery of photographs taken during the event, can be found at the following web site:

http://www.imst.upv.es/en/eu_seminar.htm

This Seminar is organised by EURO THERM every four years. The Refrigeration Division of the Royal Institute of Technology of Stockholm, Sweden, kindly expressed their willing to organise the next 3rd Seminar on Thermodynamics, Heat and Mass Transfer of Refrigeration Machines and Heat Pumps.

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First International Conference on Microchannels and Minichannels Report April 24-25, 2003, New York, USA

by Hisashi UMEKAWA

First International Conference on Microchannels and Minichannels was held on April 24 to 25, 2003, in Rochester, New York, USA. The conference chair was Satish G Kandlikar (USA), and the conference co-chairs were Gian Piero Celata (Italy), Shigefumi Nishio (Japan), Peter Stephan (Germany) and Bernard Thonon (France).

The interest in these channels has been spurred by needs in a number of applications during last five years. This was well demonstrated by the fact that 125 papers were submitted, and 184 investigators participated into this conference in spite of SARS and postwar condition. The number of the head authors of each nationality is as follows; US•@42, Korea 13, China 11, Japan 11, Germany 9, France 8, Canada 4, Italy 4, Taiwan4, Hon-Kong 3, U.K.3, Norway 2, Russia 2, Israel 1, Malaysia 1, Poland 1 and Sweden 1. Unfortunately, most of Chinese participants could not join to the conference owing to the visa problem, but the number of

the participants among nationalities was kept even in a good balance. And as an indication of high interest in industrial applications, participants from many fields were seen.

The subjects classified by the conference committee are as follows: Boiling 25, Condensation 6, Fabrication 4, Fluidics 18, Heat Exchanger 14, Biological 4, Single Phase 19, Single Phase liquid 6, Single Phase numerical studies 7, Tribology 1 and Two Phase 17. These papers were presented in three parallel sessions. As the conclusion of this conference, a panel session was held at the last day, and the status and problem in this field were pointed out. Recently, so many Mini-Microchannel equipments were produced. Then so many experimental data were presented in this conference, but also a variety of theories were discussed. This does not mean that some new theory and experimental methods were presented, but most of the results were still based on the common knowledge in ordinary meth-

ods and fact in Macrochannels. In this sense, the really new knowledge and approaches will be indispensable.

During this conference, Prof. Yasunobu Fujita and Prof. Masahiro Shoji were awarded from ASME Heat Transfer Chapter Rochester Section for their valuable contributions in heat transfer and celebrations of their 60th birthday.

The 2nd International Conference on Microchannels and Minichannels will be held in Rochester in June 2004. The detail information of the next conference will be found in web site in late June 2003. (www.asme.org/events/micromini). At this moment, tentative informa-

tion of the important dates are as follows:

Abstract: December 1, 2003

Complete paper due for review: January 12, 2004

Paper acceptance notification: February 23, 2004

Final paper due: March 15, 2004

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Future Meetings

Following list includes Conference Name, Place, Date and Contact.

Eleventh International Conference on Computational Methods and Experimental Measurements

Halkidiki, Greece, May 12-14, 2003

Dr. Gaye McKeogh

Conference Manager

WESSEX INSTITUTE OF TECHNOLOGY

Ashurst Lodge, Ashurst

Southampton, SO40 7AA

Tel: 44 (0) 238 029 3223

Fax: 44 (0) 238 029 2853

Email: gmckeogh@wessex.ac.uk

<http://www.wessex.ac.uk/conferences/2003/cmcm03/>

The 7th Asian Symposium on Visualization (7ASV)

National University of Singapore, Singapore, May 26-30, 2003

7th ASV Secretariat

c/o Integrated Meetings Specialist Pte Ltd

1122A Serangoon Road

Singapore 328206

Tel: (65) 62955 790

Fax: (65) 62955 792

Email: 7ASV@inmeet.com.sg

<http://www.eng.nus.edu.sg/PACentre/7ASV/>

ANS Annual Mtg.

