

The International Information Center for Multiphase Flow

NEWSLETTER

No.10

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ICeM

The Japan Society of Multiphase Flow

Election of Governing Board for ICMF

by Yutaka Tsuji

The election of the Governing Board for the International Conference on Multiphase Flow will be held during ICMF'98 in Lyon. The Governing Board will be composed of four members from each of three geographical regions, Asia, America and Europe/Russia. This board will be responsible for evaluating proposals for future meetings and other issues related to ICMF. All registered attendees will be eligible to vote. Before the Lyon brief vitae of the nominees will be distributed to those who have registered. There will be 8 nominees from each region, two of

whom will be elected for 3 years and two for 6 years. Following the first election, there will be an election every three years and two members will be elected from each region for 6 years.

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ICMF'98

Third International Conference
on Multiphase Flow '98

Lyon, France, June 8-12, 1998

Palais des Congres de Lyon

EUROPE: <http://www.mecaflu.ec-lyon.fr/ICMF98/>USA: <http://amy.me.tufts.edu/ICMF98>JAPAN: <http://www.ijnet.or.jp/JSMF/icmf98/>

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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**The International Multiphase Flow Award Committee has selected
the 1998 Prize and Award winners**

by M.C.Roco

The International Multiphase Flow Award Committee has established two honors open to nominees from all countries, one for lifetime achievement and another for a special contribution by a young researcher. The 1998 honorees are Prof. Thomas J. Hanratty and Prof. Howard H. Hu.

A. THE MULTIPHASE FLOW INTERNATIONAL PRIZE

recognizes an individual's significant scientific/technical contributions to the field of multiphase flow research, as well as outstanding leadership in promoting scholarship, research, development and education in this field.

Prof. Thomas J. Hanratty from the University of Illinois at Urbana is the recipient of the The Multiphase Flow International Prize in 1998. He is recognized for his lifetime achievement in research and his international leadership in multiphase flow, for developing a phenomenological understanding of multiphase flows that relates large scale behavior to small scale interactions. Prof. Hanratty will deliver an invited lecture at the International Conference of Multiphase Flow (ICMF'98) in Lyon, France, in June 8-12, 1998. The Prize is sponsored by the International Energy Agency of Japan and ICMF'98.

B. THE YOUNG SCIENTIST MULTIPHASE FLOW BREAKTHROUGH AWARD

recognizes an individual's significant scientific/technical breakthrough(s) in the field of multiphase flow research, made by a researcher younger than 40 years at the date of the Award presentation.

Prof. Howard H. Hu from the University of

Pennsylvania is the recipient of The Young Scientist Multiphase Breakthrough Award in 1998. He is recognized for pioneering contributions to direct numerical simulations of particulate flow in Newtonian and viscoelastic flows in which the fluid and particle motions are determined without approximation from their respective equations of motion. The Award will be presented at the International Conference on Multiphase Flow in 1988 in Lyon, France Prof. Hu will deliver an invited keynote paper at ICMF'98 in Lyon, France, in June 8-12, 1998. The Award is sponsored by the Eastman Kodak Co. and ICMF'98.

The 1998 international multiphase flow Prize and Award will be presented at the ICMF'98, and the respective lectures will be reviewed and published by the International Journal of Multiphase Flow. The world-wide competition is held each three years and nominations are open to contributors from universities, industry and national laboratories.

The International Multiphase Flow Award Committee

Prof. M.C. Roco (fax +1-703-306-0319,
e-mail mroco@nsf.gov, USA), Head
Prof. M. Bohnet (Germany),
Dr. G.-P. Celata (Italy),
Dr. J.-M. Delhaye (France),
Prof. D.D. Joseph (USA),
Prof. S. Savage (Canada),
Prof. T. Theofanous (USA),
Dr. A. Tsuge (Japan),
Prof. Y. Tsuji (Japan),
and Prof. L. Zhou (China), 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.

