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The Japan Society of Multiphase Flow

Report on and Reviews to 8th Workshop on Two-Phase Flow Predictions March 26-29, 1996, Mersberg, GERMANY

by Lixing Zhou

The 8th Workshop on Two-Phase Flow Predictions is the continuation of the 1st to 7th workshop series, held each two years, sponsored jointly by the European Research Community of Flow, Turbulence and Combustion (ERCOFTAC) and the International Association of Hydraulics Research (IAHR), and organized by Prof. Sommerfeld formerly from Erlangen-Nurnberg University and now from Martin-Luther University. The 8th Workshop was held on March 26-29, 1994, at Martin-Luther University, in Mersberg, Germany. Nearly 75 participants from Europe, the United States, Australia, Japan and China, together 18 countries, attended this workshop.

The main topics of this workshop are: New mathematical models, numerical methods, and fundamental studies of gas-solid, gas-liquid and liquid-solid flows; direct numerical simulation and large eddy simulation; two-phase flow measurements and application of mathematical models in chemical, nuclear, hydraulic and combustion engineering; verification of existing numerical models developed by different authors by the same experimental data of test cases.

The fundamental studies using LDV, PDPA and LES paid much attention to particle fluctuation and particle-fluid turbulence interaction. Hishida from Keio University reported reduction of gas turbulence by glass beads of 50 and 100 micrometers in two-phase wall jets, however

Talor from Imperial College of Science and Technology found that glass beads of 80 and 40 micrometers enhance gas turbulence in downstream region of sudden-expansion two-phase flows, and that particle fluctuation increases with increasing particle size. The PDPA measurements by both Talor and Boree from CNRS, France show much greater particle axial fluctuation than its radial fluctuation and increasing anisotropy with the increase of particle size. The LES, made by Simonin from EDF, France shows reduction of particle normal Reynolds stresses and their anisotropy by particle-particle collision.

For modeling complex two-phase flows, many papers show new development of two-fluid models, in particular, based on the statistical theory or theory of probability distribution function (PDF). Derevich from High-Temperature Institute, Russia, derived particle diffusivity due to collision using a joint PDF transport equation in velocity and geometrical coordinates of two colliding particles. Zaichik from Energy Institute, Russia, proposed a closure method for Particle Reynolds stress and turbulent kinetic energy transport equations using the analytical solution of PDF transport equation for simple uniform and isotropic turbulent gas-particle flows. Alternatively, Zhou from Tsinghua University, China, derived a joint PDF transport equation in gas and particle velocity space, proposed a clo-

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sure method using the idea similar to that used in the second-order moment closure, solved PDF equation numerically and compared the prediction results with those obtained directly using the second-order moment closure and the experimental results.

In developing Lagrangian models of dispersed phase (particles or droplets) Graham from Plymouth University proposed a new method of selecting the eddy-particle interaction time. Pereira from Institute of Superior Technico, Portugal, proposed a method of using 500 particle trajectories instead of original 150000 particle trajectories by introducing the concept of PDF. Hishida from Keio University simulated the gas-particle wall jet using a two-scale k-epsilon turbulence model and stochastic particle trajectory model, trying to study the effect of particles on gas turbulence in different regions of the energy spectrum. Sommerfeld from Martin-Luther University and Tropea from Erlangen-Nurnberg University simulated the spray-gas two-phase flows using the particle stochastic trajectory model and three different particle collision models, compared the prediction results with the PDPA measurements and pointed out the merits and drawback of these models.

In the area of DNS studies, Squire from Vermont University reported his simulation results for gas-particle flows in a mixing layer with glass and copper beads and $Re = 644$, indicating the increase of particle fluctuation and its anisotropy with the increase of particle size and material density. Elghobashi studied uniform gas-particle shear flows with corn and copper beads of 87 micrometers using DNS, and pointed out that particles reduce gas turbulence due to not only the effect of drag force, but also the reduction of production of turbulent kinetic energy and changing the vortex structure of gas.

Some recent advances in two-phase flow measurements have also been reported. Hassan from Texas A&M University developed PIV and

PTV technique for measuring gas-liquid two-phase flows. Tropea from Erlangen-Nurnberg University studied the drawback of PDPA measurements and proposed a dual burst technique to improve the accuracy of measurements.

Many engineering application results have been reported in this workshop. Most of these studies are using the commercial codes FLUENT, PHOENICS, FLOW-3D and FIDAP to simulate nonreacting and reacting gas-particle flows in chemical reactors, separators, and boiler furnaces. In doing this, different turbulence models, such as k-epsilon, k-epsilon-RNG and DSM models have been used and compared with each other.

One of the important purposes of this workshop is using the same experimental data of test cases to verify and evaluate different numerical models developed by different authors. This is a unique feature of this workshop. I think, this is much helpful for improving existing numerical models and developing new models.

Personally, I myself have sent our papers published at the 3rd and 5th Workshops, and attended the 7th and 8th Workshops, presented our papers at these two last workshops. Although I am not the organizer of the workshop but I hope that more and more numerical modelers in the field of two-phase flows can attend the future workshops and exchange the information of common interest. Finally, I like to express my sincere gratitude to Prof.-Dr. Sommerfeld for organizing such interesting workshops and inviting me to attend these workshops.

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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 the fourth Engineering Foundation Conference
on Fluid-Particle Interaction
May 12-17, 1996, Davos, SWITZERLAND**

by Graham Wallis

Over seventy researchers, academics and practitioners attended the fourth Engineering Foundation Conference on Fluid-Particle Interaction, held in Davos, Switzerland, 12-17 May 1996. The meeting was co-chaired by Graham Wallis and Gad Hetsroni. The topics covered a very broad field, from bacterial attachment to surfaces and the properties of colloidal suspensions to aquifers, avalanches and snowdrifts. Many papers concerned fluidized beds and particle transport.

Three keynote lectures focused on industrial applications. Reg Davies presented a vast array of applications involving particles of many shapes and sizes, mentioning problems of attrition, wear, dustiness and concentrated suspensions. He emphasized that many elements of a plant, such as cyclones and filters, are installed to fix up processes that don't work right in the first place, due to lack of understanding and control. Instruments, using optical and acoustic methods and tomography, are needed to measure particle size and concentrations. Lothar Rey reviewed the operating conditions of large CFB reactors. He developed the basic mechanics leading to a set of dimensionless groups to characterize equipment. Models based on a single particle need modification because particles form strands, influencing the effective interphase drag force. David Newton spoke of a gulf between academic information and the needs of industry, citing as an example gas penetrations in fluid beds reactors that are shorter than predicted. However, he also presented key sets of (Glicksman's) dimensionless groups that provide some success in representing equipment.

Introducing keynote lectures on the more fundamental side, John Yates traced the history of two-fluid models for fluidization and the debates about what terms should be in the equations. He reviewed attempts to introduce stability by using a "particle pressure coefficient" or some similar force that repels particles trying to form aggregates. Some models are more successful than others in predicting details, such as the void fraction ahead of a bubble or the trajectories of

particles in the cloud around it. Olivier Simenon gave a virtuoso description of two-phase turbulence, collisions, averaging, probability density, evolution equations, large eddy simulations and other fundamental theory that might explain why industrial engineers can be driven desperate. Gad Hetsroni showed fascinating videos of turbulent bursts near a heated wall and the effect of particles upon them, giving a clear example of how flow visualization can help develop a picture of what is really happening behind the simplifications of averaging. Clayton Crowe gave an overview of two-phase codes, particularly those using averaged equations for the fluid and a trajectory approach for the particles, coupled by interphase forces. He mentioned gaps in the theory, such as ways to represent the random energy of particles, and the need for good information about particle size, especially in atomization. He described the use of codes for modeling sprays and coal-fired boilers and mentioned the unrealistic patterns of dense phase transport predicted by some codes while individual particle simulation may do better. Ferit Boysan gave more examples of the application of CFD to cyclones, combustion, Taylor vortices and bubbles in a fluidized bed. He described the interaction force on a particle, the effects of fluid turbulence and the Gidaspow model of particle "temperature".

Shorter papers covered many topics including particle aggregation and breakup, direct numerical simulation, particle-eddy interactions, length scales, mechanisms for diffusion and dispersion, shock waves, slugging, bubble stability, sedimentation, measurement of interphase forces, wall effects, instrumentation, filtration and well-drilling muds.

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**Report on the 2nd European Thermal-Sciences and 14th UIT National
Heat Transfer Conference
May 29-31, 1996, Rome, ITALY**

by G. P. Celata

The 2nd European Thermal-Sciences and 14th UIT National Heat Transfer Conference has been organized in Rome, during 29-31 May 1996, by the ENEA National Centre of Thermal-Fluid Dynamics, in cooperation with the EURO THERM Committee and the Italian Union of Thermal-Fluid Dynamics.

As many as 28 countries took part in the Conference for a total of 252 delegates, including 31 students. A total of 210 general papers have been finally accepted for presentation at the Conference (poster format) and published in the Conference Proceedings, with a significant contribution from non-european and overseas countries. A total of 34 papers have been presented at the Open Forum Session (poster format).

Such papers have not been reviewed and not included in the conference Proceedings.