San Diego, USA, June 1-5, 2003

<http://www.ans.org/meetings/annual/>

The Third International Mediterranean Combustion Symposium

Marrakech, MOROCCO, June 8-13, 2003

Dr. Federico Beretta

Istituto di Ricerche sulla Combustione

Consiglio Nazionale delle Ricerche Napoli - ITALY

E-mail: beretta@irc.na.cnr.it

Prof. Nevin Selcuk

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Prof. Mohy S. Mansour

Mechanical Engineering Department

The American University in Cairo Cairo - EGYPT

E-mail: mansourm@aucegypt.edu

<http://www.ichmt.org/Mcs-03>

Second International Conference on Fluid Structure Interaction

Cadiz, Spain, June 24-26, 2003

Dr. Rachel Green

Conference Secretariat

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Southampton, SO40 7AA

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Fax: 44 (0) 238 029 2853

Email: rgreen@wessex.ac.uk

<http://www.wessex.ac.uk/conferences/2003/fluidstructure03/>

Turbulence and Shear Flow Phenomena-2003 (TSFP-3)

Sendai, Japan, June 25-27, 2003

Prof. Toshio Miyauchi

Tokyo Institute of Technology

Email: TSFP3@navier.mes.titech.ac.jp

<http://www.tsfp3.mes.titech.ac.jp>

14th Int. Symp. on Transport Phenomena (ISTP-14)

Bali, Indonesia, July 6-10, 2003

Dr. Yanuar

ISTP-14 Secretariat

Jurusan Teknik Mesin, Fakultas Teknik

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<http://www.eng.ui.ac.id/istp/>

4th ASME/JSME Joint Fluids Engineering Conference

Hawaii, USA, July 6-10, 2003

Prof. Yutaka Tsuji

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<http://www.asme.org/divisions/fed/events/SymposiumFinalCall.pdf>

Microscale heat transfer 2

Reims, France, July 8-10, 2003

Prof. N. Trannoy

Eurotherm Seminar 75

Université de Reims, UTAP – LEO,

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F 51687 Reims Cedex 2, France

Tel: (33) 3 26913392

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<http://www.univ-reims.fr/eurotherm75>

IEEEES-1 The First International Exergy, Energy And Environment Symposium

IZMIR, TURKEY, July 13-17, 2003

Prof. Ibrahim Dincer

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King Fahd University of Petroleum and Minerals (KFUPM)

Box 127, Dhahran 31261, Saudi Arabia

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E-mail: idincer@kfupm.edu.sa

<http://www.geocities.com/ieees03>

2003 Summer ASME Heat Transfer Conference

Rio All Suites Hotel & Casino

Las Vegas, Nevada, USA, July 21-23, 2003

Dr. Edison Aulestia

Manager, Engineering Programs

ASME International

Three Park Avenue, MS 22W3

New York, NY 10016

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Email: aulestiae@asme.org

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<http://www.asmeconferences.org/ht03/>

CallForPapers.cfm

7th Triennial International Symposium on Fluid Control, Measurement and Visualization (FLUCOME'03)

Sorrento, Italy, July 21-24, 2003

Prof. Giovanni M. Carlomagno

Facoltà di Ingegneria DETEC

P.le Tecchio, 80, 80125 Napoli - ITALY

Tel (39) 081 7682178

Fax (39) 081 2390364

E-mail: flucome@unina.it

<http://www.flucome.unina.it>

6th International Conference on Gas-Liquid and Gas-Liquid-Solid Reactor Engineering