**Report on EUROMECH 3rd European Fluid Mechanics Conference
15-18 September 1997, Göttingen, UK**

by G.E.A.Meier

After Cambridge and Warsaw Göttingen was the third host of the EUROMECH European Fluid Mechanics Conferences (EFMC) which are held every three years. It is the intention of this series' promoters that it is a forum of the whole spectrum of the Fluid Dynamics research. The conference in Göttingen performed this expectations. About 400 contributions were presented in 59 sessions, and 3 minisymposia and twelf 45 minutes lectures were invited. There were sessions on turbulence, stability, vortex dynamics, boundary layers, multiphase flows, bubble dynamics, condensation, buoyant flows, flows in rotating fluids, biological flows, waves, measurement techniques, numerical methods, aeroelastics, aerodynamics and gas dynamics. About one third of the sessions were on multiphase flows and related topics. Likewise five invited lectures were addressed on these topics. P.Clavin (Marseille) spoke on 'Dynamics of combustion waves in gases', W.G.M.Agterof (Unilever) gave a review with the title 'Fluid mechanics issues related to the Food Industry' on the manifold problems related to multiphase processes in modern food production plants, L.v.Wijngaarden (Enschede) talked about 'The collective behaviour of air bubbles rising in water', W.Lauterborn (Göttingen) informed the participants of the conference with the talk 'News from cavitation bubble dynamics' on the new experimental findings of the last years which he made with his 20 million frames per second camera, and the evening lecture was given by I.Rehberg on granular matter and ist dynamics

which can be viewed as a problem of multiphase flows, too. All three minisymposia concerned problems of multiphase flows. W.Schneider (Vienna) organized the minisymposium on 'Forced flows with solidification' with contributions from Beer, Ehrhard, Riley, Hohenbichler, Digruber, Kluwick, DeSantis, Steinrück, Noshadi, Zilberberg. The next minisymposium was on 'Dispersed multiphase flows' convened by M.Sommerfeld (Halle) and the contributors were van den Akker, Climent, Joia, Biesheuvel, Möller, Feuillebois, van Haarlem, Sherwood, Berlemont and Buggisch. The last minisymposium had the title 'Turbulent mixing-mechanism and control' and was organized by H.E.Fiedler (Berlin). Active participants were Rys, Villermaux, König, Völtz, Lavrov, Pitsch and Verzicco.

In the whole the high number of participants (more than 450) and the resonance of the contributions confirmed the concept of the new created conference series.

For those who are interested in more details of the conference it can be offered to send them the book of abstracts and the programme. Proceedings will not be published. Please send a letter of request with a crossed cheque on the amount of 40DM payable to DLR, Institut für Strömungsmechanik, Prof G.E.A.Meier, to the address: Institut für Strömungsmechanik des DLR zu Händen von Frau E. Winkels Bunsenstr.10 D-37073 Göttingen Germany

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 5th UK National Heat Transfer Conference
September 17-18, 1997, London, UK**

by Gian Piero Celata

The IChemE (Institution of Chemical Engineers) and UK Heat Transfer Committee organized in London during 17-18 September 1997 the 5th UK National Heat Transfer Conference, which is scheduled every two years in the odd years. In this way any overlapping with the International Heat Transfer Conference and the EURO THERM European Thermal Sciences Conference is prevented.

The Conference has been attended by about 120 people (some of them from outside UK), and 61 papers have been presented in Poster Sessions, while 8 invited lectures have been given in Oral Sessions.

Each Poster Sessions (two Sessions for each half a day) has been preceded by a Poster Session Review and an Open Discussion, where the Reviewer has highlighted the major findings of each paper. At the end of each reviewer's report an animated discussion generally followed and enriched participants benefit. It is to be said that this format (already experienced at the 10th IHTC in Brighton - 1994 - and at the ICMF '95 in Kyoto - 1995) allows much more time for discussion than usual oral presentation style. Anyway, the good result is very much liked to the ability and experience of the poster reviewers and the session chairmen, who were, in this Conference, excellent.

The 61 papers have been presented as subdivided into eight technical sessions, such as:

- A) Fouling and Heat Exchangers
- B) Forced Convection
- C) Natural, Mixed and Transient Convection
- D) Boiling and Gas-Liquid Flow
- E) Condensation and Other Phase Change Systems

- F) Numerical and Experimental Techniques
- G) Advances Topics in Heat Transfer
- H) Radiation, Combustion and Engines

Each Session hosted the delivering of an invited lecture on the topic treated by the papers grouped in the session itself. In particular we had: H. Müller-Steinhagen (fouling and its mitigation in heat exchangers), M. Fiebig (vortices and generators in heat transfer), C. Arcoumanis (heat transfer process in Diesel engines), V.V. Wadekar (hot topics in boiling: solved and unsolved problems), J. Rose (fundamental aspects in condensation), A.D. Gosman (heat transfer modelling in turbulent flow), M. Biggs (new numerical techniques in heat and mass transfer), M.G. Carvalho (heat transfer remodelling in combustion).