The topics treated in the Conference covered many aspects of thermal-sciences and heat transfer: heat transfer enhancement, freezing, melting and solidification, particulate, porous media, flow boiling and CHF, forced convective heat transfer, conduction and insulation, natural/mixed convection, thermodynamic processes and material properties, process safety and nuclear reactors, measurement techniques, numerical heat transfer, condensers and condensa-

tion, heat exchangers and fouling, two-phase flow, thermal radiation and combustion, fluidized beds and drying, pool boiling.

The twelve keynote lectures, presented by outstanding experts, highlighted the state-of-the-art in the following topics: heat transfer enhancement techniques for electronic components, process industry heat exchangers, and fusion reactors high heat flux components, turbulence in heat transfer, natural convection in enclosure, thermal-fluid dynamics in process safety, quantitative infrared thermography, fouling and heat transfer in compact and non-compact heat exchangers, radioactive properties and radiative transfer in gases, electricity from coal.

The Proceedings of the Conference are available from Edizioni ETS, Pisa, Piazza Torricelli, 4, I-56126, Italy, Fax: +39 6 50 20158.

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**Report on the 34th Meeting of the European Two-Phase Flow Group
June 3-5, 1996, Grenoble, FRANCE**

by G. P. Celata

The 34th European Two-Phase Flow Group Meeting was held at Grenoble, France, hosted by the Commissariat à l'Energie Atomique. The Group meets every year in a European country, discussing very informally the latest research presented by delegates in plenary sessions.

As there are no Proceedings, and copies of papers are distributed by authors at the meeting, presentations very often deal with researches in progress, while discussions are very often sources of new ideas for research.

The 27 papers were presented in ten plenary sessions distributed over two and a half days. About fifty-five people attended the meeting giving rise to very debated and animated discussions after each talk.

The papers covered the following items:

- * Boiling heat transfer (oxidation effect on the minimum film boiling temperature, geometrical effects on the CHF)
- * Flashing and droplet flow (two-phase flashing flow, dynamics of compressible expansion flows, choked flashing flow at multiple simultaneous locations)
- * Instrumentation (three-phase dispersed flows in a Venturi tube, bubble image phase discrimination calibration)
- * Flow pattern and phases distribution (turbulent flow with wall bubble injection, analysis of two-phase $k-\epsilon$ models, vorticity generation at free surfaces, inclination effect of drop sizes in annular flow, evaluation of size distribution of dispersions in breakage processes, stratified two-phase flow in near horizontal pipes, roll waves in inclined cocurrent separated gas-liquid flow, analysis of large bubbles injected into bubbly pipe flow, split of vertical churn flow and two-phase flow at T junctions)
- * Nuclear reactors and industrial systems (high pressure passive injection system for LWR application, experimental results from transient tests - PANDA facility -, solar absorber tube with direct steam generation, three-phase gas-liquid-solid separation using centrifugal forces).

At the delegates meeting it was decided that the 1998 European Two-Phase Flow Group Meeting be held open to Japanese delegates (a sort of Japanese-European Two-Phase Flow Meeting) soon after or before the ICMF-98 in Lyon.

It is planned that Professor Iztok Zun organizes the meeting and keeps contacts with Japan.

Information about programme and/or papers of the Grenoble meeting may be obtained contacting:

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General information

The GREDIC is a research group of the French CNRS devoted to basic research in two-phase flow. The group is composed of research teams of CNRS, CEA, EDF and Bertin. It was created in 1992 and is headed by Professor Jean-Marc Delhaye. The GREDIC activities are summarized in a set of articles published in the French scientific journal *La Houille Blanche*, Volume 1-2, 1996. Two-phase flow modeling and measuring techniques were the two research programs handed over by the GREDIC in its four years of existence.

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**Report on the European Two-Phase Flow Group Meeting
June 3-5, 1996, Grenoble, FRANCE**

by D. Grand and J.M. Delhaye

The 34th European Two-Phase Flow Group Meeting was held in Grenoble on June 3-5. About 40 people representing 14 European countries attended the meeting which was co-chaired by Professor Dominique Grand and Professor Jean-Marc Delhaye.

The keynote lecture of the meeting was given by Sebastien Candel, Professor at Ecole Centrale Paris and a Corresponding Member of the French Academy of Sciences. Professor Candel talked about the *Current trends in combustion modeling*, insisting in particular on the two-phase aspects of combustion.

Several topics were addressed during the meeting such as boiling, flashing flow, condensation, instrumentation, bubbly flows, droplet flows, horizontal and inclined flows, two-phase flows in singularities, computer codes, industrial systems and nuclear reactors. The session on Boiling was dedicated to the late John G. Collier, the well known scientist and manager who passed away in November 1995.

The European Two-Phase Flow Group Meeting being a private meeting with an imposed number of participants per country, there is no proceedings. It is primarily a forum for presentation and discussion of current research activities.

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Report on "SPRAY 96"

June 4 - 5, 1996, University of Bremen, Bremen, GERMANY

by G. Schulte

From June 4 to 5 the SPRAY was held at the University of Bremen, Germany. The workshop, this year organized by the Fachgebiet Verfahrenstechnik, University of Bremen, is related on sprays, measurements in sprays and liquid atomization systems.

The conference is addressed mainly to German speaking people, although on request most of the speakers as well provide English versions of their papers. In total a number of 20 oral papers were presented. This year the conference was attended by a number of 60 participants. Those who are

interested in the proceedings from the conference should contact:

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**Report on International Conference on Porous Media and Their Applications
in Science, Engineering and Industry
June 16-21, 1996, Kona, Hawaii, USA**

by Kambiz Vafai

In response to the increasing interest in the area of fluid and heat transport in porous media Engineering Foundation and Institute of Industrial Mathematical Sciences had sponsored an International Conference on Porous Media and Their Applications in Science, Engineering and Industry in Kona, Hawaii. This conference was co-sponsored by the National Science Foundation, Fields Institute for Research in Mathematical Sciences (Canada), Applied Mathematics Institute at the University of Alberta, the University of New Brunswick (Canada), and The Ohio State University.

The conference was very successful and extremely interactive, with representatives from government labs, universities and private industries. Topics, sessions and abstracts were covered in the preprogram booklet and the Proceedings of the International Conference on Porous Media and their Applications in Science, Engineering and Industry was later published.

The International Program Committee consisted of:

Chair: Kambiz Vafai

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- P. N. Shivakumar (Manitoba)
- C. L. Tien (U/California-Berkeley)
- D. Vortmeyer (Germany)
- S. Whitaker (U/California-Davis)

The invited speakers were:

- I. Catton (California)
- P. Cheng (Hong Kong)
- F. A. L. Dullien (Alberta)
- J. Georgiadis (U/Illinois-Urbana)
- C.E. Hickox (Sandia National Labs)
- H. Kubota (Japan)
- A. Mojtabi (France)
- V. E. Nakoryakov (Russia)
- N. Rudraiah (India)
- D. Vortmeyer (Germany)
- S. Whitaker (U/California-Davis)

Papers in the proceedings were divided according to the following technical topics:

- 1) Natural and Forced Convection in Porous Media
- 2) Multiphase Flow and Heat Transfer
- 3) Advanced Mathematical Approaches to Modeling and Numerical Techniques
- 4) Effective Properties and Transport Through Porous Media
- 5) Experimental and Measuring Techniques
- 6) Industrial and Environmental Heat Transfer and Fluid Flow
- 7) Reactive Flows and Radiation Heat Transfer
- 8) Combined Heat and Mass Transfer

In this conference the newly established Journal of Porous Media was introduced. For additional information on this journal, the prospective authors can contact me at the above address, Email or fax number.

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**Report on Eith International Symposium on Application
of Laser Techniques to Fluid Mechanics
July 8-11, 1996, Lisbon, PORTUGAL**

by M. Maeda et al.

Eith International Symposium on Application of Laser Techniques to Fluid Mechanics was held at The Gulvenkian Foundation in Lisbon July 8th to 11th 1996.

The objective of the symposium was to provide a forum for the presentation of the most advanced research on laser techniques for flow measurements and communicate significant results to fluid mechanics. The applications of laser techniques to scientific and engineering fluid flow research was emphasized but contributions to the theory and practice of laser methods were also considered where they facilitate new improved fluid mechanic research. Attention was placed on laser Doppler anemometry, particle sizing and other methods for the measurement of velocity, scalars such as particle image velocimetry and laser induced fluorescence.

200 papers from 280 submitted abstracts were presented in the sessions; Two- phase

Flows Instrumentation, Two-phase flows, Complex flows, 2D- and 3D-PIV, PTV signal processings, Sprays, Liquid Films, Combustion, Engines. 35 topic papers from the symposium presentations were selected and are published in a bound volume by Springer-Verlag next year.

The organizers would like to express our thanks for all advisories, participants and supporting organizations.

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**Report on the Fifth World Congress of Chemical Engineering
July 14-18, 1996, San Diego, California , USA**

by Joseph J. Cramer

The Fifth World Congress of Chemical Engineering was held in San Diego, California from July 14-18, 1996. The Congresses are co-sponsored by the Asian Pacific Confederation of Chemical Engineering, European Federation of Chemical Engineering and Interamerican Confederation of Chemical Engineering and have been held every fifth year since 1976. The host society and confederation for the San Diego Congress was the American Institute of Chemical Engineers (AIChE) and the Interamerican Confederation of Chemical Engineering respectively.