University of British Columbia, Vancouver, Canada, August 17-20, 2003

Dr. Norman Epstein, GLS-6 Chair

Department of Chemical & Biological Engineering

The University of British Columbia

2216 Main Mall

Vancouver, B.C., Canada, V6T 1Z4

Tel: 1 604 822-2815

Fax: 1 604 822-6003

E-mail: helsa@chml.ubc.ca

<http://www.conferences.ubc.ca/events/gls6/>

Transient Convective Heat and Mass Transfer in Single and Two-phase Flows

Cesme, Turkey, August 17-22, 2003

Professor Faruk Arinc

ICHMT Secretary General

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E-mail: arinc@metu.edu.tr
<http://www.ichmt.org/Trcon-03>

International Conference on Global Environment and Advanced Nuclear Power Plants (GENES4/ANP2003)

Kyoto Research Park, Kyoto, JAPAN, September 15-19, 2003

Email: genesanp@utnl.jp
<http://genes4-anp2003.nuclear.jp>

Third European-Japanese Two-Phase Flow Group Meeting

Certosa di Pontignano, Pontignano - 53010 Vagliagli, Italy, September 21-27, 2003

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International Conference on Supercomputing in Nuclear Applications (SNA 2003)

Paris, France, September 22-24, 2003

Dr. René Pellat, Haut Commissaire CEA

Email: sna-2003@cea.fr

<http://sna-2003.cea.fr/>

Tenth International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-10)

Seoul, Korea, October 5-9, 2003

Prof. Won-Pil Baek

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<http://www.nureth10.org>

4th International Symposium on Turbulence, Heat and Mass Transfer

Antalya, Turkey, October 12-17, 2003

Prof. K. Hanjalic, Chairman

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<http://www.ichmt.org/Thmt-03>

Second International Conference on Computational Methods in Multiphase Flow

Santa Fe, New Mexico, USA, November 3-5, 2003

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Conference Secretariat

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Fax: 44 (0) 238 029 2853

Email: shobbs@wessex.ac.uk

<http://www.wessex.ac.uk/conferences/2003/multiphase03/>

International Conference on Power Engineering - 03 (ICOPE-03)

International Conference Center Kobe, Port-

Island, Kobe, Japan, November 9-13, 2003

Prof. Terushige Fujii

Kobe University

USA: Prof. David Y.S. Lou

Prof. J.K. Ludwickson

Department of Mechanical Engineering, University of Nebraska Lincoln

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Japan and others: Prof. Mamoru Ozawa

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<http://www.jsme.or.jp/pes/ICOPE-03>

ANS/ENS International Winter Meeting

New Orleans, USA, November 16-20, 2003

<http://www.ans.org/meetings/>

AIChE 2003 Annual Meeting

San Francisco, CA, USA, November 16-21, 2003

Prof. Michael F. Malone

MPC-Meeting Program Chair

University of Massachusetts, Amherst

Email: aiche03@ecs.umass.edu

<http://www.aiche.org/conferences/>

International Symposium on Micro-Mechanical Engineering (ISMME 2003)

Tsuchiura, Ibaraki, Japan, December 1-2, 2003
Tsukuba, Ibaraki, Japan, December 3, 2003
Dr. Shigeaki Hirasawa
Mechanical Engineering Research Laboratory,
Hitachi, Ltd.
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<http://www.jsme.or.jp/tes/ISMME.html>

Third International Conference on Computational Fluid Dynamics in the Minerals & Process Industries

Melbourne, AUSTRALIA, December 10-12, 2003
Dr. Phil Schwarz
Science Advisor - Process Modelling &
Development
Coordinator - CFD Team
CSIRO - Minerals
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Email: phil.schwarz@csiro.au
<http://www.cfd.com.au/cfdconf>

The 1st International Symposium on Micro & Nano Technology (ISMNT-1)

Honolulu, Hawaii, USA, March 14-17, 2004
Dr. Makoto Inoue
President
Komatsu Electronics Inc.
E-mail: makoto_inoue@komatsu.co.jp
<http://www.ismnt.com>

