



The Information Center for Multiphase Flow

NEWSLETTER

No.5

October 1995

The Japan Society of Multiphase Flow

Report on the Second International Conference on Multiphase Flow ICMF'95-Kyoto

April 3-7, 1995, Kyoto, Japan

The Second International Conference on Multiphase Flow (ICMF'95) was held on April 3-7, 1995 in Kyoto, Japan under the auspices of the Japan Society of Multiphase Flow. The Conference was also supported by the Ministry of Transport, Japan, US Department of Energy (Office of Energy Department), National Science Foundation and EPRI, and co-sponsored by twenty two academic organizations or institutes including JSME, ASME, ANS, Atomic Energy Society of Japan, AIChE, The Society of Chemical Engineers, Japan, The German Society of Chemical Engineers, International Freight Pipeline Society, etc. The Conference was also supported financially by more than forty Japanese industries, research institutes and funding agencies.

The International Conference on Multiphase Flow (ICMF) had begun in 1991 in Tsukuba, Japan, following the establishment of the Japan Society of Multiphase Flow (JSMF) in 1987,

with the aim of encouraging information exchange in interdisciplinary ways between people working on all aspects of multiphase flows. Earlier, multiphase flow phenomena and their applications had been pursued in various academic disciplines with very different concepts, approaches and even terminology. The success of the First ICMF has shown worldwide interest in obtaining an understanding of various multiphase flow phenomena and problems in terms of a common language of multiphase flow. Thus, multiphase flow is now recognized as a general concept commonly understood among people. The ICMF'95 continued with the same successful format by further promoting this strategy as one of the premier international conferences in the field of multiphase flow. This Second ICMF also highlighted international technology-sharing in the fields of energy, environment and public health to create a brighter and sustainable future for

(This article is continued on the next page.)

To Join ICeM:

Everybody, who has an interest in "multiphase flow", can become a member of ICeM. ICeM welcomes his/her joining. Please contact either of the following to register in ICeM.

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ICMF'95-Kyoto

man and for all life in the next century. The Third ICMF (ICMF'98) is scheduled for Lyon, France in 1998.

The present Conference was attended by about four hundreds participants from twenty eight countries and over three hundreds twenty papers were presented either orally or in poster sessions. These numbers represent an important increase from those for the First Conference in 1991.

The conference scope included *experiments, modeling, multiphase CFD and numerics, instrumentation & visualization* both for basic studies and for industrial/environmental applications, covering the following topics:

- particle/bubble/droplet dynamics
- particle-wall interaction
- particle/bubble-turbulence interaction
- interfacial/liquid film/separated flow
- spray and combustion
- pressure wave and high speed flow phenomena
- phase change, CHF, flooding, nuclear safety problems, etc.
- fluidized beds
- flow patterns and multiphase flow in various geometries (internal flow, tube bundle, porous media with and without heat transfer)
- biofluids

The morning sessions started with plenary lectures given by international experts on five different topics. A list of the speakers for plenary lectures and 10 keynote lectures can be referred to the issue No.3 of ICMF Newsletter. In addition to these invited lectures and oral presentations, there were thirty minutes chairman's review for each poster session:

- G. Hetsroni: Bubble/Particle Problems
- M.Z. Podowski: Large Code
- J. Domnick: Instrumentation and Visualization
- B.J. Azzopardi: Flow Characteristics
- G.P. Celata: Phase Change
- T. Sakaguchi: Micro-Gravity
- M.C. Roco: Fluidized Beds
- R.J. Perkins: Industrial Application
- K. Bendiksen: Environment and Flow Patterns

In general, the Conference represented a composition of fine researches and development works as addressed in the Conference scope. It also represented, in my opinion, an impression of

- a rapid progress in multiphase CFD providing

more detailed understandings of fundamental phenomena not easily accessible by experiments,

- development of computer aided visualization techniques,
- better understanding of turbulence-related phenomena in multiphase flow,
- still limited in our knowledge of dynamics or transient behavior of interfaces both in theory and experiment,
- a wider application of multiphase flow phenomena.

The present Conference sponsored the Forum focusing on international technology sharing in the fields of energy, environment and health. Topics and invited speakers are as follows:

- The Threat of Emerging Diseases: International Cooperation for Prevention and Control by F.A. Murphy (University of California, Davis, USA)
- Global Climate Changes and Ecology by Yuriy A. Izrael (Russian Academy of Science, Russia)
- Nuclear Energy and Technology Transfer by K. Uematsu (OECD-NEA)
- A Bridge between Academia and Industry-Research Community- by M. Kawasaki (JRDC, Japan)

Hopefully, the scientific works of the Conference were fruitfully conducted by individual attendants and also by the members of the Conference Committees.

Finally, as the chairman of the present Conference, I hope that all the participants found their stay in Kyoto rewarding both personally and professionally. I look forward to meeting you again in Lyon in 1998 for beautiful dinner!

The four volume Conference Proceedings and its Supplement are still available on request. Selected papers from the ICMF'95 will soon appear from Elsevier Science Publishers. Those who want to purchase this volume may contact A. Serizawa.

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Report on the 1994 International Symposium on Heat and Mass Transfer in Chemical Process Industry Accidents September 15-16, 1994, Rome, Italy

Objective and scope

The purpose of the Symposium was to provide an opportunity for engineers and scientists belonging to engineering Companies, research organizations and regulatory bodies to assess the state of the art in models for heat and mass transfer phenomena relevant to accidents and their management in industrial plants. The focus was on physical phenomena of major importance during foreseeable accidents, also regarding their possible consequences, i.e. heat propagation in fires, irradiation, convection, clouds formation and mechanism of flashing or explosion, pressure peaks propagation and their effects, toxic substances diffusion, etc. All thermodynamics and transport phenomena affecting major accidents foreseeable for chemical process plants and chemical substances strong were considered the physical understanding of these phenomena, as well as experimental data on experienced situations, are necessary for the development of models to be used at the design stage or for the computation of foreseeable consequences of given or anticipated accidents. Particular attention was called towards chemical plants, fuel storage, industrial settlements for which high hazard for population may be devised in the case of accidents and which deserve "ad hoc" safety reports. Heat and mass transfer phenomena relevant to accidents prevention were also analyzed.

Main topics analyzed were:

Fundamentals

- heat and mass transfer in high-power fires (pool fires, jet fires) and in concentrated and vapor cloud explosions;
- in-vessel and breach-dependent transient thermohydraulics;
- runaway reactions in batch reactors;
- emergency pressure relief from chemical reactor runaway;
- handling of discharge from reactors and storage vessels;
- release, propagation and dispersion of clouds of vapours and toxic gases.

Applications

- criteria for prevention of high power fires; the influence on the design of extinguishing equipment;
- engineered safety features;
- utilization of passive and inherent safety to limit the hazard and the risk in industrial plants;
- prevention and control of effects from pressure waves due to explosion;

- safe storage and handling of high-hazard toxic materials.

Technical programme

The papers accepted for presentation were 43. They were grouped into technical sessions, as follows:

Technical session A:

Fires and Explosions: Models and Experimental Investigations.

Technical session B:

Heat and Mass Transfer in Chemical Reactions.

Technical session C:

Clouds Dispersion.

Technical session D:

Two-phase Flows - Safety and Relief Valves.

Technical session E:

Fires and Explosions: Accidents Analysis and Theoretical Investigations.

Technical session F:

Thermal-Hydraulic Aspects.

Two invited lectures were included in the programme, addressing two particularly relevant issues in the framework of heat and mass transfer in chemical process industry accidents:

- the first one regarded "Research and Development for Process Safety" and was presented by Mr A.J.J. Timmermans of the European Process Safety Center, UK;
- the second one regarded "Flixborough; Twenty Years Later. The lesson to be Learned" and was presented by Prof. Venart of the Department of Mechanical Engineering, and of the Fire Science Centre, University of New Brunswick CANADA.

Some 60 participants attended the Symposium, from 13 Countries. A discussion followed the presentation of papers, and two special panels were organized, with the view at stimulating discussion suggestions: the first one regarded the issue of the first invited lecture, and focused the demand and priorities in new research issues on heat and mass plants; the second one regarded the conclusions of the Symposium and suggestions for new initiatives aimed at improving the information flow on technical-scientific issues relevant for process plant safety.

The proceedings of the Symposium may be requested to

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Report on the International Conference on Convective Flow Boiling

April 30 - May 5, 1995, Banff, Canada

The purpose of the Conference was to examine state-of-science and recent developments in technology of flow boiling, i.e. boiling systems which are effective by convective flows. Applications include power generation systems, refrigeration systems, chemical processing operations, and environmental unit operations.