Two extra sessions have been dedicated to industrial problems, namely on evaporators and condensers, and on compact heat exchangers. Papers presented have dealt with different types of heat exchangers, (TEMA 'E' and 'J'), thermosyphon reboilers, firetube package boilers, and plate heat exchangers with special reference to refrigeration systems.

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Information on The Japan Society of Multiphase Flow (JSMF) and on The International Information Center for Multiphase Flow (ICeM) available on:

JSMF: <http://www.ijnet.or.jp/JSMF>

ICeM: <http://www.kz.tsukuba.ac.jp/~monji/> (tentative)

**REPORT ON "INTERNATIONAL SYMPOSIUM ON MULTIPHASE FLUID,
NON-NEWTONIAN FLUID AND PHYSICO-CHEMICAL FLUID FLOWS'97 BEIJING "
(ISMNP'97 Beijing)
October 7-10, 1997, Beijing, China**

by Lixing Zhou

The International Symposium on Multiphase Fluid, Non-Newtonian Fluid and Physico-Chemical Fluid Flows, sponsored by the Chinese Society of Theoretical and Applied Mechanics and Chinese Society of Petroleum Engineering, and co-sponsored by other two related Chinese societies, was held in October 7-10, 1997, in Petroleum University, Beijing, China. The Co-Chairmen and Vice-Chairman of the International Committee of this meeting are Prof. C.T. Crowe from Washington State University, USA, Prof. X.J. Chen from Xi'an Jiaotong University, PRC and Prof. L.X. Zhou from Tsinghua University, PRC, respectively, and the meeting was organized by Prof. L.X. Zhou, assisted by Prof. X.F. Li from Petroleum University, Beijing. There are nearly 30 attendants from the United States, England, Russia, Australia, Japan, Malaysia and 90 attendants from China. One plenary lecture, 5 invited papers and 75 session papers, together 81 papers were presented at the Symposium. The main topics discussed in this meeting are: Gas-Solid and Gas-Droplet Flows; Gas-Liquid, Liquid-Solid and Liquid-Liquid Flows; Single-phase/Multiphase Fluid Flows with Heat Transfer and Combustion; Non-Newtonian Fluid Flows and Flows through Porous Media, including fundamentals, numerical modeling, experimental studies, measurements and application of these flows.

Regarding to the plenary and invited lectures, Prof. C.T. Crowe made a thorough lecture to the recent advances in modeling of turbulent gas-particle flows, including fundamental concepts, turbulence modulation, Lagrangian and Eulerian approaches of dispersed-phase flow equations.

Prof. M.W. Reeks gave a systematic review to the development and current status of PDF theory and modeling of turbulent gas-particle flows, including the PDF transport equation, the PDF-based mass, momentum, and particle Reynolds stress equations of two-fluid model, and application of PDF modeling in particle boundary conditions at the wall. Prof. Y. Tsuji reported very interesting results of his systematic studies on simulation of dense gas-particle flows with the effect of particle-particle collision using a pure Lagrangian approach, in which particle-particle collision and contact are simulated using very simple hard-sphere model and soft-sphere model, and a numerical method of Monte-Carlo direct simulation, developed in molecular dynamics is used to calculate the collision probability. Prof. L.X. Zhou reported recent advances in

development of two-fluid models of turbulent gas-particle flows and combustion in China, including the two-fluid-trajectory model and pure two-fluid model of reacting particle phase, the k-epsilon-kp model and two-phase Reynolds stress model of two-phase turbulence, and also the PDF-based k-epsilon-PDF and DSM-PDF models of two-phase turbulence. These models are verified by LDV and PDPA measurements and are applied to simulate complex 2-D and 3-D flows in combustors, furnaces and separators. Dr. W.D. Bachalo gave a review on development and application of phase Doppler particle anemometer (PDPA) for measuring dispersed two-phase flows using the instrumentation developed by Aerometrics Co.

As for the session papers, in the field of gas-solid and gas-droplet flows, new development of PDF equations with particle-particle and particle-wall collisions, new approaches in Eulerian-Lagrangian modeling of gas-particle flows, PDPA studies on swirling gas-particle flows and experimental studies on acoustic emissions in fluidized bed combustors were discussed.