CHT-04 Advances in Computational Heat Transfer

Kirkenes, Norway, April 1-6, 2004
Prof. Graham de Vahl Davis
Prof. Eddie Leonardi
CFD Research Laboratory,
School of Mech. & Manuf. Engineering,
The University of NSW, Sydney, NSW, Australia
2052
Tel: (+61 2) 9385 4099 / 4254
Fax: (+61 2) 9663 1222
Email: cht04@cfm.mech.unsw.edu.au

CHT-04: International Symposium on Advances in Computational Heat Transfer

Kirkenes and Bergen, Norway, April 19-24, 2004
Professors Graham de Vahl Davis and Eddie Leonardi
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The University of New South Wales
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Fax: +61 2 9663 1222

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5th International Conference on Multiphase Flow (ICMF-2004)

Yokohama Pacifico Conference Center,
Yokohama, Japan, May 31- June 3, 2004
Conference Chair
Prof. Y. Matsumoto
University of Tokyo
Email: icmf@jsmf.gr.jp
<http://www.jsmf.gr.jp/icmf/>

RAD-04: International Symposium on Radiative Transfer

Istanbul, Turkey, June 20-25, 2004
Professor M. Pýnar Mengüç
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<http://www.ichmt.org/Rad-04>

3rd International Symposium on Two-Phase Flow Modelling and Experimentation (Pisa'04)

Pisa, Italy,
September 22- 24, 2004
Symposium Chairman:
Prof. Gian Piero Celata
ENEA Casaccia
Email: celata@casaccia.enea.it
Symposium Scientific Secretary:
Prof. Paolo Di Marco
University of Pisa
Email: p.dimarco@ing.unipi.it
<http://www.ing.unipi.it/pisa04/>

The ILASS (Institute for Liquid Atomisation and Spray Systems) Europe meeting

Nottingham, UK, September 2004
Prof. Barry Azzopardi
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AIChE 2004 Annual Meeting

Austin, TX, USA, November 7-12, 2004
<http://www.aiche.org/conferences/>

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ICMF-2004

www.jsmf.gr.jp/icmf/

5th International Conference on Multiphase Flow

Announcement and Call for Papers



May 31–June 3, 2004

**Yokohama Pacifico Conference Center,
JAPAN**

Website: www.pacifico.co.jp/index-e.htm

International Scientific Committee

(Only Chairpersons are listed)

Prof. HISHIDA, K. (Chair) Japan
 Prof. PROSPERETTI, A. (Vice chair) USA
 Prof. YADIGAROGU, G. (Vice chair) Switzerland

Local Organizing Committee

Matsumoto, Y. (Chair), Hishida, K. (Vice chair), Takemura, F. (Secretary general), Tomiyama, A. (Scientific secretary), Mishima, K., Ozawa, M., Hagiwara, Y., Takamasa, T., Tsuchiya, K., Hosokawa, S., Takagi, S.

Contact address: E-mail: icmf@jsmf.gr.jp

Venue

The Conference will be held in the PACIFIC CONVENTION PLAZA YOKOHAMA Conference Center, Japan. Yokohama is an international port city located in the Metropolitan Area of Japan, which was opened to the foreign countries in 1859. Since then, this city has been keeping an international, exotic and entrepreneurial atmosphere. PACIFICO YOKOHAMA is a part of the newly developed water front area in Yokohama, known as "Minato Mirai 21" or "Future Port 21."

ICMF-2004
5th International Conference on
Multiphase Flow

Website: www.jsmf.gr.jp/icmf/

Scope

This Conference, ICMF-2004, is the 5th in a series of International Conferences on Multiphase Flow: the first one was held in TSUKUBA, Japan in 1991; the second ICMF'95 in KYOTO, Japan in 1995; the third ICMF'98 in LYON, France in 1998; and the 4th ICMF-2001 in NEW ORLEANS, USA in 2001. The aim of these conferences is to bring together researchers from all countries and experts from all disciplines and applications involving multiphase flow in promoting the exchange of new ideas, results and techniques.