A total of 57 papers (including 5 keynote lectures) from 15 countries were presented in six sessions representing the following topical areas:

- *Boiling Inception and Subcooled Boiling
- *Industrial Applications and Developments
- *Saturated Convective Boiling
- *Critical Heat Flux and Transition-Film Boiling
- *Multicomponent Boiling
- *Special Systems and Effects

Among the specific topics treated in the technical sessions we may cite:

- nucleation and convective contribution in flow boiling;
- onset of nucleate boiling and subcooled flow boiling heat transfer in refrigerants;
- subcooled flow boiling CHF in small diameter channels, uniform and non-uniform heating, with and without twisted tapes, using water, refrigerants and binary mixtures;
- flow boiling in helicoidal tube and micro finned tubes using refrigerants;
- bubble detachment mechanisms and nucleation studies using high-speed movies;
- subcooled and saturated flow boiling heat transfer in binary mixtures, including the effect of the presence of oil.

Five very interesting keynote lectures have highlighted some specific research aspects of convective flow boiling.

Prof. F. Mayinger (Advanced Experimental Methods) gave the general features of few optical techniques, such as holography, holographic interferometry, and laser-induced fluorescence (LIF). Holographic techniques allow to obtain 3-D information on specific problems (sprays, bubble, drop, etc.), in addition to the evaluation of temperature fields and thermal gradients. LIF

technique provides information on the temperature distribution in a substance or on the concentration distribution in a mixture.

Prof. G.F. Hewitt in his lecture Phenomenological Issues in Forced Convective Boiling dealt with dryout (available annular flow CHF models have their weakness in droplet deposition and entrainment rate), nucleation and convective contribution in flow boiling heat transfer (postulating the existence of a secondary nucleation mechanism), computer fluid dynamics applied to convective flow boiling.

Dr. L.W. Swanson (Convective Boiling Applications in Shell-and-Tube Heat Exchangers) reviewed the state-of-the-art on heat transfer mechanisms and flow patterns in pure fluids and in mixtures for shell-and-tube heat exchangers, under different operating conditions.

Dr. L.E. Haseler (Boiling in Compact Heat Exchangers. Industrial Practice and Problems) reviewed current researches on boiling in compact heat exchangers. He dealt with plate heat exchangers, plate-fin heat exchangers (thermosiphon and kettle reboilers), and printed circuit heat exchangers, describing also boiling methods in compact heat exchangers.

Prof. Y. Katto (Critical Heat Flux Mechanisms) reviewed CHF mechanisms starting from a few pionieristic studies (Gambill, Macbeth, Tong, Hewitt and Bergles). Prof. Katto presented current CHF models for pool boiling (the hydrodynamic instability model, based on the Taylor and the Helmholtz instabilities, and the macrolayer dryout model), for external and internal flow boiling (annular flow and subcooled flow boiling). Information about heater internal and external factors effects, such as wall thermal properties and thickness, and surface wettability has been provided.

Information about program and/or papers may be obtained contacting:

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Report on CAV'95 - International Cavitation Symposium

May 2-5, 1995, Deauville, France

CAV'95, an international symposium on cavitation organized by the Bassin d'Essais des Carènes, was held in Deauville from 2-5 May 1995. Why cavitation? Because it is no longer reasonable to conduct a project today without considering cavitation, which has become a daily problem for the scientific and industrial communities alike.

The Bassin d'Essais des Carènes therefore focused on organizing an international congress on the subject, assembling all aspects related to the phenomenon: turbomachines, propellers and propulsion, materials-erosion, cavitation flow, fundamental and different horizons: scientists, researchers, sailors, users of hydraulic equipment, producers of energy etc.

The symposium received the support of various national and international associations:

- ASME (American Society of Mechanical Engineers)
- ATMA (Association des Techniques Maritimes et Aéronautiques)
- DCN (Direction des Constructions Navales)
- AIRH (Association Internationale de Recherches Hydrauliques)
- IMEchE (Institution of Mechanical Engineers)
- ONR (Office of Naval Research)
- PSH (Pôle des Sciences pour l'Hydrodynamique)
- SHF (Société Hydrotechnique de France)

These associations contributed heavily in publicizing CAV'95. They also played an active role in the rigorous choice of papers. 58 of which were finally selected representing 16 different countries. CAV'95's scientific organizing committee comprised members from the Bassin d'Essais des Carènes, which organized the event, and a representative from the different associations:

Steven CECCIO

The University of Michigan, USA (ASME)

Jean-Claude DERN

DCN Bassin d'Essais des Carènes, France

(ASTMA, PSH)

Jean-Pierre FRANC

LEGI/IMG, France (SHF)

Bernard GINDROZ

DCN Bassin d'Essais des Carènes, France
(Organizer)

Pierre HENRY

EPFL/IMHEF, Switzerland (AIRH)

Ron PALGRAVE

Ingersoll-Rand Company Ltd, UK (IMEchE)

Edwin ROOD

Office of Naval Research, USA (ONR)

No parallel sessions were held during the symposium's four days so as to ensure the initial aim was achieved, namely that everyone could follow all the activities in the different areas affected by cavitation. Consequently, over 150 people from more than 25 countries followed the 14 sessions, during which approximately 60 presentations of a very high scientific level were made. There were three sessions on turbomachines, three on propulsion, two on fundamental research, two on numerical modelisation, three on erosion and one on specific instrumentation. A recreational afternoon provided an opportunity to visit the region in a most convivial atmosphere.

Alongside the technical sessions, an excursion program enabled accompanying guests to visit the port of Honfleur, the nearby region of Pays d'Auge, the Mont St Michel and the chateau at St Germain de Livet. An exceptional gala dinner was held at the Deauville Casino. The dinner was set to the dynamic beat of boogie woogie, and we were even treated to an impressive orchestral improvisation on "Cavitation Blues".

A big "thank you" to the associations who lent us their support, to their organizing committee representative who was called upon for a sizeable contribution, to all our colleagues at the Bassin d'Essais des Carènes involved in the organization, to the friendly and efficient staff at CID and to all the authors, co-authors and participants.

Dr. Bernard Gindroz
Head of the International
Institutional Dept.
France

Report on the 33rd Meeting of the European Two-Phase Flow Group May 30 - June 2, 1995, Den Bosch, The Netherlands

The 33rd European Two-Phase Flow Group Meeting was held at Den Bosch, The Netherlands, hosted by the Technical University of Eindhoven. The European Two-Phase Flow Group meets every year in a European country, discussing in a very informal way (there are no Proceedings but only material distributed by the authors) the latest research presented by delegates in plenary sessions. Because of the lacking of Proceedings, presentations very often deal with works in progress, while discussions are often sources of new ideas for the research work.

The 32 papers were presented in nine plenary sessions distributed over three days. About sixty people attended the meeting giving rise to very debated discussions after each talk.

The papers covered the following items:

- * Annular flow (transition between intermittent, stratified and annular two-phase flow in inclined pipes, inverted annular film-boiling, air-water thermal non-equilibrium annular flow);
- * Boiling heat transfer (pool boiling enhancement with an imposed electric field, DNB in forced convective boiling, heat transfer and CHF in forced convective boiling of binary mixtures, surface boiling of superheated liquid);
- * Nuclear safety (passive injection depressurization system, two-phase flow inside the upper plenum of a PWR, after core melt down investigation, onset of subcooled flow boiling for fusion reactors applications, steam generator tube rupture test analysis using RELAP5-Mod. 2, vapour film around high temperature melt jets, condensation of fission products and aerosol particles);
- * Bubble dispersion (bubble dispersion in turbulent flows, particle-turbulence interaction, turbulent bubble flow in a tube, bubble migration and transition to plugflow, dispersed two-phase flows);
- * Void fraction profiles (void profile development in a vertical pipe, void fraction measurement by needle-shaped conductivity probe, impedance imaging of two-phase flow);
- * Flashing and stability (flashing during rapid depressurisation, two-phase flow and pressure relief, fittings effect on drop size in two-phase flow).

Information about program and/or papers may be obtained contacting:

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To Members

For forthcoming data bank on Multiphase Flow Research/Researchers, ICeM would like to have your personal data. Please write your name, address, research field and a list of papers etc. to the Editor.

ICeM would also be very grateful to receive recent reprints, along with up to five keywords per paper.

ICeM welcomes research articles on multiphase flow or articles on personalities in the field for inclusion in the future Newsletters. It would be very helpful if the manuscripts are sent by E-mail or diskettes are attached to the manuscript submitted.

Report on 7th International Conference - MULTIPHASE 95 Cannes, France, June 7-9, 1995

This Multiphase Conference is an international event held every other year in Cannes, France organised by BHR Group. The last Conference was held in Cannes 7-9 June 1995.

The Conference is a reputable and highly recognised event to present the latest developments and field experience worldwide related to multiphase production technology.