The Congress had more than 1800 total attendees from more than 50 countries with representation split about evenly between US and international participation. The Congress had 112 technical sessions over its four days of technical programming and covered a broad gamut of technical subjects related to today's and tomorrow's chemical engineering. Areas receiving especially

heavy attention included materials research, technology management and transfer, energy development, environmental and sustainability questions and process safety.

The formal portion of the Congress was initiated on Monday morning with major plenaries by representatives of each of the three major confederations. Professor Naoya Yoda of the Kansai Research Institute and formerly CEO of Toray Corporate Business Research addressed the new challenges faced by the materials industry, while David Buzzelli, Vice President for Dow Chemical, looked at the question of sustainability from his perspective as Co-Chair of President Bill Clinton's Council on Sustainable Development. The Third plenary speaker, Professor Jacques Villermaux from the Institut Universitaire De France, addressed the broad issue of a new paradigm in chemical engineering and the need to move more from an emphasis only on process engineering to a greater attention

to product engineering.

In addition, keynote addresses by Dr. Richard Emmert, Executive Director of AIChE, and Dr. Alfred Wechsler, Senior Vice President of Arthur D. Little, Inc. addressed the future of chemical engineering from human (engineer) and technical viewpoints respectively.

Finally, the Congress closed at midday on July 18 with an address by Professor Saul J. Escalera, professor at the University of San Simon, Cochabamba, Bolivia and a 50th Anniversary Fulbright Distinguished Fellow. Dr. Escalera's address emphasized the need for an increased direct partnership between scientists

and engineers from both developed and less developed nations. He very effectively espoused the view that overcoming global poverty is the principal challenge for the next millenium.

Ian Shedden, President of the Sixth World Congress of Chemical Engineering, spoke briefly at the closing ceremonies and invited everyone to attend Melbourne, Australia in 2001.

Dr. Joseph J. Cramer,
Dir., Programming and Educational Services,
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Report on the 15th Multiphase Flow Symposium' 96-Fukui
July 29 - 31, 1996, Fukui, JAPAN

by Fujio YAMAMOTO

The 15th Multiphase Flow Symposium' 96-Fukui was organized by the Japan Society of Multiphase Flow and other 34 societies. In the symposium, beside the conventional programs, such as lectures, presentations and predetermined forum "What should we do in the research of Multiphase Flow of the 21th century and in the joint research programs among industries, universities and government?", a new forum titled "Life and play in snow" was also opened. More than 200 participants with their 89 lectures, three lectures for the fora, one invited lecture took part in the symposium. Proceedings with a volume of 356 pages have been published.

Since there were many fields researched in multiphase flow, lectures were divided in several sessions to be taken. The lecture sessions and number of papers in them are listed as follows.

Lecture Sessions	Number of papers
Physics (Gas-Liquid)	10
Numerical Simulation	23
Environmental Technology	7
Interfacial Phenomena	5
Multiphase Turbulent Flow	9
Dynamics	14
Industrial Technology	3
Measurement & Contro	19
Visualization	5
Modelling	4
<hr style="border-top: 1px dashed black;"/>	
Total	89

Prof. Yoshiyuki Iemoto, Fukui University, gave his invited lecture on "Air-Texturing of Yarn". Three lectures for forum mainly on the topic of joint research program among industries, universities and government. Ideas and suggestion were proposed for the forum-discussion. Many young researchers participated in this symposium and showed their great activities in the future researches. The chairman of the organizing committee was gratified that a lot of fruitful discussion were made among the participants from industries and universities in each session room and on the floor.

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**Report on Interfacial Phenomena and thermophysics in Microgravity,
31st National Heat Transfer Conference
August 3-5, 1996, Houston, Texas, USA**

by Mohamed S. El-Genk

A total of fourteen papers were presented in three sessions on the topic of interfacial phenomena and thermophysics in Microgravity at the 31st National Heat Transfer Conference, August 3-5, 1996. The first four papers dealt with the current joint effort between USA and Russian to develop the design and model performance of the International Space Station ALPHA (ISSA) Russian Segment Two-Phase Flow Thermal Control System. ISSA will incorporate many modules with a total heat load of a few tens of kilowatts. The collection, transport, and rejection of excess heat are accomplished using a central two-phase thermal control system (TPS). In a collaborative research by RSC "ENERGIA" and KhAI in Russia, TPS has been shown to be superior to single-phase system for high heat loads and long transport distances. Analysis of thermophysical and operational properties of various coolants has shown that ammonia is the most appropriate choice for ISSA TPS and R-114 is the most appropriate fluid for test beds. A small-scale simulation flight for comprehensive system testing in zero-gravity is being prepared. The United States space station Team (US Team) has developed a SINDA/FLUINT thermal model of the Russian TPS. The model results indicated that the maximum assured heat rejection capability of TPS was 21.5 kW for both hot and cold environments. Results also showed that the pumped liquid active thermal control system was stable at heat exchanger heat loads as low as 1.0 kW, which is 20% of the total system heat load.

The other ten papers presented results of fundamental research on flow boiling simulation experiments using line quench to determine the flow patterns and heat transfer and pressure drop experiments in gas-liquid mixtures that spanned both slug and annular flow regimes on board of NASA KC-135 aircraft. Other topics included experimental studies of pool boiling of water at reduced pressures to investigate nucleate boiling and observe conditions for the critical heat flux in reduced gravity, again on board of NASA 930(KC-135) aircraft. The annular flow data

base for both one-g and reduced gravity were reviewed for the applicability of the former to the latter. In another paper, the two-phase flow at a Tee-Junction was investigated experimentally to determine the behavior of an air-water mixture in microgravity on board of a specially modified DC-9 aircraft. The authors concluded that the two-phase flow at the TEE-junction is strongly dependent on its orientation with respect to gravity and that the flow conditions are different from those at earth gravity. The effect of thermocapillary on freezing of molten sodium and tin in reduced gravity was investigated numerically; the results at earth gravity and at 1/3, 1/6, and zero gravity were compared. Results showed that combined effects of Marangoni and natural convections in reduced gravity increased melt velocities and reduced freezing rates, particularly near the free surface. In another paper, the thermocapillary migration of two-dimensional, deformable bubbles toward a free surface was investigated numerically. Finally, the results of experiments which investigated the instabilities occurring around a bubble due to combined effects of Marangoni and buoyancy forces were presented. This study used the Mach-Zehnder and Wollaston prism interferometers to observe and record steady, transitional, periodic and non-periodic oscillatory temperature fields surrounding air bubbles on a solid surface subjected to various temperature gradients.

Full papers were published in the AIChE Symposium Series - Heat Transfer NO. 310, Vol. 92, Ed. Mohamed S. El-Genk, American Institute of Chemical Engineers, 345 EE, 47 Street, New York, N. Y. 10017, (212) 705 - 7576. Fax (212) 705 - 7812.

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**Report on Instrumentation for Particle-Fluid Flow
at the National Heat Transfer Conference
August 3-6, 1996, Houston, Texas, USA**

by G. M. Colver

A session titled Instrumentation for Particle-Fluid Flow was held at the National Heat Transfer Conference, August 3-6, 1996, in Houston, Texas, sponsored by the American Institute of Chemical Engineers. Reviewed papers were presented on experimental methods for intrusive and non-intrusive related particle measurements in multiphase systems. Topics sought for the session included laser and optical methods, electric tomography, capacitance probing, and electrostatic field detection and related measurements. Four papers were presented relating to fluidized beds and pneumatic transport. Specific topics areas included fundamental measurements in liquid evaporation in fluidized beds (Lehigh University, USA), electrical capacitance tomography of gas-solid motion (University of Manchester, U. K.), interpretation of multiphase systems through particle image velocimetry (Ohio State University, USA), and diagnostics of

powder systems using particle resistivity (Iowa State University, USA). Session chair was Professor G. M. Colver, Iowa State University and session co-chair was Professor J. C. Chen, Lehigh University.

Copies of all papers are available in AIChE Symposium Series No. 310, Volume 92, 1992 (pp. 153-173). Inquiries for symposium can be sent to Mark Rosenzweig, Editor-in-Chief, AIChE, 345 E. 47th St., New York, NY, 10017; Ph. 212-705-7576; Fax: 212-705-7812).

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**Report on the Fourteenth International Conference
on Nucleation and Atmospheric Aerosols
August 26-30, 1996, Helsinki, FINLAND**

by Markku Kulmala

The first conference of this series took place in Dublin (1955); Second, Basel and Locarno (1956); Third, Cambridge (1958); Fourth, Frankfurt-am-Main and Heidelberg (1961); Fifth, Clermont-Ferrand and Toulouse (1963); Sixth, Albany and University Park (1966); Seventh, Prague and Vienna (1969); Eight, Leningrad (1973); Ninth, Galway (1977); Tenth, Hamburg (1981); Eleventh, Budapest (1984); Twelfth, Vienna (1988); Thirteenth, Salt Lake City (1992). This series of conferences has been held jointly with the Nucleation Symposium since 1988 in Vienna to enhance interaction between two groups of researchers.

In the conference over 200 scientific papers from 32 countries have been presented. The program includes sessions considering basic nucleation phenomena, ice nucleation, tropospheric and stratospheric aerosols and clouds and aerosol-cloud-climate interaction. All these phenomena are studied both experimental and theoretical point of view.