The scope covered by the Conference will be divided into five major areas:

- A. *Constituent Elements of Multiphase Flows*
- B. *Adiabatic Multiphase Flows*
- C. *Diabatic Multiphase Flows*
- D. *Advanced Models and Instrumentations*
- E. *Applications*

We hope that this Conference will facilitate and encourage communications between all those working on multiphase flows, especially towards new ideas and approaches in multiphase flow research.

Technical Program

The Program will consist of:

- 1) Four Plenary lectures,
- 2) Ten Keynote lectures for Scope A through E, and
- 3) Oral and poster presentations.

Presentation

The official language of the Conference will be English. Overhead projectors and multimedia projectors with PCs will be available for lectures and orals. Posters will be displayed on a board (details will be announced later in the website).

Registration

The registration fee covering the conference participation, conference proceedings, banquet and coffee breaks is 65,000 yens (on-site registration) or 55,000 yens (early registration). For students, it will be 30,000 yens (on-site registration) or 25,000 yens (early registration). Accommodation is NOT included. Specific information about accommodation will be available due course in the website.

Conference Proceedings

All accepted contributions will appear in the proceedings (in CD-ROM) of the Conference. The proceedings will be made available to participants during the registration at the Conference.

Contributions

Abstracts of the proposed contributions should be sent to the local organization, *via Web*, no later than September 1, 2003. An abstract should be on one A4 (or letter) page, including tables and figures if any, with two-column format given in the website and contain the title of the proposal and the name(s) of author(s).

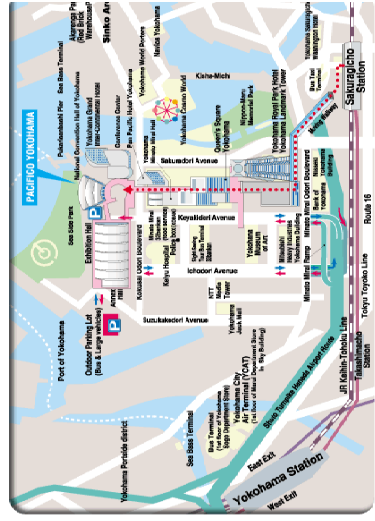
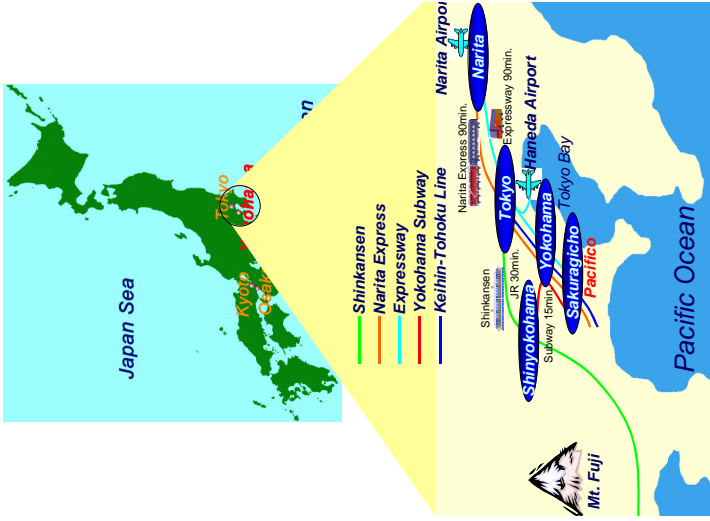
All contributors will be informed before November 1, 2003 whether their proposal was accepted, in Oral or Poster presentation, by the scientific committee. Further information on the preparation of full-length manuscripts for the Conference proceedings will also be provided to the contributors in November, 2003 on the website.

Deadlines

- September 1, 2003** Receipt of one-page abstracts
- November 1, 2003** Notification of acceptance
- March 1, 2004** Receipt of full-length manuscripts

Supporting Organization

The Japanese Society for Multiphase Flow (JSMF)



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