It covers a well balanced range of topics related to multiphase production which include:

- Latest theoretical and modelling techniques and their validation to predict the characteristics of multiphase flow under steady state and transient conditions
- Results of field tests and experiences gained on various aspects of multiphase production
- Innovations on modelling, products, systems and techniques related to multiphase production
- Operation issues reporting problem areas, solutions and actual field experience. Example: pigging operation
- Production issues related to key aspects of production such as hydrate formation, severe slugging, wax formation, scaling, high den-

sity viscous oil

- Processing, covering experience, latest products and techniques for gas-liquid separation, oil water separation and sand separation
- Boosting, covering various options including multiphase pumps, application of jet pumps, downhole pumps
- Multiphase metering, covering new products and field experience

The Conference has a good mixture of theoretical, products and operation issues, covering the development work and field experience reported by the operators which contribute to improving safety, efficiency and production from oil and gas fields. The proceedings are published in a bound copy and can be purchased separately from MEP Sales Department, Northgate Avenue, Bury St Edmunds, Suffolk. Tel: +44 1284 763277, Fax: +44 1284 704006.

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To Corresponding Members

Please address information on multiphase flow researches and researchers to the Editor. Also, please invite colleagues working on multiphase flow in your country to join ICeM.

All Correspondence Concerning

News items of general interest to ICeM members, notice of future meetings and conferences, personal news items, new books, etc. should be addressed to the editor or to regional corresponding members. It will be very helpful if any manuscripts proposed for publication are sent by E-mail or if diskettes are also attached to the manuscripts.

Report on the 13th UIT National Heat Transfer Conference

June 22-23, 1995, Bologna, Italy

The 1995 edition of the annual Heat Transfer Conference organized by the UIT (Italian Union of Thermo-fluid-dynamics) was held in Bologna on June 22-23. The conference subjects were grouped under three themes, respectively on: a) Heat transfer and single-phase systems; b) Thermo-fluid-dynamics of multiphase systems; and c) Energy systems. A total number of 43 papers were presented, and about 70 people attended the conference.

Two invited lectures were delivered by Prof. M. di Marzo (Department of Mechanical Engineering, University of Maryland, College Park, U.S.A.) and by Dr. C. Marvillet (CEA/GRETh, Grenoble, France). The lecture by Prof. di Marzo, titled 'Dropwise Evaporative Cooling', covered a ten-year period of researches that Prof. di Marzo directed at the University of Maryland on that subject. The lecture by Dr. Marvillet, titled 'Heat Transfer Intensification in Evaporators and Condensers: an Overview of Recent Development', provided a state-of-the-art review, with a special emphasis on the GRETh researches about high-performance surfaces used in heat exchangers.

An experimental and theoretical research on boiling and condensation of R22 inside a micro-finned and a smooth tube was presented. This work provided some useful results on heat transfer coefficients and pressure losses, comparing experimental results and literature correlations. Another work on inside condensation of refrigerants focused on alternative refrigerants, both pure fluids and mixtures, with particular attention to the heat transfer performances under stratifying and wavy flow regimes. An experimental study on a binary mixture of refrigerant R12/R114 was also presented, focusing on the heat transfer characteristics in vertical forced convective boiling. The pool boiling heat transfer for R113 on a heated wire was analyzed in a paper which took into consideration the effect of local phenomena, mainly the influence of the colder side-ends of the wire and the possibility of two-mode boiling onset. The heat transfer phenomena during falling film evaporation of CFC, HCFC and HFC fluids on the outside surface of a vertical tube were analyzed in a paper, which presented two theoretical models, one for

the thermodynamic and one for the transport properties prediction of refrigerants. The influence of finned surfaces on the heat transfer coefficient for R113 and HCFC141b in nucleate boiling was analyzed in an experimental work, which aimed at applying the obtained results to the problems of two-phase cooling of power chips in electronics.

A connection between thermal and electronics problems also characterized a paper, which presented some experimental results concerning the nucleate boiling of dielectric fluids on finned surfaces. This analysis showed with special interest the effect of hysteresis on fluids which are typically employed in electronic cooling, like Fluorinert FC-72 and Galden HT-55. Another experimental research concerned the evaluation of the onset of subcooled flow boiling at high liquid velocity and subcooling. This paper was particularly interesting for its applicability to the thermal-hydraulic studies about high heat flux components in fusion reactors. The particular boiling process known as *hypervapotron effect* was studied in a paper which presented a theoretical model to analyze this phenomenon. The pulsating boiling-condensation effect, which takes place in a heated, finned channel where a coolant flows - under particular conditions of velocity and subcooling degree - was described and studied here, with special attention to the application of this technique to the removal of high heat fluxes. An experimental work was presented, which studied the pressure distribution inside an air-water horizontal flow near an abrupt area contraction. In particular, the pressure loss behavior was analyzed for different values of the gas mass flow rate, keeping the liquid mass flow rate constant. Another experimental work on pressure drops in tubes referred to the situation of water flowing in narrow tubes under conditions of saturated boiling.

The next UIT Heat Transfer Conference will be held in Rome, May 29-31, 1995, jointly with the 2nd European Thermal-Sciences Conference.

For further information on UIT activities:

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Report on International Workshop on PIV-Fukui'95 Fukui, Japan, July 2-5, 1995

International Workshop on PIV-Fukui'95 was held at Fukui Chamber of Commerce and Industry Building, Fukui, Japan on July 2 - 5, 1995.

International Workshop on PIV-Fukui'95 was organized by the Visualization Society of Japan and The Center for Cooperative Research in Science and Technology, Fukui University. Chairman was Prof. Toshio Kobayashi, Institute of Industrial Science, University of Tokyo. Secretary of General was Prof. Fujio Yamamoto, Department of Mechanical Engineering, Fukui University.

PIV, the abbreviation of Particle Imaging Velocimetry, is a newly-developed technique for measurement of the fluid velocity field. Recently it has the following merits: 1) instantaneous whole flow field measurement, 2) contact-free measurement, 3) easy extraction and processing of physical information through velocity field. Further more the simple system, usually consisting of personal computer, laser light systems for flow visualization, image processing units and video system is applicable to wide area of fluid engineering.

International Workshop on PIV-Fukui'95 focuses on three topics, that is, 1) Three dimensional measurement, 2) New techniques and 3) Applications. Twenty-eight scientists who had done the significant work on PIV were invited by the Workshop organizers. The most important four stages of PIV, which are of seeding,

illuminating, photographing and image processing were discussed by them together with around one hundred participants. Thirty papers were presented and three panel discussions were opened for exchanging and developing the delegates' views.

During the period of Workshop the experts in PIV reported their recent research results. It is believed that PIV can provide us not only the physics pattern of field, but also the quantitative analysis. Followings are the new fields of PIV applications.

- Multiphase flow applications. Microgravity measurement, water-gas two-phase flow and bubbly flow.
- Three dimensional simultaneous measurement of temperature and velocities.
- Holographic PIV system
- Turbulence structures

The Workshop Proceedings was published. The remains of the proceeding can be obtained at the price of 15,000 Japanese Yen for member of societies and 25,000 Japanese Yen for non-member, from Prof. F. Yamamoto. His address is as follows:

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WWW Server Information

Prof. Tsuji's group at Osaka University opened their home page on the WWW. The address is as follows;

http://www_mupf.meim.eng.osaka-u.ac.jp/english/tsuji_home.html

This home page contains the information about studies at Tsuji lab, profiles of people and some movies of particle simulations. Some links for other servers relating to powder science and multiphase flows are available.

Report on the 14th Multiphase Flow Symposium '95 July 13-14, 1995, Matsuyama, Japan

The 14th Multiphase Flow Symposium'95 was held at The Matsuyama General Community Center on July 13 to 14, 1995. In last summer, Matsuyama city was subject to the dearth of water because of the unusual weather. Fortunately, we have enough water to use in this summer, but it was sweltering hot outside the symposium hall during the session. Some participants enjoyed Dogo spa in this city, which is famous in Japan and has history above a thousand years.

The symposium program included the followings: two invited papers, three presentations in a forum and 77 contributed papers. Participants in the Symposium were about 150 people including several people from abroad. Though the Symposium was held only three months later after the International Conference on Multiphase Flow '95-Kyoto, it had many papers and participants. We are pleased with finding activity of researchers on the multiphase flow in Japan.

The contributed papers presented in 21 sessions were roughly divided into 7 papers related to hydrodynamic modeling, 7 papers to interfacial phenomena, 7 papers to visualization, 8 papers to turbulence, 11 papers to numerical analysis and simulation, 13 papers to dynamics, 5 papers to intelligent and functional multiphase flow, 8 papers to physics in multiphase flow, 5 papers to environmental and industrial technology and 6 papers to measurement. The best presentation awards were own by two young speakers.