The plenary lectures have been given by P.J. Crutzen, J. Gras, J.L. Katz, A.A. Lushnikov,

D. Oxtoby, J.E. Penner, T. Peter, F. Raes, S.E. Schwartz, R. Strey and G. Vali.

The papers by plenary speakers and other presentations are included in the book "Nucleation and Atmospheric Aerosols 1996" edited by M. Kulmala and P.E. Wagner. The plenary papers together with contributed papers published in this volume will provide a well-balanced perspective of the current research over the entire field and will indicate some important open questions.

The conference were supported by IAMAS, ICCP, CNAA, IGAC and FAAR.

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**Report on QIRT '96 Quantitative Infrared Thermography,
Eurotherm Seminar No.50
September 2-5, 1996, University Stuttgart, GERMANY**

by G. Busse

The third Eurotherm Seminar on Quantitative Infrared Thermography (QIRT '96) was held in Stuttgart during Sept. 2-5.

Thermography has become a very popular tool to look in a nondestructive and remote way into various problems, e.g. damage of airplanes, heat losses of buildings, functionality of electronic circuitry, and medical applications. The goal of QIRT '96 is to provide first-hand information on new applications, on new equipment, and on emerging techniques.

Sept. 2nd was the day of preseminar courses to provide an overview as a background for the specialised presentations. There were 3 courses. Basics of thermography, Application to fluids, and Application to solids.

On Sept. 3rd, after the opening ceremony two invited plenary papers were presented, one on thermography of buildings (Dr. Wiggemhauser, BAM Berlin), and one on aerospace applications of thermography (Prof. Roser, DLR Berlin). The following 92 contributions (oral and posters) documented the rapid development in this field. Focal plane array cameras have now achieved a high standard. Lockin-thermography is becom-

ing popular for remote quality control of big components, and ultrasonic lockin thermography as a dark field method allows for selective imaging of defect areas.

A proceedings book will be published in early 1996. Available right now is the book of abstracts where each of the 92 contributions is presented on 2 pages.

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IKP, Stuttgart University, Pfaffenwaldring 32
D-70569 Stuttgart, Germany
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Fax: +49/0711-685 2066

Location for next conference (QIRT '98) is still under discussion, the decision will be made before the end this year.

For further information please contact

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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.

**The Japan-U.S. Seminar on Two-Phase Flow Dynamics (The Fifth)
Fukuoka, JAPAN in 1996**

by Tohru Fukano

The Japan-U.S. Seminar on Two-Phase Flow Dynamics has been held every four years either in Japan or in U.S. alternatively. The first seminar was held at Kobe in Japan in 1979, the second was at Lake Placid in 1984, the third was at Ohtsu in Japan in 1988, and the fourth was at Berkeley in 1992.

This seminar was the fifth one, held in Fukuoka (Kyushu university), and organized by both Prof. M. Ishii (Purdue University) and Prof. T. Fukano (Kyushu University), who had been assigned to the organizers at the previous seminar in Berkeley. This seminar was one of the Japan-U.S. Scientific Cooperative Projects, and supported by both JSPS and the NSF.

The topics of the gas-liquid two phase flow has been mainly discussed in these seminars for twenty years. I would like to show my gratitude to all of the participants to these seminars for their efforts.

The topics relating to the gas-liquid two phase flow dynamics have been discussed intensively in one room. The objectives of the present seminar are followings;

- (1) To present the guide lines for the future research, by summarizing the research programs which have been conducted in both Japan and U.S. since the last one in Berkeley,
- (2) To set the new directions of the researches by summarizing the development of the state-of-the-art measurement technologies,
- (3) To construct the three dimensional flow models,
- (4) To investigate the gas-liquid interfacial phenomena deeper and further,
- (5) To promote the academic exchanges between Japan and U.S. young researchers.

The total participants from both domestic and over seas was about ninety. The details are the followings.

- (1) The number of the committee members from U.S. was ten. They are
M. Ishii (Purdue Univ.),
M. L. Bertodano (Purdue Univ.),
V. K. Dhir (Univ. of California, Los Angeles), T. J. Hanratty (Univ. of Illinois),
R. T. Lahey, Jr. (Rensselaer Poly. Tech. Inst.), P. F. Peterson (Univ. of California, Berkeley),
V. Ransom (Purdue Univ.),
J. Reyes (Oregon State Univ.),
T. Theofanous (Univ. of California, Santa Barbara), and G. B. Wallis (Dartmouth College).
- (2) The number of the committee members from Japan was fifteen.

- (3) The number of the participants from neither U.S. nor Japan was two. They are
I. Zun (Slovenia), and M. Kawaji (Canada).
- (4) The number of the participants from Japan was about sixty.

The program and the session titles are the followings, where the number of the presentation in each session are shown in ().

The First Day :

Opening Ceremony (Summaries of the research in these four years in U.S. and Japan)

Keynote Lecture 1 :

Gas-Liquid Flow and its Application to Petrochemical Industries by T. Hanratty

S1 : Petro-chemical (1)

S2 : Interfacial Structure and Phenomena (5)

The Second Day :

S3 : Scaling (2)

S4 : Multi-Dimensional Modeling 1 (4)

S5 : Multi-Dimensional Modeling 2 (2)

S6 : Liquid Films and Droplets 1 (4)

S7 : Liquid Films and Droplets 2 (4)

The Third Day :

Keynote Lecture 2 :

Advanced PWR AP600 Research at OSU by J. N. Reyes, JR.

S8 : Nuclear Reactor 1 (4)

Keynote Lecture 3 :

Simplified Boiling Water Research at Purdue by M. Ishii

S9 : Nuclear Reactor 2 (4)

The Fourth Day :

Keynote Lecture 4 :

Compact Heat Exchanger - Two-Phase Flow Heat Transfer in a Narrow Channel by Y. Yamamoto

S10 : Compact Heat Exchangers (4)

S11 : Dynamics and Instability 1 (3)

S12 : Dynamics and Instability 2 (3)

S13 : Dynamics and Instability 3 (3)

The Fifth Day :

S14 : Non-Equilibrium Phase Change (4)

S15 : Measurement 1 (2)

S16 : Measurement 2 (4)

S17 : Measurement 3 (4)

The Sixth Day :

S18 : Turbulence (2)

S19 : Discussion of Future Problems.

The concept of this seminar is to provide the opportunities for the state-of-the-art works, including unfinished ones, to be presented and to be discussed for certain amount of time. How-

ever, the presentation time was at most thirty minutes in this seminar, since the number of the presentation increased, especially Japanese ones.

All of the participants from states were well known researchers. Since some of the participants have known each other for more than twenty years and comprehended each other's work, the discussions were active and essential.

No topics relating to the bio-engineering, of which priority discussion would have been made according to the original plan, were presented from either sides of U.S. or Japan. These topics are expected to be discussed in the next seminar. The number of topics of the computational simulation increased among young researchers, and they are promising. However, it would be suggested to make sure both to perceive the physical meanings of the results and to confirm ones by some other methods such as experiments.

The committee meeting was held during the seminar period. As the results, Prof. T.

Theofanouse (University of California at Santa Barbara) and Prof. K. Hijikata (Tokyo Institute of Technology) were assigned to the representatives of the next seminar which was appointed to be held in the either second or third week of January in year 2000 at Santa Barbara.

Note: There are some proceedings of this seminar, which contain both the summary of the researches conducted in recent four years in Japan and the list of publication, left. If you are interested in these, please make contact with Prof. Fukano.

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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) (¥1,500 for members of the Japan Society of Multiphase Flow (JSMF)); the fee for 3 years(1997-1999) is ¥10,000.

Please send your remittance to the Editor in one of the following ways.

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Name of the Account: ICeM, G. Matsui

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*Personal checks are not acceptable.

- ICeM will send the membership card and the receipt of membership fee for those who pays the fee.
- The ICeM Newsletter is published twice a year and the next issue will be published in April 1997.
- Space may be bought in the Newsletter for advertisements. Please contact the Editor for details and rates.
- Any questions/comments are also welcome.

Future Meetings

Listings include Conference Name, Place, Date and Contact.