In the field of gas-liquid, liquid-solid and liquid-liquid flows, measurement of oil-gas-water three-phase flows, particle imaging velocimetry of liquid-solid flows, modeling of collision of solid inclusions in the liquid steel, modeling of oil slick spilled in flowing water and studies on oil-water hydrocyclones were reported.

In the field of flows with heat transfer and combustion, numerical modeling of flows and combustion in tangentially-fired furnaces, burning and slagging in the standpipe of a CFB boiler furnace, 3-D modeling of gas combustion in a glass furnace and phase change in the fluid under natural convection were reported.

The Russian, Australian and Malaysian scientists reported the following research results in non-Newtonian fluid flows: shock waves in bubbly non-Newtonian liquid, measurement of flocc strength in turbulence, measurement of true yield stress of waxy crude oils, new empirical models of steady shear viscosity of polymer liquid, rheology of metal oxide suspensions through electrostatic repulsive forces, capillary viscometry for yield stress materials, charged patch interactions in colloidal dispersions.

For flows through porous media, multiphase percolation flow through porous media, microscopic mechanisms of steam-foam flow in porous media, ultrasonic emulsions in porous me-

dia, viscoelastic effect of polymer solution flowing through porous media, fractal properties of viscous flow in porous media were discussed.

Anyone who is interested in the results published in the ISMNP'97 Beijing may contact Ms. Kunrong Li for purchasing the Proceedings of ISMNP'97 Beijing (Price is near 70 USD). Her e-mail address is: uinterl@upcl.ihep.ac.cn

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**Report on The 3rd International Conference on
Fluid Dynamic Measurement and Its Applications
(3rd-ICFDMA)**

October 14-17, 1997, Beijing, China

by Xiong SHEN

Followed the First and Second International Conference on Fluid Dynamic Measurement and Its Applications (ICFDMA) held in 1989 and 1994, the Third ICFDMA was subsequently held from Oct. 14-17, 1997 in Tsinghua University, Beijing, China. The conference was approved by the State Educational Commission of China, financially supported by the China National Natural Sciences Foundation and co-organized by the Department of Engineering Mechanics and the Department of Thermal Engineering of Tsinghua University.

A total number of 66 participants come from Japan, Germany, USA., UK, Russia, France, Australia, Belgium, and Hong Kong, Taiwan and mainland of China attended the conference for strengthening the academic contact and exchange in the area of modern techniques and instruments for fluid measurements. 60 presentations including 7 invited lectures and 14 plenary reports were contributed to the conference. They were split into 18 sessions and 4 sections named as:

Laser Doppler Velocimetry and Phase Doppler Particle Sizing	20 papers
Whole Field Measurement and Flow Visualization	15 papers
Hot-Wire/Film Anemometry and Thermometry	16 papers
New Sensor Techniques and System Testing	19 papers

The titles of 7 invited lectures are:

Experimental and Computational Studies on Flow Around a Circular Cylinder Submerged in

Oscillatory Flow by Prof. Atsushi OKAJIMA from Japan,

Considerations on the Application of Optical Diagnostics to Fluid Dynamics Research in Complex Flows by Dr. W.D. BACHALO from USA,

New Laser-Doppler Measuring Techniques for Aerodynamic Applications using High Power Tunable Diode Lasers and Optical Amplifiers by Prof. D. DOPHEIDE from Germany,

Generalized Lorenz-Mie Theory: Last Developments with Application to Particle Sizing by Prof. Gerard GOUESBET from France,

Rainbow Refractometry: Application to Nonhomogeneous Scatters by Dr. Gerard GREHAN from France,

PIV Measurement of Torque Converter Internal Flow-Improvement of PIV Result Using CFD Techniques by Prof. Fujio Yamamoto from Japan

Flame Flickering in Nonpremixed Combustion Behind a Bluff-Body Burner by Prof. Jing-Tang YANG from Taiwan of China.

The conference proceedings which including all plenary, invited and contributed papers (a total of 400 pages in a hard cover volume) are available. For more information, write to the address as follows.

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**REPORT ON: ICHMT International Symposium -
Liquid-Liquid Two-Phase Flow and Transport Phenomena (LLFT-97)
held on November 3-7 1997, Antalya, Turkey**

by David Moalem Maron

The first time Prof. Maron raised the idea of a conference in Liquid-Liquid Systems was at the 10th International Heat Transfer Conference in Brighton, England in August 1994, after which the first framework was defined for the various aspects of Liquid-Liquid Systems resulting in the creation of LLFT-97.