Two invited lectures were delivered by Prof. K. Suzuki, Ehime University, on "Circumstances on water in Shikoku Island and the dearth of water in the northern part of the Island" and Prof. A.E.Beylich, Technische Hochschule, Aachen, on "Molecular Kinetic Approach to the Modeling of Condensation".

In the forum held in afternoon at the first day, three examples of industrial and practical problems were presented by industrial engineers in Shikoku in which Matsuyama city is located and discussed at the stand of view of the cooperation among industries, national institutes and universities in a similar way to the previous Symposium.

The former invited lecture and the forum were opened for people who did not register themselves in the Symposium in order to let citizenry understand our activity for social demands.

We had the JSMF award ceremony in 1995 during the Symposium. Emeritus Professors T.Ueda (Tokyo University) and K.Akagawa (Kobe University) were awarded the JSMF Prizes for their outstanding contributions to development of multiphase flow researches, respectively. Dr. T.Saito (National Institute for Resources and Environment) and Dr.H.Takahashi (Tohoku University) also won the JSMF awards for young members for their distinguished works.

Next Symposium is to be held at Fukui city, Japan on July 23-25, 1996.

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**Report on the Joint ASME/JSME Fluids Engineering Annual Conference
and ASME/EALA 6th International Conference on Laser Anemometry
August 13-18, 1995, South Carolina, USA**

The Fluids Engineering Divisions of the American Society of Mechanical Engineers and the Japan Society of Mechanical Engineers and the European Association for Laser Anemometry hold the above mentioned conferences from August 13th to 18th, 1995 at the Westin Resort, Hilton Head Island, South Carolina, USA. Dr. Edwin P. Rood (ASME), Prof. Masahiro Inoue (JSME) and Dr. John Turner (EALA) were jointly organized those conferences successfully. During this 5 day conferences, over 700 papers were presented on a large variety of specialist topics. Many symposia and fora concerning to multiphase flows were held in the conference. The titles of symposia and fora and organizers are shown below.

Symposia:

- Gas-Liquid Flow** (Prof. U.S. Rohatgi, Brookhaven National Laboratory and Prof. T. Fukano, Kyushu University)
Gas-Solid Flow (Prof. D.E. Stock, Washington State University, Prof. Y. Tsuji, Osaka University, Dr. M.W. Reeks, Berkely Nuclear Laboratories, Prof. E.E. Michaelides, Tulane University and Prof. M. Gautam, West Virginia University)
Cavitation & Gas-Liquid Flow in Fluid Machinery & Devices (Prof. S. Ceccio, University of Michigan and Prof. A. Furukawa, Kyushu University)
Flow Visualization & Image Processing of Multiphase Systems (Prof. W.J. Yang, University of Michigan, Prof. F. Yamamoto, Fukui University and Prof. F. Mayinger, Technical University of Munich)

Fora:

- Cavitation and Multiphase Flow** (Prof. J. Katz, Johns Hopkins University and Prof. Y. Matsumoto, University of Tokyo)
Multiphase Flow (Prof. A. Prosperetti, Johns Hopkins University and Prof. K. Kikuyama, Nagoya University)

In these symposia and fora, over 180 papers were presented and many hot and fruitful discussions were held from various directions. Not only the application problems but also fundamental subjects in multiphase flows, such as detailed behavior of dispersed phase, averaged equations for multiphase flow and the interaction between dispersed phase and vortices in continuum phase were studied intensively. Computational Fluid Dynamics on Multiphase Flows are becoming hot topics. Newly developed methods and obtained results were presented. The panel discussion on "What's Wrong with Two-Fluid Modeling? A Way Forward?" was held in the symposium on Gas-Particle Flows. Many participants attended in this panel session and they had hot discussions. Forum on Multiphase Flow was a new trial. In this forum, they had no bound volume of papers and they only presented the recent results and discussed on the matter. In the plenary lecture, Prof. Tsujimoto, Osaka University, gave a talk ! on rotating cavitations, where he summarized there are so many unsolved problems.

It is undoubted that participants in these symposia and fora were satisfied with fruitful discussions on various aspects on multiphase flows and certain progresses of the researches.

Yoichiro Matsumoto
The University of Tokyo
Japan

**Report on ASME/JSME Fluids Engineering and
ASME/EALA Laser Anemometry Summer Meeting
August 13-18, 1995, South Carolina, USA**

The joint of ASME & JSME Fluid Engineering Annual Conference & Exhibition and ASME & EALA 6th International Conference on Laser Anemometry was held at the Westin Resort, Hilton Head Island, South Carolina, USA on August 13-18, 1995. The meeting was sponsored by the American Society of Mechanical Engineers International (ASME) in cooperation with the Japan Society of Mechanical Engineers (JSME) and the European Association for Laser Anemometry (EALA). During the period of five-day meeting, more than 400 participants who came from 29 countries reported their papers and research reports.

In this summer meeting, there were 8 symposium programs, 11 forum programs, one general papers and one instructional fluid dynamics which covered almost the whole fields of Fluid Engineering and Laser Anemometry. There are three symposium programs concerning measurement and visualization techniques including Particle Imaging Velocimetry (PIV). These symposium programs were, Experimental & Numerical Flow Visualization, Laser Anemometry and Flow Visualization & Image Processing of Multiphase Systems.

In the Proceeding of Flow Visualization and

Image Processing of Multiphase System, which was edited by Prof. W.J. Yang (University of Michigan, USA), F. Yamamoto (Fukui University, Japan) and F. Mayinger (Technische Universitat Munchen, Germany), there were 84 papers reported the newly developed PIV techniques and their applications. The following papers were concerned deeply.

- Prof. Adrian: Two-Color-Dual-Beam-Sweep Particle Image Velocimetry
- Prof. Yamamoto, F.: Measurement of Bubbling-Jet Two-Phase Flow Using 3-D PTV based on Binary Image Cross-Correlation Method
- Prof. Hassan, Y. A. and A. Prof. Okamoto, K.: Spring Model Tracking Algorithm for Three-Dimensional Particle Image Velocimetry
- Prof. Merkirch, T. : PIV Measurements in Multiphase Flow Using CCD and Photo-Cameras

Prof. F. Yamamoto
the Organizer of the Symposium
"Flow Visualization and Image
Processing of Multiphase System"

**Reprt on Workshop on Computing and Modeling of Multiphase Flows
Santa Barbara, California, USA, January 9-13, 1995**

The Santa Barbara Workshop focussed on one-dimensional modeling and computations for the first 2 1/2 days and multidimensional aspects for the rest of the week. There were 30 participants. The discussions were particularly lively on multidimensional modeling. Steve Orszag presented ideas regarding use of renormalization methods for large-eddy simulations, and Sanjoy Banerjee presented ideas regarding DNS and LES of dispersed flows. Gray Leal discussed boundary integral methods for Low Reynolds number problem with mobile interfaces.

On more conventional topics, there was discussion regarding four-field methods for

complex two-phase flows and $k-\epsilon$ modeling in such situations. Major problems identified were lack of knowledge in all multidimensional flow regimes except dispersed flows, and well-separated flows such as at air-sea interfaces. Environmental multiphase flows were seen as a major area for future developments.

Prof. S. Banerjee
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Fax +1-805-893-4731

Welcome to JSMF

Professor Kyozo AYUKAWA
President of JSMF

The Japan Society of Multiphase Flow (JSMF) has endeavored to achieve its purpose to promote further progress in the field of multiphase flow by facilitating more intimate cooperation and exchange of new information among researchers and engineers in different areas of science and technology related to multiphase flow since 1987 in which JSMF was established.

As one of its activities, JSMF has managed and sponsored The Symposium of Multiphase Flow in Japan every year with the cooperation of The Japan Science Council and about thirty Societies in Japan related to science and technology. The Symposium has grown more and more active as you found that contributed papers and participants have increased every

meeting. Furthermore, JSMF hold International Conferences on Multiphase Flow, that is, ICMF'91-Tsukuba and ICMF'95-Kyoto which brought a great success, respectively. People, working in various fields related to multiphase flow, might find that international exchange was necessary and important to promote their research and development through these conferences. We would like to contribute to the promotion of cooperation and exchange among people interested in multiphase flow all over the world.

I would appreciate it if you would be interested in supporting us and also encourage your colleagues to join JSMF.

I am looking forward to your participation.

Executive Committee of The Japan Society of Multiphase Flow (1995-1996)

| | | |
|---|--------------|-------------------------|
| President | K. Ayukawa | (Ehime University) |
| Vice Presidents | T. Sakaguchi | (Kobe University) |
| | H. Hashimoto | (Tohoku University) |
| | T. Shimizu | (Hitachi Ltd.) |
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Office of JSMF:

The Japan Society of Multiphase Flow
c/o Academic Publication & Printing Co., Ltd.
2-14-9, Kasugadenaka, Konohana-ku, Osaka 554, Japan
TEL: +81-6-466-1588 FAX: +81-6-463-2522

Future Meetings

Listings include Conference Name, Place, Date and Contact.