Summer School Hochschulkurs Mehrphasenstroemungen

Hannover, GERMANY, October 7-10, 1996
Prof. Dr. Mewes, Prof. F. Mayinger, Information:
Prof. D. Mewes, Institut fuer
Verfahrenstechnik, Universitaet Hannover,
Callinstrasse 36, D-30167 Hannover
Tel: +49-511 762 3638
Fax: +49-511 762 3031

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@be.pc2ihep.ac.cn

12th International Conference on MHD Electrical Power Generation

Yokohama, JAPAN, October 15-18, 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
Prof. Sang Chun Lee, Tel +82-53-810-2453,
Fax +82-53-813-3703
Prof. Motoo Fujii, 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

Multiphase Flow Modeling-Fundamentals and Application to Oil Production Systems

Part1: November 4-8, 1996 Trondheim
Part2: November 11-15, 1996 Torondheim,
NORWAY, (Abstracts due: October 7, 1996)
Prof. Michael Golan, Institute of Petroleum
Technology and Applied Geophysics
Tel: 73 59 49 62, Fax: 73 94 44 72, E-mail:
mgolan@ipt.unit.no

AICHe 1996 Annual Meeting Session on Turbulent Flows

Chicago, USA, November 10-15, 1996
(Proposal due: April 15, 1996)
Prof. Sanjoy Banerjee, Department of Chemical
Engineering, University of California,
Santa Barbara, CA 93106, USA
Tel: +1-805-893-3456, Fax: +1-805-893-4731,
E-mail: banerjee@anemone.ucsb.edu

Modeling and Enhancement of Convective and Ebuilient Heat Transfer - A Symposium in honor of Prof. Arthur E. Bergles

Atlanta, Georgia, USA, November 16, 1996

Dr. R.M. Manglik, Fax: +1 513 556 3390

E-mail: rmanglik@gauss.uc.edu

Dr. M.K. Jensen, Fax: +1 518 276 6025

E-mail: jensem@rpi.edu

Dr. A. Bar-Cohen, Fax: +1 612 624 1398; E-mail: abc@me.umn.edu

Dr. A.D. Kraus, Fax: +1 408 649 6324; E-mail: krausa@asme.org

1996 International Mechanical Engineering Congress & Exposition (IMECE)

Atlanta, Georgia, USA, November 17-22, 1996

Prof. G.P. Peterson

Tel: +1 409 845 5337, Fax: +1 409 845 3081

E-mail: gppeterson@mengr.tamu.edu

• Special Session: Experimental Study of Multiphase Flow

Dr. J.R. Riznic, Fax: +1 414 229 6958

• Special Session: Symposium on Fire and Combustion Systems

Prof. M.P. Menguc, Fax: +1 606 257 3304

E-mail: menguc@ukcc.uky.edu

Molecular and Microscale Heat Transfer in Materials Processing and Other Applications

Yokohama, JAPAN, December 1-5, 1996

Prof. I. Tanasawa, Fax: +81 3 3401 6575

International Conference on Heat Transfer with Change of Phase

Kielce, POLAND, December 8-10, 1996

Prof. M. Poniewski, Conference secretary: Artur

Bartosik, Kielce University of Technology,

A1. 1000-lecia P.P.7; Tel: (+48-41) 24333

e-mail: heat@eden.tu.kielce.pl

Sixth Australasian Heat and Mass Transfer Conference

Sydney, AUSTRALIA, December 9-12, 1996

Dr. C. V. Madhusudana Secretary, 6th AHMTC,

School of Mechanical and Manufacturing

Engineering, The University of New South

Wales, Sydney, 2052 Australia, Fax: +61 2 663

1222

5th Asian Conference on Fluidized-Bed and Three-Phase Reactors

Hsitou, TAIWAN, December 16-20, 1996

Dr. Lii-Ping Leu, Prof. of Chemical Engineer-

ing Department, National Taiwan University,

Taipei, Taiwan 106; Tel: +886-2-365-7200

FAX: +886-2-362-3040

Fifth Pan American Congress of Applied Mechanics PACAM V

Puetro Rico, U.S.A., January 2-4, 1997

Prof. Luis E. Suarez, Prof. Marek

Rysz, Department of General Engineering,

University of Puetro

Rico, Mayaguez, P.R. 00681-5000, U.S.A.

Fax: +1-809-265 3816, +1-809-831 4079,

E-mail: PACAMV@RMCE02.UPR.CLU.EDU

Lubricated Transport of Viscous Materials
Tobago, TRINIDAD AND TOBAGO, West Indies, January 7-10, 1997
(Abstracts due: May 31, 1996)
Dr. H. Ramkissoon, Department of Mathematics and Computer Science, The University of the West Indies, St. Augustine, Trinidad, W.I.
Tel: +1 809 645 3162, Fax: +1 809 645 7132
E-mail: hramki@centre1.uwi.tt

A Workshop on Computation and Modelling of Multiphase Flows
Santa Barbara, CA, USA, January 15-19, 1997
Prof. Sanjoy Banerjee, Tel +1-805-893-3456
Fax +1-805-893-4731
E-mail banerjee@anemone.ucsb.edu

STAIF-97, Space Technology & Applications International Forum
Albuquerque, NM, USA, January 26-30, 1997
Prof. M. El-Genk, Fax: +1 505 277 2814
E-mail: mgenk@unm.edu

A. 1st Conference on Future Space Science & Earth Science Mission

Dr. P. Ulrich, Fax: +1 202 358 3096, E-mail: pulrich@sl.ms.ossa.hq.nasa.gov

B. 1st Conference on Synergistic Power and Propulsion Systems Technology

Dr. F. Kennedy, Fax: +1 505 846 8927, E-mail: Kennedy@plk.af.mil

C. 1st Conference on Applications of Thermophysics in Microgravity

Dr. T.R. Reinarts, Fax: +1 407 631 3552, E-mail: mnstrmec@digital.net

D. 2nd Conference on Commercial Development of Space

Dr. R.P. Whitten, Fax: +1 202 358 2886, E-mail: rwhitten@osat.hq.nasa.gov

E. 2nd Conference on Next Generation Launch Systems

Dr. J. Sponable, Fax: +1 505 846 8930, E-mail: sponablj@plk.af.mil

F. 14th Symposium on Space Nuclear Power and Propulsion

Prof. S.K. Bhattacharyya, Fax: +1 708 252 4007
E-mail: leeann@td.anl.gov

Rheology in the Mineral Industry

San Diego, California, USA, February 17-22, 1997, (Abstracts due: May 31, 1996)
Engineering Foundation, 345 East 47th St., New York, N. Y. 10017, Tel: +1 212 705 7836,
Fax: +1 212 705 7441, E-mail: engfnd@aol.com
Chair: Prof. J.S.Laskowski, University of British Columbia, Vancouver, B.C., V6T 1Z4, CANADA, Fax: 604-822-4949,
E-mail: jsl@hardrock.mining.ubc.ca

The 1st Pacific Symposium on Flow Visualization and Image Processing

Honolulu, HAWAII, February 23-26, 1997
(Abstracts due: May 1, 1996)
Prof. S. Mochizuki, Department of Mechanical Systems Engineering, Tokyo University of A&T Nakacho, Koganei, Tokyo 184, JAPAN
Tel/Fax: +81 423 88 7088
E-mail: motizuki@cc.tuat.ac.jp
www: http://www.cc.tuat.ac.jp/~psfvip-1/

2nd European Conference on Turbomachinery, Fluid-Dynamics and Thermodynamics

Antwerpen, BELGIUM, March 5-7, 1997
Ms. R. Peys, Fax: +32 3 216 0996

AIChE 1997 Spring Meeting

Houston, USA, March 9-13, 1997
(Proposal due: August 1, 1996)
Dr. Dennis Griffith, E-mail: dgriffith@b-r.com

IUTAM Symposium on Transformation Problems in Composite and Active Materials

Cairo, EGYPT, March 9-13, 1997
(Abstracts due: December 1, 1996)
Prof. Y.A. Bahei-El-Din, Structural Engineering Department, Cairo University, Giza, Egypt
Tel: 20-2-417-0450, Fax: 20-2-572-3486
E-mail: iutam@alpha.eun.eg

The 22nd International Technical Conference on Coal Utilization & Fuel Systems

Clearwater, Florida, USA, March 17-20 1997
(Abstracts due: September 27, 1996)
Barbara Sakkestad, CSTA, 1156 Fifteenth Street, N.W., Suite 525, Washington, D.C. 20005, Tel: +1-202-296-1133, Fax: +1-202-223-3504

OECD/CSNI Specialist Meeting on Advanced Instrumentation and Measurement Techniques

Santa Barbara, CA, USA, March 17-20, 1997
Prof. M. Ishii, Fax: +1 317 494 9570
E-mail: grad@ecn.purdue.edu
Dr. G.P. Celata, Tel: +39 6 3048 3905, Fax: +39 6 3048 3026, E-mail: celata@casaccia.enea.it

INFUB, 4th European Conference on Industrial Furnaces and Boilers

Porto, PORTUGAL, April 1-4, 1997
Prof. A. Reis, Fax: +351 2 973 0746

Control of Particulate Processes IV

Delft, THE NETHERLANDS, April 6-9, 1997
(Abstracts due: November 1, 1996)
Engineering Foundation Conferences, 345 East 47th Street New York, NY 10017, Fax: +1-212-705-7411, E-mail: engfnd@aol.com
Chairs: Prof. B. Scarlett, Delft University of Technology The Netherlands

Frontiers in Industrial Process Tomography - II

Delft, THE NETHERLANDS, April 9-12, 1997
(Abstracts due: September 1, 1996)
Prof. Brian S. Hoyle, Department of Electronic and Electrical Engineering The University, Leeds, LS2 9JT, United Kingdom, Tel: +44-113-233-2056, Fax: +44-113-233-2032
E-mail: b.s.hoyle@leeds.ac.uk

NUTHOS-5, Fifth International Topical Meeting on Nuclear Thermal Hydraulics, Operations, and Safety

Beijing, CHINA, April 14-18, 1997
Dr. Jason Chao, Technical Program Co-Chair, EPRI, 3412 Hillview Avenue, Palo Alto, CA 94304, USA, Tel:+1 415 855 8901, Fax:+1 415 855 1026, E-mail:JCHAO@MSM.EPRI.COM

Powders and Grains 1997 Third International Conference on Micromechanics of Granular Media