The conference was held in Antalya, Turkey, with Prof. David Moalem Maron chairing the Organizing Committee, whose members were Prof. Brauner, Prof. Merchuk and Prof. Semiat. They worked very closely with Prof. Faruk Arinc, Secretary-General of the International Centre for Heat and Mass Transfer, ICHMT.

The conference was divided up into 13 sessions:

- Flow patterns in oil-water systems: modeling and experiments
- Flow characteristics: modeling and experiments
- Flow phenomena in two-fluid systems
- Modeling of transport phenomena in liquid-liquid systems
- Mass transfer in liquid-liquid systems
- Transport phenomena in two-fluid systems
- Two fluid systems and applications
- Separation of liquid-liquid emulsions
- Liquid-liquid separation, phenomena and equipment
- Interfacial phenomena
- Stability and transitions
- Measurement and instrumentation
- Liquid-liquid mixing phenomena and equipment

A large number of papers were reviewed for the conference, of which 70 were accepted. In all, 52 papers were presented at the conference with participants coming from many parts of the world, U.S.A., Japan, Europe, East Europe, Australia, Middle East, 21 countries in all.

The abstracts of the presented papers are to be found on the web page of ICHMT at the URL address <http://ichmt.me.metu.edu.tr/abstracts/llft97-paplist.html>.

Prof. Maron invited six Keynote Speakers to participate at the conference:

Prof. G.F. Hewitt: "From gas-liquid to liquid-liquid two phase flows: a difficult journey?"

Prof. N. Brauner: "The effect of surface forces on flow patterns and flow characteristics in two-phase systems"

Prof. H.R. Jacobs: "Modeling of multiphase dispersed systems - state of the art and future directions"

Prof. S. Hartland: "Separation of liquid-liquid dispersions"

Prof. A.H.P. Skelland: "Simultaneous solution of stability, permeability, and swelling problems in emul-

sion liquid membranes by non-Newtonian conversion"
Prof. W. Zijl: "Liquid-liquid motion in porous and fractured media".

The conference included an Open Discussion Panel chaired by Prof. Geoff Hewitt, and included most of the leading scientists in order to get a spontaneous feedback on the conference and its issues.

Some participants remarked that it is very important to emphasize the relation between academic and industry-driven studies (thus, by increasing cooperation with relevant industries such as oil transportations, industries, nuclear industry, etc.) A feeling was expressed that most of the discussions dealt with industrial related topics and we should encourage more basic research. In short, we need to keep the interaction between basic and applied studies, while at the same time keeping the balance between both. However, all the participants were in agreement that a second conference on Liquid-Liquid Two Phase Flows should take place with an attempt to cover more widely areas such as:

- Sprays, droplets and sophisticated measurement techniques in liquid/liquid flow.
- Instabilities at liquid-liquid interfaces with and without heat and mass transfer.
- Computer modeling of liquid-liquid systems.
- Microscale modelling in multiphase systems while considering the interactions between turbulent eddies of continuous phase and the dispersed phase (bubbles or droplets or particles).

Prof. Maron appealed to the Executive Committee of ICHMT expressing the general feeling that another meeting should take place. We are pleased to announce that the Executive Committee of ICHMT has already approved a second conference which will hopefully take place in the spring of 2000. Under sponsorship of ICHMT, Prof. Maron will most probably lead the second meeting in existing areas, including a wider range of subjects.

To obtain further information on future meetings and/or purchase a copy of the Proceedings volume of the first LLFT Symposium, please see the Web page of ICHMT at <http://ichmt.me.metu.edu.tr>.

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**Report on Tenth International Symposium on Transport Phenomena (ISTP-10)
November 31 - December 3, 1998, Kyoto Research Park, Kyoto, Japan**

by Kenjiro Suzuki

Tenth International Symposium on Transport Phenomena has been held in Kyoto in the time period from November 31st to December 3rd, 1997 under the auspices of Pacific Center of Thermal-Fluid Engineering and in cooperation with eleven Japanese academic Societies including The Japan Society of Multiphase Flow, The Japan Society of Mechanical Engineers and The Heat Transfer Society of Japan. It was financially supported by two non-profitable organizations; The Commemorative Association for the Japan World Exposition (1970) and Kansai Research Foundation for Technology Promotion, and was also supported by thirty four Industries and the Kansai Branch of The Heat Transfer Society of Japan.