- * **IUTAM-Symposium on Combustion in Supersonic Flows**
Poitiers, FRANCE, October 2-6, 1995
Prof. M. Champion, Laboratoire d'Energétique et de Détonique, ENSMA, 20, Rue Guillaume VII, F-86034 Poitiers, France, Fax +33-49-605-044
- * **Heat Transfer in Condensation - EUROTHERM Seminar 47**
Grenoble, FRANCE, October 4-5, 1995
Dr. Ch. Marvillet, Fax: +33 1 7688 5172
- * **21st Seminar on Safety and Reliability of Plant Technology**
Stoccarda, GERMANY, October 5-6, 1995
Dr. K. Kussmaul, Fax: +49 711 685 3144
- * **International Symposium on Two-Phase Flow Modelling and Experimentation**
Rome, ITALY, October 9 - 11, 1995
Dr. G.P. Celata, ENEA Casaccia, Energy Department, Via Anguillarese, 301, I-00060 Rome, Italy, Fax +39-6-3048-3026, E-mail cclata@risc990.casaccia.enea.it
- * **Flow of Particles in Suspensions**
Udine, ITALY, October 9-13, 1995
CISM Palazzo del Torso, Piazza Garibaldi 18, 33100 Udine, ITALY, Tel +39-0432-294989 or 508251, Fax +39-0432-501523
- * **9th Int. Conference on finite elements in fluids New trends and applications**
Venezia, ITALY, October 15-21, 1995
Maria Morandi Cecchi, Fax +39 49 8758 596, E-mail: mcecchi\@pdmat1.math.unipd.it
- * **Advances in Thermal Insulation - EUROTHERM Seminar 44**
PORTUGAL, October 18-20, 1995
Prof. Albino Reis, Fax: +351 2 973 0746
- * **International Symposium on Nuclear Energy (Main Topic: Nuclear Safety)**
Bucarest, ROMANIA, October 20-21, 1995
Prof. C. Bratianu, Fax: +40 1 312 0800
- * **3rd European Workshop on High Temperature Materials**
Stuttgart, GERMANY, October 23-27, 1995
ESTEC, Fax: +31 1719 85658
- * **23rd International Thermal Conductivity Conference**
Nashville, Tennessee, USA, October 29 - November 1, 1995
Dr. G. Latini, Tel.: +39 71 220 4759, Fax: +39 71 894677
- * **7th International Conference on Stirling Cycle Machines (ICSC'95)**
Tokyo, Japan, November 5-8, 1995
Mr. Shigeji Tsukahara, 7th ICSC Japan '95 Secretariat, Director, Power and Energy Institute, Ministry of Transport, 6-38-1 Shinkawa, Mitaka, Tokyo 181, Japan, Tel +81-422-41-3086, Fax +81-422-41-3101
- * **Workshop on Surface Thermal Measurements**
Budapest, HUNGARY, November 7-9, 1995
Ing. F. Righini, Tel.: +39 11 397 7340, Fax: +39 11 397 7347
- * **1995 ASME Winter Annual Meeting**
San Francisco, CA, USA, November 12-17, 1995
 - **International Symposium on Turbomachinery Performance Deterioration**
Dr. W. Tabakoff, Dr. A. Hamed, Dept. of Aerospace Engineering & Engineering Mechanics, Univ. of Cincinnati, Cincinnati, OH 45221-0070, USA, Tel +1-513-556-3226, Fax +1-513-556-5038, Mr. D. B. Cale, Aviation Applied Technology, Directorate, Fort Eustis, VA 23604, USA, Tel +1-804-878-2771

- **1995 Symposium-Fluid Mechanics and Heat Transfer in Sprays/International Mechanical Engineering Congress**
Dr. J.W.Hoyt, San Diego State Univ., Tel +1-619-594-6067, Fax +1-619-594-6005,
Dr. T.J.O'Hern, Sandia National Laboratories, Tel +1-505-844-9061, Fax +1-505-844-4523,
E-mail, tiohern@sandia.gov., Dr. C. Presser, National Inst. of Standards and Technology,
Tel +1-617-255-4920, Fax +1-617-762-9375, Prof. A.K.Gupta, University of Maryland,
Tel +1-301-405-5276, Fax +1-301-314-9477
- **Symposium on Erosion Processes**
Dr. J.R.Kadambi, Chair, Organizing Committee, Dept. of Mechanical and Aerospace
Eng., Case Western Reserve Univ., Cleveland, Ohio 44106, USA, Tel +1-216-368-6456,
Fax +1-216-368-6445, Dr. G.Ahmadi, Dept. of Mechanical and Aeronautical Eng., Box
5725, Clarkson Univ., Postdam, NY 13699, USA, Tel +1-315-268-2322, Fax +1-315-268-
6438, Dr. U.S.Rohatgi, 457B, Dept. of Nuclear Energy, Brookhaven National, National
Laboratory, Upton, NY 11973, USA, Tel +1-516-282-2475, Fax +1-516-282-2613
- **Symposium on Electrorheological Flows III**
Prof. D.A.Siginer, Dept. of Mech. Eng., 201 Ross Hall, Auburn Univ., Auburn, AL, USA,
Tel +1-205-844-3331, Fax +1-205-844-3307, Dr. J.H.Kim, Elec., Power Res. Inst., 3412
Hillview Ave. P.O.Box 10412, Palo Alto, CA 94303, USA, Tel +1-415-855-2671, Fax +1-
415-855-1026, Prof. G.S.Dulikravich, Dept. of Aero. Eng., Pennsylvania State Univ., 233
Hammond Bldg., University Park PA 16802, USA, Tel +1-814-863-0134, Fax +1-814-865-
7092
- **Forum on Measurement Techniques in Multiphase Flows**
Dr. T.J.O'Hern, Tel +1-505-844-9061, Fax +1-505-844-8251, E-mail
tjohern@sandia.gov, Dr. A. Naqwi, Tel +1-612-490-2811, Fax +1-612-490-3824,
Dr. R.D. Skocypec, Tel +1-505-845-8838, Fax +1-505-844-8251, E-mail
rdskocy@sandia.gov, Dr. C.Presser, Tel +1-301-975-2612, Fax +1-301-869-5924
- **Forum on University-Industry Collaborative Research in Multiphase Flow**
November 13-14 (Abstracts due April 15, 1995)
Prof. M.C.Roco, National Science Foundation, 4201 Wilson Blvd., Suite 525, Arlington, VA
22230, USA, Tel +1-703-306-1371, Fax +1-703-306-0319
- * **Fluidization and Fluid Particle Systems**
Miami, FL, USA, November 12-17, 1995
Dr. W.C.Yang, Westinghouse Electric, Sci. and Techn. Center, 1310 Beulah Rd., Pittsburgh,
PA 15235, USA, Tel +1-412-256-2207, Fax +1-412-256-1222
- * **Solids Flow, Handling and Processing**
Miami, FL, USA, November 12-17, 1995
Dr. J. Sinclair, Carnegie-Mellon Univ., Chemical Engineering Department, Pittsburgh, PA
15213, USA, Tel +1-412-268-3020, Fax +1-412-268-7139
- * **Powder Technology**
Miami, FL, USA, November 12-17, 1995
Dr. S. Pratsinis, Univ. of Cincinnati, Chemical Engineering Department, Cincinnati, OH 45221,
USA, Tel +1-513-556-2761, Fax +1-513-556-3473
- * **International Conference on Thermophysical Aspects of VVER - Type Reactor Safety
(THERMOPHYSICS - 95)**
Obninsk, RUSSIA, November 21-24, 1995
Prof. P.L. Kirillov, Fax: +7 8439 98210; E-mail: root@lenux.obninsk.su
- * **RAN95 International Symposium on Advanced Energy Conversion and Related
Technologies**
Nagoya, Aichi, JAPAN, December 4-6, 1995
Prof. N. Arai, Fax: +81 52 789 3915; E-mail: narai@mhlab.cc.nagoya-u.ac.jp
- * **Thermomechanical Behaviour of Advanced Materials under Severe Conditions
- EUROTHERM Seminar 43**
Font-Romeu, FRANCE, December 6-8, 1995
Prof. A. Ferriere, Fax: +33 6830 2940