Duke University, Durham, NC, USA, May 18-22,1997, (Abstracts due: September 1, 1996)
Prof. Robert BEHRINGER, Department of Physics, Box 90305, Duke University, Durham, NC 27708-0305, USA
Fax: (919) 660-2525,E-mail: bob@phy.duke.edu

2nd International Conference on Convective Flow and Pool Boiling

Irsee, GERMANY, May18-23, 1997
(Abstracts due: November 29, 1996)
Prof. F. Mayinger, Fax: +49 89 289 16218
E-mail: may@thermo-a.mw.tu-muenchen.de
Dr. G.P. Celata, Tel.: +39 6 3048 3905
Fax: +39 6 3048 3026
E-mail:celata@casaccia.enea.it
Engineering Foundation Conferences, 345 E. 47th Street New York, NY 10017, Fax: +1-212-705-7441, E-mail: engfnd@aol.com

International Symposium on the Physics of Heat Transfer in Boiling and Condensation

Moscow, RUSSIA, May 21-24, 1997
(Abstracts due: October 1, 1996)
Prof. A.I. Leontiev, Chairman
Dr. N.V.Medvetskaya, Scientific Secretary
National Committee for Heat and Mass Transfer, Russian Academy of Sciences, IVT RAN, Krasnokazarmennaya 17A, Moscow 111250
RUSSIA, Fax: +7 095 362 55 90
Dr. G.P. Celata, Tel.: +39 6 3048 3905
Fax: +39 6 3048 3026
E-mail: celata@casaccia.enea.it

CFD 97, Fifth Annual Conference of the CFD Society of Canada

British Columbia, CANADA, May 25-27, 1997
CFD 97 Conference Secretariat, Department of Mechanical Engineering, University of Victoria, P.O. Box 3055 MS 8895, Victoria, B.C. V8W 3P6, Tel: (604) 721-6034, Fax: (604) 721-6051
E-mail: cfd97@me.uvic.ca

The Second Israel Conference for Conveying and Handling of Particulate Solids

Jerusalem, ISRAEL, May 26-28 1997
(Abstracts due: October 1, 1996)
Dr. Haim Kalman, Department of Mechanical Engineering, Ben-Gurion University of the Negev, P.O.Box 653, Beer Sheva,84105, ISRAEL; Tel: +972-7-472105, Fax: +972-7-472990, E-mail: kalman@menix.bgu.ac.il

CHT-97, International Symposium on Advances in Computational Heat Transfer

Cesme, TURKEY, May 26-30,1997
Prof. G. de Vahl Davis, Fax: +1 2 663 1222
E-mail: g.devahldavis@unsw.edu.au

Fifth International Conference on Nuclear Engineering

Nice, FRANCE, May 26-30, 1997
(Abstracts due: September 5, 1996)
Pierre Lecocq, Senior VP and Technical Manager, EDF France, c/o French Nuclear Energy Society (SFEN), 69-73, rue Dutot, F-75015, Paris, FRANCE
Dr. J. Costa, E-mail: costa@ntp.ceca.fr
Tel: +33.1.4419.6220, Fax: +33.1.4419.6222

8th International Stirling Engine Conference and Exhibition

Ancona, ITALY, May 27-30, 1997
Prof. C.M. Bartolini, Tel: +39 71 220 4772
Fax: +39 71 280 4239

ARS '97, 2nd International Topical Meeting on Advanced Reactor Safety

Orlando, FL, USA, June 1-4, 1997
Prof. F. Oriolo, Tel: +39 50 585252, Fax: +39 50 585265, E-mail: oriolo@ccii.unipi.it
Dr. R.P. Taleyarkhan, Fax: +1 423 574 0740
E-mail: zrt@cosmail1.ornl.gov

4th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics

Brussels, BELGIUM, June 2-6, 1997
Prof. M.Giot, Tel +32-10-472200, Fax +32-10-452692, E-mail giot@term.ucl.ac.be
Dr. G.P. Celata, C.R. Casaccia ENEA
Heat Transfer Unit Head, Via Anguillarese, 301 00060 S.M. di Galeria, Rome, Italy
Tel.: +39 6 3048 3905, Fax: +39 6 3048 3026,
E-mail: celata@casaccia.enea.it

2nd International Symposium on Turbulence, Heat and Mass Transfer

Delft, THE NETHERLANDS, June 9-12, 1997
Prof. K. Hanjalic, Fax: +31 15 278 1204, E-mail: hanjalic@duttwta.tn.tudelft.nl
Dr. T.W.J. Peeters, Fax: +31 15 278 1204
E-mail: tim@duttwta.tn.tudelft.nl

ITEEC 97, 3rd International Thermal Energy & Environment Congress

Marrakesh, MAROQUE, June 9-12, 1997

Prof. A. Mir, Fax: +1 212 8 22 78 24/22 72 60

• **New Technologies Symposium**

Prof. V. Naso, Tel: +39 6 487 4839, Fax: +39 6 487 4838

• **Natural Convection Symposium**

Prof. J.K. Platten, Fax: +32 65 37 35 10

• **Thermal Buildings Symposium**

Prof. F. Haghighat, Fax: +1 514 848 7965

• **Fluidized Beds Symposium**

Prof. J. Chaouki, Fax: +1 514 340 4159

• **Heat Pumps Symposium**

Dr. J. Labidi, Fax: +1 514 340 4159

• **Environment Symposium**

Dr. M. Mansour, Fax: +49 89 3187 3371

ISHTEEC '97, International Symposium on Heat Transfer Enhancement and Energy Conservation

Guangzhou, CHINA, June 16-19, 1997

Prof. F. Mayinger, Fax: +49 89 289 16218

E-mail: may@thermo-a.mw.tu-muenchen.de

Prof. S.P. Wang, Fax: +86 20 5511616, E-mail: cespwang@scut.edu.cn

8th International Conference Multiphase 97

How deep? How far? How soon?

Cannes, FRANCE, June 18-20, 1997 (Abstracts due: September 27, 1996)

Mrs Catherine Cox, Conference Organiser, BHR Group Limited, Cranfield, Bedfordshire MK43 0AJ, UK

Fax: +44-(0)1234 750074

E-mail: ccox@conf.bhrgroup.co.uk

1997 ASME FED Summer Meeting

Vancouver, Canada, June 22-26, 1997

(Abstracts due: November 15, 1996)

• **7th International Symposium on Gas-Particle Flows**

Prof. D. Stock, Symposium Chair, Mech. Dept., Washington State Univ., Pullman WA 99164-2920, USA, TEL +1-509-335-3223, E-mail stock@mme.wsu.edu

Prof. Y. Tsuji, Faculty of Engineering, Osaka Univ., Suita, Osaka 565, Japan, Tel & Fax +81-6-879-7315, E-mail tsuji@mupf.meim.eng.osaka-u.ac.jp

• **6th International Symposium on Liquid-Solid Flows**

Dr. M. C. Roco, Symposium Chair, National Science Foundation, Engineering Directorate, Suite 525, 4201 Wilson Blvd., Arlington, VA 22230, Tel: +1-703-306-1371, Fax: +1-703-306 0319

• **6th International Symposium on Gas-Liquid Two-Phase Flows**

Dr. Timothy J. O'Hern, Sandia National Labs Engineering Sciences Center, MS 0826, Dept. 9111, Albuquerque, NM 87185-0826, USA

Tel: +1-505-844-9061, Fax: +1-505-844-8251

E-mail: tjohern@sandia.gov

Prof. Jean Bataille, L.M.F.A., Ecole de Lyon 69131 Ecully cedex, France

Tel: +33-72-18-61-56, Fax: +33-78-64-71-45

E-mail: bataille@mecaflu.ec-lyon.fr

• **Multiphase Flow Education**

Prof. K. Ravindra, Aerospace & Mechanical Engrg. Dept., Parks College of St. Louis Univ., Cahokia, IL 62206

Tel: 618-337-7575, Fax: 618-332-6802

E-mail: ravindra@pxa.slu.edu

• **Cavitation and Multiphase Flow**

Prof. Joseph Katz, Mechanical Engineering Dept., Johns Hopkins Univ., 118 Latrobe Hall, Baltimore, MD 21218

Tel: 410-516-5470, Fax: 410-516-7254

E-mail: katz@polaris.me.jhu.edu

• **Multiphase Flow - Work in Progress**

Prof. Andrea Prosperetti, Mechanical Engineering Dept., 122 Latrobe Hall, Johns Hopkins Univ., Baltimore, MD 21218, Tel: 410-516-8584

E-mail: prosper@titan.me.jhu.edu

• **Fluid Measurements & Instrumentation**

Prof. Gerald L. Morrison, Mechanical Engineering Dept., Texas A&M Univ., College Station, TX 77843-3123, Tel: 409-845-5414, Fax: 409-845-3081, E-mail: gmorrison@mengr.tamu.edu

• **Advances in Numerical Modeling of Free Surface and Interface Fluid Dynamics**

Prof. Peter E. Raad, Mechanical Engineering Dept. Southern Methodist Univ., 3160 SMU Boulevard, Dallas, TX 75205

Tel: 214-768-3043, Fax: 214-768-1473

E-mail: peter@seas.smu.edu

Energy-Related Process Integration Technologies-EUROTHERM Seminar 52

Manchester, UK, June 26-27, 1997

Prof. B. Linnhoff, Fax: +44 161 236 7439

Mechanics of Granular Materials for the Joint ASME/ASCE/SES Summer '97 Meeting

Northwestern University, USA, June 29 - July 2, 1997, (Abstracts due: September 25, 1996)