Two hundred forty abstracts were submitted to the Symposium. Based on the review reports of two experts, finally one hundred sixty two papers have been accepted for presentation. The three-volume Proceedings of the accepted papers have been published by the Organizing Committee of the Symposium. Total number of the participants was two hundred eighty five composed of one hundred sixty five domestic participants and one hundred seventeen foreign participants.

The presented papers ranged over a wide spectrum of the fields related to Transport Phenomena. Four oral sessions are assigned for the Gas-liquid two phase flows with and without phase change. Several important papers in two-phase flow area were presented in Poster Ses-

sions. Various types of forced and natural convective heat transfer problems were covered as well. Chemical reacting flows including combustion were also discussed.

Turbulence and its modelling were also the topics discussed in the Symposium. A large number of papers treating practical heat and mass transfer processes including those related to heat exchangers were also included.

The conference started with the registration and the Informal Reception on November 31st. During the next three days have been held totally thirty-three Oral Sessions starting with Plenary Session. Two Poster Sessions were also combined to make the presentation of all the accepted papers possible. On December 2nd, Symposium Banquet was held at Kyoto Hotel. It was preceded by Koto and Shakuhachi performance beautifully given by an internationally recognized traditional Japanese musician Ms. Iwabori. In the Closing, Best Poster Awards were presented to the six papers presented in Poster Sessions. Eleventh International Symposium on Transport Phenomena will be held in Hsingchu in the beginning of coming December, 1998.

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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 "First Annual IMuST Meeting"
February 26-28, 1998, Santa Barbara, California, USA**

By Theo G. Theofanous

The Institute for Multifluid Science and Technology (IMuST) was founded on February 28, 1997, during a meeting of about 50 workers in the field, held in Santa Barbara, California. This founding meeting took place with financial support from the National Science Foundation (NSF). Theo Theofanous, Tom Hanratty, Fred Wasden, Mike Roco, Andrea Prosperetti, and Graham Wallis, were elected to the Executive Committee. Jim Tilton was appointed as an ex-officio member, to bring balance in the industrial participation.

The purpose of IMuST is to foster scientific understanding of multifluid systems. A special mission is to focus work in this area so as to have an impact on technology. Membership is open to qualified individuals with an interest in multi-fluid science and technology.

An important part of the IMuST operations is to be found in the function of Technical Advisory Committees (TACs). During the first year, TACs were established for a number of industries (Oil & Gas, Chemical/Petrochemical, Nuclear, Refrigeration, Microelectronics) and several key generic areas (Education, CFD, Exact Solutions). Preliminary reports from these TACs were received during the First Annual Meeting.

The First Annual IMuST meeting took place with financial support from the National Science Foundation, the US Nuclear Regulatory Commission, the National Aeronautics and Space Administration, and the US Department of Energy. The technical focus was "Dispersed Flows." Several papers were presented on the Field Equations, their numerical solutions (CFD), and on comparison of such solutions with experiments or exact results. In addition, there were sessions on the Physics of Interactions, and an Open Forum. The papers have been posted on the IMuST web page (<http://www.chemengr.ucsb.edu/imust>). Ample time was allowed, in the regular program, for discussions. A very important and special goal of IMuST is to provide a framework for continuing key areas of these discussions un-

til they are brought to a conclusion. This is taking shape now on the basis provided in the first annual meeting.

Specifically, the following action items were identified.

Action 1: To aggressively pursue "Education" in Multiphase Flow.

Action 2: To pursue the work on dispersed flows presented in our last meeting to conclusions.

Action 3: To focus our next meeting on Flow Regimes.

Action 4: To pursue cooperative efforts toward identifying and settling key Flow Regime issues.

Action 5. To pursue cooperative efforts towards the understanding and development of design tools, for multiphase stirred vessels (including sparged, slurry liquids).

Action 6: To continue to refine the TAC efforts towards useful conclusions.

Currently we are in the process of defining the operational framework for each of these actions. The First Annual Report of IMuST will be published upon completion of this effort.

The Second Annual IMuST meeting will take place around mid-March, 1999 (so as to be convenient for the academic obligations of our Japanese colleagues).

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Future Meetings

Listings include Conference Name, Place, Date and Contact.