- * **Twelfth Australasian Fluid Mechanics Conference, 12 AFMC**
Sydney, AUSTRALIA, December 10-15, 1995 (Abstracts due: April 25, 1995)
12 AFMC Secretariat, Dept. of Mechanical and Mechatronic Eng., Univ. of Sydney, NSW
2006, Australia, Tel +61-2-351-2341, Fax +61-2-692-9169, Telex AA73460MICNAV, E-mail
12afmc@tiny.me.su.oz.au
- * **International Symposium on Mathematical Modelling of Turbulent Flows**
Tokyo, JAPAN, December 18-20, 1995 (Abstracts due: July 10, 1995)
Prof. Hisaaki Daiguji, Department of Aeronautics and Space Engineering, Tohoku University,
Sendai 980-77, Fax +81-22-217-6987, E-mail n0001@ifscray.ifs.tohoku.ac.jp
- * **Particle Science and Technology in The 21st Century**
Pune, INDIA, December 17-21, 1995
Engineering Foundation Conferences, 345 East 47th Street, New York, NY 10017, USA, Tel
+1-212-705-7836, Fax +1-212-705-7441, E-mail engfnd@aol.com
- * **Workshop on Computation and Modeling of Multiphase Flows**
Santa Barbara, California, U.S.A. The Week of January 15, 1996
Prof. Sanjoy Banerjee, Tel +1-805-893-3456, Fax +1-805-893-4731, E-mail
banerjee@anemone.ucsb.edu
- * **2nd ISHMT-ASME Heat and Mass Transfer Conference, and 13th National Heat and
Mass Transfer Conference**
Surathakal, INDIA, December 28-30, 1995
Dr. B.T.Nijaguna, Tel +91-824-407322, Fax +91-824-476090, Prof. F.Mayingner,
Fax +49 89 2105 3451, E-mail may@thermo-a.mw.tu-muenchen.de
- * **Fifth Symposium on Multiphase Transport in Porous Media/ASME Winter Annual
Meeting**
Chicago, IL, USA, December, 1995
Dr. R.R.Eaton, Sandia National Labs, Tel +1-505-844-4063, Fax +1-505-844-8251, Prof.
K.S.Udell, Univ. of California, Tel +1-510-642-2928, Prof. M.Kaviany, Univ. of Michigan,
Tel +1-313-936-0402, Prof. M.P.Sharma, Univ. of Wyoming, Tel +1-307-766-6317,
Prof. K.Vafai, Ohio State Univ., Tel +1-614-292-6560
- * **Heat Pump Conference**
Melbourne, AUSTRALIA, February 11-14, 1996
TTI, Fax: +33 1 4266 0447
- * **The Eighth Beer-Sheva International Seminar on MHD-Flows and Turbulence**
Jerusalem, ISRAEL, February 25-29, 1996 (Abstracts due: September 15, 1995)
Prof. H. Branover, The Center for MHD Studies, Ben-Gurion University of the Negev,
P.O.Box 653, Beer-Sheva 84105, Israel, Tel 972-7-280451 or 461298 Fax 972-7-280467
E-mail kissel@bgumail.bgu.ac.il
- * **The 6th International Symposium on Transport Phenomena and Dynamics of Rotating
Machinery**
Honolulu, Hawaii, U.S.A., February 25-29, 1996 (Abstracts due June 1, 1995)
Prof. D. C. Han, Department of Mechanical Design and Production Engineering, Seoul Na-
tional University, San 56-1, Shinlim-Dong, Kwanak-Gu, Seoul 151-742, Korea, Tel +82-2-
880-7139, Fax +82-2-883-1513
Prof. Wen-Jei Yang, Department of Mechanical Engineering & Applied Mechanics, 2150
G.G.Brown Building, University of Michigan, Ann Arbor, Michigan 48109, USA, TEL +1-
313-764-9910, FAX +1-313-747-3170
- * **3rd International Conference on Power Development**
Kathmandu, NEPAL, March 4-7, 1996
Dr. C.V.J. Varma, Fax: +91 11 301 6347; E-mail: cbip@cbipdel.uunet.in
- * **4th International Conference on Nuclear engineering, ICONE-4**
New Orleans, USA, March 10-14, 1996
Dr. H.H. Chung, Fax: +1 708 252 4780; E-mail: hchung@anl.gov
- **Special Session: Feedback of Thermalhydraulic Research on NPP Design, Design,
Operation and Licensing**
Prof. F. D'Auria, Fax: +39 50 585256

- **Special Session: Fundamental Thermal Hydraulics**
Prof. J. Weisman, Fax: +1 513 556 3390
- **Special Session: Two-Phase Flow and Heat Transfer Fundamentals**
Prof. J.F. Klausner, Fax: +1 904 392 1071; E-mail: klaus@nervm.nerdc.ufl.edu
- **Session: The Role of System Simulation in Scaling** (Abstracts due July 17, 1995)
Prof. V. H. Ransom, Purdue University, 1290 Nuclear Engineering Building, West Lafayette, IN 47907-1290, TEL +1-317-494-5742, FAX +1-317-494-9570
- **Session: Energy Planning for a Sustainable World** (Abstracts due July 17, 1995)
Prof. V. H. Ransom, Purdue University, 1290 Nuclear Engineering Building, West Lafayette, IN 47907-1290, TEL +1-317-494-5742, FAX +1-317-494-9570

- * **Turbulent Heat Transfer**
San Diego, CA, USA, March 10-15, 1996 (Abstracts due September 1, 1995)
Engineering Foundation, 345 East 47th Street Room 303, New York, NY 10017, USA, Fax: +1-212-705-7441; E-mail: engfnd@aol.com
Dr. R.M.C. So., Conference Chair, Mechanical and Aerospace Engineering, Arizona State University, Tempe, AZ 85287-6106, USA, TEL +1-602-965-4119 Fax +1-602-965-1384
E-mail so@asuvas.eas.asu.edu

- * **The 21st Internatinal Technical Conference on Coal Utilization & Fuel Systems**
Clearwater, Florida, U.S.A., March 18-21, 1996 (Abstracts due September 22, 1995)
Coal Utilization & Fuel Systems Conference Committee, 1156 Fifteen Street, N.W., Suite 525, Washington, D.C. 20005, Tel +1-202-296-1133, Fax +1-202-223-3504

- * **Physical Models of Thermal Energy Storage - EUROTHERM Seminar 49**
Eindhoven, THE NETHERLANDS, March 25-27, 1996
Prof. A.A. Van Steenhoven, Fax: +31 40 433 445

- * **Optical Methods and Data Proceeding in Heat and Fluid Flow**
London, U.K., April 18-19, 1996
C. Paice, Fax +44 171 222 9881

- * **8th Workshop on two-phase flow predictions**
Merseburg, GERMANY, April, 1996
Prof. M. Sommerfeld, Fax +39 3641 46 2878

- * **Biomass Usage for Utility and Industrial Power**
Snowbird, Utah, USA, April 28 - May 3, 1996
Dr. N.S. Harding, Fax: +1 212 705 7441; E-mail: engfnd@aol.com

- * **Fluid-Particle Interaction IV**
Davos, SWITZERLAND, May 12-17, 1996
Prof. Graham Wallis, Thayer School of Engineering, Dartmouth College, 8000 Cummings Hall, Hanover, NH 03755-8000, USA, E-mail graham.b.wallis@dartmouth.edu
Prof. Gad Hetsroni, Department of Mechanical Engineering, Technion, Israel Institute of Technology, Haifa 32000, Israel, E-mail hetsroni@enrgy.technion.ac.il

- * **4th Asian Symposium on Visualization, AVS'96**
Beijing, CHINA, May 15-18, 1996 (Abstracts due July 31, 1995)
Chairman Prof. Qing-Ding WEI, Secretary Jun Chen, Secretariat of AVS'96, Department of Mechanics, Peking University, Beijing 100871, P.R.China, Tel & Fax +86-1-250-1992, E-mail weiqd@mccux0.mech.pku.edu.cn

- * **1996 CHINA-JAPAN Symposium on Particuology**
Beijing, P.R.CHINA, May 24-25, 1996 (Abstracts due August 31, 1995)
Prof. Genji Jimbo, Chubu Powtech Plaza Laboratory, Room 507, Chukei-building, Mei-eki 4-4-12, Nakamura-ku, Nagoya 450, Japan, Tel +81-52-586-5643, Fax +81-52-586-5676
Dr. Fei Wei, Department of Chemical Engineering, Tsinghua University, Beijing 100084, P.R.China. Tel +86-10-2595464, Fax +86-10-2562768, E-mail dccjy@tsinghua.edu.cn

- * **3rd International Symposium on Engineering Turbulence Modeling and Measurements**
Crete, GREECE, May 27-29, 1996 (Abstracts due: May 1, 1995)
Prof. W.Rodi, Institut für Hydromechanik, Universität Karlsruhe, Kaiserstrasse 12, 76128 Karlsruhe, Germany, Tel +49-721-608-3535, Fax +49-721-608-2202, E-mail Rodi@bau-vern.uni-karlsruhe.de