Prof. Wing Kam Liu, Northwestern University, Department of Mechanical Engineering, 2145 Sheridan Rd., Evanston, IL 60208-3111

Fax: +1-708-491-3915

E-mail: McNU97@nwu.edu, www: http://www.mech.nwu.edu/McNU97

JSME Centennial Grand Congress

- **Toward the New Century** -

Tokyo, JAPAN, July, 1997

Mr. M. Takahashi, Tel +81-3-5360-3508

Fax +81-3-5360-3500

Fourth International Conference on Technologies and Combustion for a Clean Environment

Lisbon, PORTUGAL, July 7-10, 1997

(Abstracts due: October 18, 1996)

Prof. M.G. Carvalho, Mechanical Engineering Department, Instituto Superior Tecnico, Av. Rovisco Pais, 1096 Lisbon Codex, PORTUGAL

Tel: +351-1-841 73 72 / 841 71 62
Fax: +351-1-847 55 45 / 726 26 33
www: <http://navier.ist.utl.pt/cleanair/>

ISAC '97 High Performance Computing on Multiphase Flows

Tokyo, JAPAN, July 18-19, 1997
(Abstracts due: December 1, 1996)
Prof. Y. Matsumoto, Dept. Mech. Eng., The University of Tokyo, Hongo, Bunkyo-ku, Tokyo 113, JAPAN, Fax: +81-3-3818-0835, E-mail: ymats@mech.t.u-tokyo.ac.jp

International Conference on Fluid and Thermal Energy Conversion '97

Yogyakarta, INDONESIA, July 21-24, 1997
(Abstracts due: December 1, 1996)
Dr. A. Suwono, Thermodynamics Research Laboratory, Inter University Center for Engineering Sciences, Bandung Institute of Technology, Jalan Tamansari 126, Bandung 40132, INDONESIA, Tel: (62.22)250-2342, Fax: (62.22)250-1926, E-mail: thermo@ibm.net

International Symposium on Radiative Transfer

Kusadasi, TURKEY, July 21-25, 1997
Prof. M.P. Menguc, Fax: +1 606 257 3304
E-mail: menguc@enr.uky.edu
www: <http://www.evl.uky.edu/~enguc/rad.html>

The 2nd Pacific Rim Conference on Rheology

Melbourne, AUSTRALIA, July 27-31, 1997
(Abstracts due: September 30, 1997)
Conference Secretary, PRCR2, Department of Chemical Engineering, The University of Melbourne, Parkville Victoria, AUSTRALIA 3052, Tel: +61 3 9344 7440, Fax: +61 3 9344 4153, E-mail: prcr2@unimelb.edu.au
www: <http://gondwana.ecr.mu.oz.au/~chemeng/conference.html>
Chair: David Boger

3rd International Thermal Energy Congress

Kitakyushu, JAPAN, July 28 - August 1, 1997
(Abstracts due: December 1, 1996)
Ms H. Okabe, Congress Secretary/ 3rd ITEC, AINEC Co., Ltd., 2408 Hyatt Residential Suites Fukuoka 2, 1-3-70 Momochihama, Sawaraku, Fukuoka, 814 JAPAN
Tel: +81-92-852-1575, Fax: +81-92-845-5135
E-mail: ainec@jms09.jeton.or.jp

1997 National Heat Transfer Conference

Baltimore, MARYLAND, August 10-12, 1997
(Abstracts due: October 30, 1996)
Prof. G. Kojasoy, College of Engineering & Applied Science, Department of Mechanical Engineering, University of Wisconsin, Milwaukee, P.O. Box 784, Milwaukee, WI 53201
Tel: (414) 229-5639, Fax: (414) 229-6958
E-mail: kojasoy@csd.uwm.edu

ICLASS-97, 7th International Conference on Liquid Atomization and Spray Systems

Seoul, KOREA, August 18-22, 1997
ICLASS-'97, Fax: +82 2 3452 7292
E-mail: intercom@soback.kornet.nm.kr

4th International Conference on Moving Boundaries 97, Computational Modelling of Free and Moving Boundary Problems

Ghent, BELGIUM, August 27-29, 1997
Ms. Sue Owen, Conference Secretariat, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA, UK
Tel: +44 (0) 1703 293223, Fax: +44 (0) 1703 292853, E-mail: sue@wessex.witcml.ac.uk

The Second International Aerospace Congress

Moscow, RUSSIA, August 31 - September 5, 1997, (Abstracts due: March 31, 1997)
Prof. M.R. Liberzon, 27, Petrovka street, Moscow, 103767 RUSSIA

Fifth Triennial International Symposium on Fluid Control, Measurement and Visualization

Hayama, JAPAN, September 1-4, 1997
(Abstracts due: November 15, 1996)
FLUCOME Desk, Kinki Nippon Tourist, 7th flr. Takakyu Bldg., 19 Kanda Matsunaga-cho, Chiyoda-ku, Tokyo 101, JAPAN
Tel: +81-3-3253-6131, Fax: +81-3-3255-7128

Eleventh Symposium on Turbulent Shear Flows

Grenoble, FRANCE, September 8-11, 1997
(Abstracts due: November 15, 1996)
Prof. F.W. Schmidt, Secretary, Turbulent Shear Flows, Department of Mechanical Engineering The Pennsylvania State University, University Park, PA 16802 USA
Tel: +1-814-865-2072, Fax: +1-814-863-4848

World Tribology Congress

Londra, UK, September 8-12, 1997
J. Brown, Fax: +44 171 222 9881

3rd European Fluid Mechanics Conference (Particular Session on: Multi-Phase Flows)

Goettingen, GERMANY, September 15-18, 1997
Prof. Dr. G.E.A. Meier, Institut fuer Stroemungsmechanik, DLR, Bunsenstrasse 10, D-37073 Goettingen, Germany; Tel: +49-551 709 2177; Fax: +49-551 709 2889

5th UK National Conference on Heat Transfer

London, UK, September 17-18, 1997
Miss Anne Lomax, Fax: +44 1788 577182
E-mail: alomax@icheme.org.uk

11th ISAM Biennial Congress

Sendai, JAPAN, September 23-26, 1997

(Abstracts due: November, 1996)

Prof. T. Takishima, First Department of Internal Medicine, Tohoku University School of Medicine, 1-1 Seiryomachi, Aoba-ku, Sendai 980-77 JAPAN

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www-intl.med.tohoku.ac.jp/isam/index.html

Thermal Management of Electronic Systems 3 -EUROTHERM Seminar 58

Nantes, FRANCE, September 24-26, 1997

Prof. J.P. Bardon, Fax: +33 40 68 31 41

NURETH-8, Eighth International Topical Meeting on Nuclear Reactor Thermal-Hydraulics

Kyoto, JAPAN, September 30 - October 4, 1997

Dr. A. Takizawa, Nuclear Power R&D Center, the Tokyo Electric Power Co., Egasaki-cho 4-1, Tsurumi, Yokohama, Kanagawa 230, JAPAN, Tel: +81-45-585-8946, Fax: +81-45-585-8958, E-mail: nureth-8@rd.tepco.co.jp

Heat Transfer in Single Phase Flow 5 - EUROTHERM Seminar 55

Athens, GREECE, September, 1997

Prof. K.D. Papailiou, Fax: +30 1 772 1658

1997 International Symposium on Multiphase Flow

Beijing, CHINA, October 5-7, 1997

(Abstracts due: December 15, 1996)

Prof. M.C.Ge, ISMF '97-Beijing, Chinese Society of Engineering Thermophysics, P.O.Box 2706, Beijing 100080, CHINA, Tel: 8610-6257-3330-516

Fax: 8610-6257-5913,

E-mail: GMC@etpservers.etp.ac.cn

The Fifth Asian International Conference on Fluid Machinery

Seoul, KOREA, October 5-8, 1997

(Abstracts due: February 1, 1997)

Prof. Jung Yul Yoo, Department of Mechanical Engineering, Seoul National University, Seoul 151-742, KOREA, Tel: +82-2-880-7112, Fax: +82-2-883-0179, E-mail: jyyoo@plaza.snu.ac.kr

Advanced Concepts and Techniques in Thermal Modelling 2 - EUROTHERM Seminar 53

Mons, BELGIUM, October 8-10, 1997

Prof. M. Fiebig, Fax: +49 234 7094 162

International Symposium on Multiphase Fluid, Non-Newtonian Fluid and Physico-Chemical Fluid Flows '97 Beijing

Beijing, CHINA, October 9-11, 1997

(Abstracts due: January 15, 1997)

Dr. Y.C. Guo, Department of Engineering Mechanics, Tsinghua University, Beijing 100084,

CHINA; Tel: (+86-10)62782231, Fax: (+86-10)62595569

The Third international Conference on Fluid Dynamic Measurement and Its Applications

Beijing, CHINA, October 14-17, 1997

(Abstracts due: Feb. 15, 1997)

Prof. SHEN Xiong, Department of Engineering Mechanics, Tsinghua University, Beijing 100084, CHINA