Prof. G. Bergeles, Department Mechanical Engineering, National Technical University of Athens, 9 Heroon Polytechniou Ave., 15710 Zografou, Greece, Tel +30-1-7717881/7706545, Fax +30-1-7706545, E-mail bergeles@artemis.naval.ntua.gr

- * **2nd European Thermal-Sciences and 14th UIT National Heat Transfer Conference**
Roma, ITALY, May 29-31, 1996 (Abstracts due: April 5, 1995)
Dr. G.P. Celata, ENEA Casaccia, Energy Department, Via Anguillarese, 301
I-00060 Rome, Italy, Tel +39 6 3048 3905, Fax +39 6 3048 3026
E-mail: celata@risc990.casaccia.enea.it

- * **6th International Energy Conference and Exposition (ENERGEX '96)**
Pechino, CHINA, June 3-7, 1996
Ms. Liu Feng, Fax: +86 1 257 5691

- * **The Ninth International Symposium on Transport Phenomena (ISTP-9)
in Thermal-Fluids Engineering**
Singapore. SINGAPORE, June 25-28, 1996 (Abstracts due: August 15, 1995)
ISTP-9 Secretariat, Ken-Air Destination Management Co. Pte Ltd., 257 Selegie Road #03-275
Selegie Complex, Singapore 0718, Republic of Singapore, Tel 65-3368855, Fax: 65-3363613

- * **Second International Symposium on Numerical Methods for Multiphas Flows, 1996
ASME Fluids Engineering Division, Summer Meeting**
San Diego, CA, USA, July 7-11, 1996 (Abstracts due: September 1, 1995)
C.T. Crowe, Tel +1-509-335-3214, Fax +1-509-335-4662, E-mail crowe@mme.wsu.edu,
Y. Tsuji, Tel +81-6-877-5111, E-mail tsuji@mupf.meim.osaka-u.ac.jp, A. Prosperetti,
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E-mail martin.sommerfeld@cnve.univierlangen.de, R. Johnson, Tel +1-208-526-0955,
Fax +1-208-526-6970, E-mail rwj@incl.gov

- * **4th International Conference HEAT TRANSFER 96. Advanced Computational Methods
in Heat Transfer**
Udine, ITALY, July 8-10, 1996
Conference Secretariat HEAT TRANSFER 96, Fax: +44 1703 292 853, E-mail: CMI@ib.rl.ac.uk

- * **8th International Symposium on Applications of Laser Techniques to Fluid Mechanics**
Lisbon, PORTUGAL, July 8-11, 1996
LADOAN, 7-c/o Prof. M.V. Heitor, Dept. of Mechanical Eng., Inst. Superior Tecnico Av.
Rovisco Pais, P-1096 Lisbon Codex, Portugal, Tel +351-1-847-7379, Fax +351-1-849-6156

- * **Fifth World Congress of Chanical Engineering**
San Diego, CA, USA, July 14-17, 1996
AIChE, Programming Dept. 12th Floor, 345 East 47th Street, New York, NY 10017, USA,
Tel +1-212-705-7373, Fax +1-212-752-3297

- **International Particle Technology Forum**
San Diego, USA, July 14-18, 1996 (Abstracts due: June 1, 1996)
Prof. R. Pfeffer, Tel +1-201-596-3429, Fax +1-201-596-6479, Dr. R. Davies,
Tel +1-302-695-2839, Fax +1-302-695-2504, Prof. M.C. Roco, Tel +1-703-306-1371,
Fax +1-703-306-0319)

- * **15th Multiphase Flow Symposium '96**
Fukui, JAPAN, July 23-25, 1996
Prof. Fujio Yamamoto, Department of Mechanical Engineering, Fukui Univ., 3-9-1 Bunkyo,
Fukui-shi, 910, Japan, Tel/Fax +81-776-25-8534, e-mail yamamoto@fv.mech.fukui-u.ac.jp

- * **International Symposium on Transient Convective Heat Transfer**
Cesme, TURKEY, August 19-23, 1996
Prof. F. Arinç, Fax: +90 312 210 1331

- * **The 19th International Congress on Theoretical and Applied Mechanics**
Kyoto, JAPAN, August 25-31, 1996 (Abstracts due: January 15, 1996)
Chairman: Prof. T. Tatsumi, Secretary General : Prof. E. Watanabe, Dept. of Civil Eng., Kyoto Univ., Sakyo-ku, Kyoto 606-01, Japan,
Tel +81-75-753-5079, Fax +81-75-752-5296, e-mail ictam@strsun1.kuciv.kyoto-u.ac.jp
- * **3rd International Symposium on Experimental and Computational Aerothermodynamics of Internal Flows**
Beijing, CHINA, September 1-6, 1996
Prof. Y.U. Shen, Fax: +86 10 2575913
- * **Natural Working Fluids in Refrigeration and Air Conditioning**
Aarhus, DENMARK, September 2-8, 1996
Mr. M. Arnvig, Tel.: +45 42 884622, Tlx: 6420249
- * **ECCOMAS 96: 2nd ECCOMAS Conference on Numerical Methods in Engineering and 3rd ECCOMAS Computational Fluid Dynamics Conference**
Parigi, FRANCE, September 9-13, 1996
Mr. F. Tapissier, Fax: +33 39 63 56 38; E-mail: symposia@inria.fr
ECCOMAS 96, Fax: +33 1 44 27 72 00; E-mail: eccomas96@ann.jussieu.fr
- * **6th International Conference HYDROSOFT 96. Hydraulic Engineering Software**
Penang, MALAYSIA, September 10-12, 1996
Conference Secretariat HYDROSOFT 96, Fax: +44 1703 292 853
- * **6th International Symposium on Temperature and Thermal Measurements in Industry and Science (TEMPMEKO-96)**
Torino, ITALY, September 10-13, 1996
Ing. F. Righini, Tek.: +39 11 3977340, Fax: +39 11 3977347
- * **14th European Conference on Thermophysical Properties (ECTP 14)**
Lione, FRANCE, September 16-19, 1996
Ing. F. Righini, Tel.: +39 11 397 7340, Fax: +39 11 397 7347
- * **Pool Boiling Heat Transfer 2 - EURO THERM Seminar 48**
Paderborn, GERMANY, September 18-20, 1996
Prof. D. Gorenflo, Fax: +49 5251 603 522
- * **Quantitative Infra-Red Thermography, QIRT-3 - EURO THERM Seminar 50**
Stoccarda, GERMANY, September, 1996
Prof. G. Busse, Fax: +49 711 685 2066
- * **IEA Conference: Heat Pumps Towards the Next Century: New Technologies and Applications**
Toronto, CANADA, September, 1996
Mr. K. Snelson, Fax: +1 613 954 1235
- * **4th International Symposium on Heat Transfer with Exhibition**
Pechino, CHINA, October 7-11, 1996
Prof. X.F. Peng, Fax: +86 10 255-1224; E-mail: liy@bc.pc2ihep.ac.cn
- * **12th International Conference on MHD Electrical Power Generation**
Yokohama, JAPAN, October 15-18, 1996 (Abstracts due: February 29, 1996)
Prof. S. Shioda, Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology, 4259 Nagatsuta Midori-ku, Yokohama 226, Japan, Fax +81-45-921-1318
- * **Third KSME-JSME Thermal Engineering Conference '96-Kyongju**
Kyongju, KOREA, October 20-23, 1996 (Abstracts due: December 31, 1995)
Prof. Sang Chun Lee, Department of Mechanical Engineering, Yeungnam University, Gyongsan 712-749, Korea, Tel +82-53-810-2453, Fax +82-53-813-3703
Prof. Motoo Fujii, Institute of Advanced Material Study, Kyusyu University, Kasuga, Fukuoka 816, Japan, Tel +81-92-573-9611 (Ext. 650), Fax +81-92-592-0211

- * **Energy-Related Process Integration Technologies - EUROTHERM Seminar 51**
Manchester, UK, October 26-27, 1996
Prof. Linnhoff, Fax: +44 61 236 7439
- * **4th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics**
Brussels, BELGIUM, June 2-6, 1997
Prof. M.Gito, Tel +32-10-472200, Fax +32-10-452692, E-mail gito@term.ucl.ac.be
Dr. R.K.Shah, Tel +1-716-439-3020. Fax +1-716-439-3648, E-mail rkshah@acsu.buffalo.edu
- * **JSME Centennial Grand Congress - Toward the New Century -**
Tokyo, JAPAN, July, 1997
Mr. M. Takahashi, The Japan Society of Mechanical Engineers, Shinanomachi-Rengakan Bldg.,
Shinanomachi 35, Shinjyuku-ku, Tokyo 160, Japan, Tel +81-3-5360-3508,
Fax +81-3-5360-3500
- * **Advanced Concepts and Techniques in Thermal Modelling 2 - EUROTHERM Seminar 52**
BELGIUM or DENMARK, da definirsi nel 1997
Prof. J.P. Saulnier, Fax: +33 49 49 81 01
- * **3rd International Conference on Multiphase Flow**
Lyon, FRANCE, June 8-11, 1998
Prof. J. Bataille, Laboratoire de Mécanique des Fluides et d'Acoustique, Ecole Centrale de
LYON, BP 163 ECULLY cedex, France Tel +33-72-18-61-56, Fax +33-78-64-71-45,
E-mail bataille@athena.mecaflu.ec-lyon.fr
- * **11th International Heat Transfer Conference**
Seoul, KOREA, August 23-28, 1998
Prof. S.T.Ro, Tel +82-2-880-7111, Fax +82-2-883-0179

A Note from the Editor

Members, who have paid the membership fee but did not send their Biographical Questionnaire, please send the Questionnaire to the Editor as soon as possible.