Fax: +86-10-62595569

Compacts Fired Heating Systems - EUROTHERM Seminar 54

November, 1997

Prof. E. Van den Bulck, Fax: +32 163 22985

The Impact of Mineral Impurities in Solid Fuel Combustion

Kona, HAWAII, November 2-7, 1997, (Abstracts due: June 2, 1997)

Engineering Foundation Conferences, 345 East 47th Street, NEW YORK, N.Y. 10017

Tel: +1-212-705-7836, Fax: +1-212-705-7441

E-mail: engfnd@aol.com, www: <http://www.engfnd.org/engfnd>

Chair: T.F. Wall, CRC for Black Coal Utilization, Department of Chemical Engineering, University of Newcastle, Callaghan NSW2308, AUSTRALIA

E-mail: cgtfw@cc.newcastle.edu.au

International Symposium on Liquid-Liquid Two-Phase Flow and Transport Phenomena

Antalya, TURKEY, November 3-7, 1997

(Abstracts due: October 15, 1996)

Dr. Faruk Arinc, ICHMT Secretary General, Mechanical Engineering Department, Middle East Technical University 06531 Ankara, TURKEY Tel: +90-312-210 5214 & 1429, Fax: +90-312-210 1331 & 1266, E-mail: arinc@metu.edu.tr, www: <http://www.metu.edu.tr/~wwwichmt>

Prof. D.M. Maron, Fax: +972 3 502 6510

E-mail: barad_r@milk.cteh.ac.il

AIChE 1997 Annual Meeting

Los Angeles, USA, November 16-21, 1997

(Proporsal due: April 1, 1997)

Dr. Dianne Dorland, E-mail: LA97@d.umn.edu

ASME International Mechanical Engineering Congress & Exposition

Dallas, Texas, USA, November 16-21, 1997

• Symposium on Dispersed Flow in Combustion, Incineration and Propulsion Systems

(Abstracts due: December 1, 1996)

Prof. D.E. Nikitopoulos, Mechanical Eng. Dept. Louisiana State Univ., Baton Rouge, LA 70803 Tel: (504)-388-5903, Fax: (504)-388-5924

E-mail: meniki@me.lsu.edu

• 4th International Symposium on Fluid-Structure Interaction, Aeroelasticity, Flow-Induced Vibration & Noise

(Abstracts due: December 2, 1996)

Prof. Michael P. Paidoussis, Department of Mechanical Engineering McGill University, 817 Sherbrooke Street West, Montreal, QC, Canada H3A 2K6
Tel: +1-514-398-6294, Fax: +1-514-398-7365
E-mail: maryf@mech.eng.lan.mcgill.ca

The Sixth Western Pacific Regional Acoustics Conference

Kowloon, HONG KONG, November 19-21, 1997, (Abstracts due: February 1, 1997)
Dr. S. K. Tang, Department of Building Services Engineering, The Hong Kong Polytechnic University, Hung Hom, Kowloon, HONG KONG
Tel: (852) 27665855, Fax: (852) 27746146
E-mail: besktang@polyu.edu.hk

The Tenth International Symposium on Transport Phenomena in Thermal Science and Process Engineering

Kyoto, JAPAN, November 30 - December 3, 1997, (Abstracts due: January 15, 1997)
Prof. K. Suzuki, ISTEP-10 Secretariat, Department of Mechanical Engineering, Kyoto University, Kyoto 606-01, JAPAN
Tel: +81-75-753-5250, Fax: +81-75-753-5851
E-mail: ksuzuki@htrans.mech.kyoto-u.ac.jp

Fifth International Congress on Sound and Vibration

South Australia, AUSTRALIA, December 15-18, 1997, (Abstracts due: May 30, 1996)
Prof. Colin Hansen, Congress Secretariat, Fifth International Congress on Sound and Vibration, Department of Mechanical Engineering, University of Adelaide, 5005, AUSTRALIA
Tel: +61 8 303 5460, Fax: +61 8 303 4367
E-mail: icsv5@mech.eng.adelaide.edu.au

Microscale Heat Transfer - EURO THERM Seminar 57

Poitiers, FRANCE, February 1998
Prof. J.B. Saulnier, Fax: +33 49 49 81 01

Heat Transfer in Radiating and Combusting Systems 3 - EURO THERM Seminar 56

Athens, GREECE, April 1-3, 1998
Dr. E. Kakaras, Fax: +30 1 380 1712

Fluidization IX

Durango, USA, May 17-22 1998
(Abstracts due: November 29, 1996)
Engineering Foundation Conferences, 345 E. 47th Street New York, NY 10017
Tel: +1-212-705-7836, Fax: +1-212-705-7441
E-mail: engfnd@aol.com, www: <http://www.engfnd.org/engfnd>
Chair: Dr. L.S.Fan, Department of Chemical Engineering at The Ohio State University, E-mail: FAN.1@OSU.EDU

ICMF '98-Lyon, 3rd International Conference on Multiphase Flow

Lyon, FRANCE, June 8-12, 1998
(Abstracts due: July 15, 1997)
Prof. J. Bataille, Laboratoire de Mécanique des Fluides et d'Acoustique, Ecole Centrale de Lyon, BP 163, 69131 ECULLY cedex, France
Tel: +33 72 18 61 56, Fax: +33 78 64 71 45
E-mail: bataille@athena.mecaflu.ec-lyon.fr
www: <http://www.mecaflu.ec-lyon.fr/ICMF98/>

Heat Exchangers for Sustainable Development

Lisbon, PORTUGAL, June 22-25, 1998
Prof. M.G. Carvalho, Fax: +351 1 847 5545/726 2633

Heat and Mass Transfer and Thermodynamics of Inverse Cycle Machines - EURO THERM Seminar 59

Nancy, FRANCE, July, 1998
Prof. M. Feidt, Fax: +33 83 59 55 51

World Congress on Particle Technology 3

The Brighton Centre, ENGLAND, July 7-9, 1998
ICHEME, Davis Building 165-189 Railway Terrace Rugby, CV21 3HQ, ENGLAND
Tel: +44-(0)1788-578214, Fax: +44-(0)1788-577182, E-mail: j.morgan@icheme.org.uk
www: <http://icheme.chemeng.ed.ac.uk/wcpt.htm>
Chair: Prof. J. Bridgwater, University of Cambridge, UK

Ninth International Symposium on Application of Laser Techniques to Fluid Mechanics

Lisbon, PORTUGAL, July 13-16, 1998
(Abstracts due: December 19, 1997)
Prof. Manuel V. Heitor, Dept. of Mechanical Engineering Instituto Superior Tecnico, Av. Rovisco Pais, 1096 LISBOA CODEX PORTUGAL, Tel: 351-841 73 79, Fax: 351-849 61 56
E-mail: mheitor@termcomb.ist.utl.pt
www: <http://gep.ist.utl.pt/Fluid-Laser-Symp.>

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

2nd International Symposium on Two-Phase Flow Modelling and Experimentation

Pisa, ITALY, May 23-25, 1999
Dr. G.P. Celata, Tel: +39 6 3048 3905, Fax: +39 6 3048 3026, E-mail: celata@casaccia.enea.it
Prof. R.K. Shah, Fax: +1 606 257 3304, E-mail: shah@engr.uky.edu
Dr. P. Di Marco, Tel: +39 50 569 610, Fax: +39 50 569 666, E-mail: dimarco@cii.unipi.it

**Integral Methods in Science and Engineering
2000**

Alberta, CANADA, June 12-15, 2000
Dr. P. Schiavone, Department of Mechanical Engineering, University of Alberta, 4-9 Mechanical Engineering Building, Edmonton, ALBERTA, T6G 2G8, CANADA
Tel: (403)492-3638, Fax: (403)492-2200
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**Information on the International Center for Heat and Mass Transfer ICHMT
and on ICHMT conferences available on:**

<http://www.metu.edu.tr/~wwwichmt>

Information on the EURO THERM COMMITTEE available on :

<http://wwwerg.casaccia.enea.it/eurotherm/>

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Corresponding Members

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Moscow, GSP, V-192, 119899, Russia
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THIRD INTERNATIONAL CONFERENCE ON MULTIPHASE FLOW

ICMF '98

June 8-12, 1998 LYON, France

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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 five 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,...
- S5: **Applications of Multiphase Flows (Poster Sessions only)**
Nuclear Thermohydraulics, Environment, Petroleum Engineering, Process Engineering,...

The conference will consist of a mixture of keynote lectures, oral and poster presentations. One day will be devoted specifically to industrial and environmental applications of multiphase flows.

Conference Committee (French members)

Prof. D. BARTHES-BIESEL	Compiègne	Prof. G. GOUESBET	Rouen
Prof. J. BATAILLE	Lyon	Prof. M. LANCE	Lyon
Dr. D. BESNARD (CEA)	Paris	Prof. R. J. PERKINS	Lyon
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Dr. J.M. DELHAYE (CEA)	Grenoble	Prof. S. ZALESKI	Paris
Prof. J. FABRE	Toulouse		

On-line information can be obtained from: <http://www.mecaflu.ec-lyon.fr/ICMF98/>

Deadlines

- Jan 15, 1997 Announcement (call for papers, information about travel and accomodation) mailed to all potential participants
- July 15, 1997 Abstracts due (Maximum length including all figures: 2 A4 pages)
- Oct 15, 1997 Notification of acceptance
- Jan 31, 1998 Extended Abstracts (6 - 8 pages)

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