Members, who have sent the Biographical Questionnaire but did not pay the membership fee, should pay the fee to ICeM.

The annual membership fee is ¥3,500 (Japanese yen) (¥1,000 for members of the Japan Society of Multiphase Flow (JSMF)).

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- The ICeM Newsletter is published twice a year and the next issue will be published in April 1996.
- Space may be bought in the Newsletter for advertisements. Please contact the Editor for details and rates.
- Any questions/comments are also welcome.

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PRELIMINARY ANNOUNCEMENT

19th International Congress of Theoretical and Applied Mechanics

Kyoto International Conference Hall, Kyoto, JAPAN

August 25-31, 1996.

The 19th International Congress of Theoretical and Applied Mechanics will be held in August 25-31, 1996 at Kyoto, Japan under the auspices of the International Union of Theoretical and Applied Mechanics (IUTAM). The Congress will cover the entire field of theoretical and applied mechanics. The scientific program of the Congress will consist of two General Lectures for the Opening and Closing Sessions, Invited Sectional Lectures, Mini-symposia, Lecture Sessions and Seminar Presentation Sessions.

The following six topics will receive special attention as subjects of the Mini-Symposia:

| | |
|--|--|
| <i>Vorticity dynamics and turbulence</i> | <i>Mechanics of heterogeneous and composite solids</i> |
| <i>Non-Newtonian fluid flow</i> | <i>Solid mechanics in manufacturing</i> |
| <i>Aero- and hydroacoustics</i> | <i>Structural optimization</i> |

The following topics will be selected as Pre-nominated Sessions:

(Fluid mechanics) *Biological fluid mechanics; Boundary layers; Combustion problems; Compressible flow; Computational fluid mechanics; Diffusion problems; Experimental methods in fluid mechanics; Flow instability and chaos; Free surface/interface problems; Geophysical fluid dynamics; Magnetohydrodynamics; Multi-phase flows; Reacting flows; Thermodynamics; Topological fluid mechanics; Vortex dynamics*

(Solid mechanics) *Active and passive structural control; Biomechanics; Chaos in dynamics; Computational solid mechanics; Contact and friction problems; Damage mechanics; Dynamic plasticity of structures (crash mechanics); Elasticity; Experimental methods in solid mechanics; Fracture and crack mechanics; Impact and wave propagation; Material instabilities; Multi-body dynamics; Plasticity; Plates and shells; Rock- and geomechanics; Scaling laws for mechanics of fracture; Stability of structures; Structural vibrations; Viscoelasticity and creep*

(Solid-fluid mechanics) *Earthquake engineering; Environmental fluid and solid mechanics; Fluid-structure interaction problems; Sport mechanics*

Papers on other topics of theoretical and applied mechanics are equally welcome and will be organized in other Sessions.

Participants who wish to contribute a paper to the Congress are asked to submit seven copies of an Extended Summary (500 words) and seven copies of a brief Abstract [100 - 150 words, single page, double space typing, with full name and full address of the author(s)]. All authors must submit this material directly to the Congress Office to arrive no later than January 15, 1996.

A limited amount of fund will be available for partial support of young participants. Requests will be considered at the time of selection of papers for the Congress.

Those who wish to be placed on the circulation list for subsequent announcement should write to the Congress Office at the following address:

Professor Eiichi Watanabe, Secretary General, ICTAM 1996
Department of Civil Engineering, Kyoto University
Sakyo-ku, Kyoto 606-01, JAPAN
Phone: +81-75-753-5079 Telefax: +81-75-752-5296
E-mail: ictam@strsun1.kuciv.kyoto-u.ac.jp

SELECTION OF PAPERS

Initial screening will be based on the abstracts of approximately 500 English words. The abstract should contain: 1) paper title, 2) authors' names, affiliations and full addresses, and 3) name, address, phone number, and fax (telex) number of the author to whom subsequent correspondence should be directed. The abstract should state clearly the objectives, results and conclusions to enable the scope and nature of the paper to be assessed. Final acceptance will be based on review of the complete manuscript. All accepted papers will be included in bound volumes which will be available at the Conference.

DEADLINES

December 31, 1995 Four (4) copies of abstract due
 January 31, 1996 Notification of abstract acceptance
 April 30, 1996 Three (3) copies of full-length paper due for review
 June 15, 1996 Notification of paper acceptance
 July 15, 1996 Camera-ready mats due

SUBMISSION OF PAPER

Please submit the abstract to one of the following:

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 2-1, Yamada-Oka, Suita, Osaka, 565, JAPAN
 Tel. 81-6-879-7253
 FAX 81-6-876-4975

SCOPE

Papers are solicited which deal with all aspects of thermal engineering including heat transfer, fluid mechanics, thermodynamics, thermal properties and combustion, both of fundamental science and applied technology. Modeling, theory, analysis, computation, design, experiments, and numerical simulations are all appropriate. Topics include but are not limited to:

- Aerospace systems
- Air-conditioning and refrigeration systems
- Boiling & evaporation
- Chemical process systems
- Combustion applications
- Combustion fundamentals
- Combustion in engines
- Conduction heat transfer
- Convection heat transfer
- Cryogenic systems
- Condensation
- Coupling of convection & radiation
- Electronic equipment cooling
- Energy and power systems
- Environmental systems
- Fluidized bed
- Heat exchangers
- Heat storage systems
- Heat transfer in bio-systems
- Materials processing
- Measurement techniques
- Molecular dynamics
- Multiphase systems
- Phase change phenomena
- Solar energy applications
- Thermal control of equipment
- Thermal radiation
- Thermophysical properties
- Turbomachinery cooling

**FIRST ANNOUNCEMENT AND
 CALL FOR PAPERS**

Third KSME-JSME

Thermal Engineering Conference

'96-Kyongju

October 20-23, 1996
Kyongju, Korea

The Korean Society of Mechanical Engineers

The Japan Society of Mechanical Engineers

ICMF'98

3rd International Conference on Multiphase Flow

LYON, France June 1998

Preliminary Announcement

The 3rd ICMF will be held in LYON, France during the week of 8 - 12 June 1998. Although details of the conference programme have yet to be defined, it is expected that the scientific programme will focus on four main subject areas:

- S1: Dynamics of isolated bubbles, drops and particles (including thermal effects)**
Hydrodynamic forces and interactions, Interfacial Effects, Wall-Particle Interactions,....
- S2: Physics of dispersed flows (including fluidized beds, sprays, bubbly and particulate flows)**
Inhomogeneous flows, Numerical Simulation, Modelling, Dispersion, Turbulence Modification, Deposition,....
- S3: Flow structure and instabilities (including solid-fluid and fluid-fluid)**
Transition, Slug and Annular Flow, Churn, Waves and Transients, Clustering,....
- S4: Heat Transfer and Phase Change**
Boiling, Condensation, Evaporation, Spray and Coal Combustion,....

Each subject area will be covered by keynote lectures, oral and poster presentations. In addition, one day will be devoted specifically to industrial and environmental applications of multiphase flows. We are still in the process of forming the necessary committees, but the following have already agreed to serve:

International Organizing Committee

| | | |
|----------------|-------------------|------------------------------|
| Chairman: | Prof. J. BATAILLE | University of LYON I, France |
| Vice-chairmen: | Prof. K. AYUKAWA | Chairman of JSMF, Japan |
| | Prof. M. ROCO | NSF, USA |

Scientific Committee

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| Dr. J.M. DELHAYE | Grenoble | Prof. S. ZALESKI | Paris |
| Prof. J. FABRE | Toulouse | | |

Anyone wishing to add their name to the mailing list for further announcements for this conference should contact Prof. J. BATAILLE, by e.mail, fax or post and should provide the following information:

ICMF'98

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