The 9th International Symposium on Freight Pipeline symposium

Monterrey, MEXICO, April 21-23, 1998
Dr. George E. Klinzing, Vice Provost for Research, University of Pittsburgh, 323 Benedum Hall, Pittsburgh, PA 15261, USA
Tel: 412 -624-0784, Fax: 412-383-9640
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Cavitation 98 - 3rd International Symposium on Cavitation

Grenoble, FRANCE, April 1998
J.M. Michel, LEGI/IMG, BP 53, F-38041 Grenoble Cedex 9
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EUROMECH Colloquium 376 - Waves in Two-phase Flows

Istanbul, TURKEY, April 1998
C.F. Delale, Dept. Mech. Engineering, Istanbul University, Avcilar Kampusu, 34850 Avcilar, Istanbul, TURKEY
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ICONE-6

San Diego, California, May 10-15, 1998
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Fluidization IX

Durango, USA, May 17-22 1998
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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

ISME FORUM 1998, The Biennial Conference of the Canadian Society for Mechanical Engineering

Toronto, Ontario, CANADA, May 19-22, 1998
Prof. Marc A. Rosen, Department of Mechanical Engineering Ryerson Polytechnic University Toronto, Ontario, CANADA
Tel: (416) 979-5303, Fax: (416) 979-5265
E-mail: mrosen@acs.ryerson.ca, www: <http://www.ryerson.ca/mech-eng/csme.forum.98>

International Symposium on Heat and Mass Transfer in Biological and Medical Engineering

Kusadasi, TURKEY, June 8-12, 1998
Prof. Faruk ARINK
Mechanical Engineering Dept., Middle East Technical Univ., 06531 Ankara, TURKEY

Tel: +90-312-210-1429 or 210-5213 or 210-5214
Fax: +90-312-210-1331 or 210-1266
E-mail: ichmt@metu.edu.tr
<http://www.metu.edu.tr/~wwwichmt>

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

Lyon, FRANCE, June 8-12, 1998
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/>

1998 ASME Fluids Engineering Division Summer Meeting

Washington, D.C., USA, June 21-25, 1998
Prof. C.T. Crowe, Washington State University, USA, Fax: 509-335-4662
E-mail: crowe@mme.wsu.edu
www: <http://www.asme.org>

1st North American Conference, In all situations from Land-based to Deep Water, MULTIPHASE TECHNOLOGY, Technology from the Arctic to the Tropics

Banff, CANADA, June 10-11, 1998
Mrs. Catherine Cox, Conference Organiser BHR Group Limited, Cranfield Bedfordshire MK 43 0AJ UK, Tel: +44 1234 750422
Fax: 750074, E-mail: ccox@bhrgroup.co.uk

USNCAM13, 13th U.S. National Congress of Applied Mechanics

University of Florida, USA, June 21-26, 1998
USNCAM13, Attn: R. Mei, AeMES Dept., Univ. of Florida, PO BOX 116250, Gainesville, FL 32611-6250, USA
Tel: 352-392-0888, Fax: 352-392-7303
E-mail: USNCAM13@aero.ufl.edu
<http://www.aero.ufl.edu/usnc/usnatcon.html>

Heat Exchangers for Sustainable Development

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

Thermodynamics, Heat and Mass Transfer of Refrigeration Machines and Heat Pumps - EURO THERM Seminar 59

Nancy, FRANCE July 6-7, 1998
Prof. M. Feidt, Fax: +33 3 83 59 55 51
E-mail: mfeidt@ensem.u-nancy.fr
Secretariat: Mrs. C. FRADEIR, Tel: +33 3 83 59 55 91, Fax: +33 3 83 59 55 51
E-mail: cfradeir@ensem.u-nancy.fr, www: <http://www.werg.casaccia.enea.it/eurotherm/seminar59.html>

World Congress on Particle Technology 3

• **Third International Particle Technology Forum(Third IPTF)**

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>

Chairman: Prof. M.C.Roco, National Science Foundation, 4201 Wilson Blvd., Suite 525 Arlington, VA 22230, U.S.

Tel: 703 306 1371, Fax: 703 306 0319

E-mail: mroco@nsf.gov

ICFM-3, THE THIRD INTERNATIONAL CONFERENCE ON FLUID MECHANICS

Beijing, CHINA, July 7-10, 1998

Prof. Li Jiachun, Institute of Mechanics, Chinese Academy of Sciences, 15 Zhong Guan Cun Road, Beijing 100080, CHINA

Fax: +86-10-6255-9588

E-mail: jcli@cc5.imech.ac.cn

Microscale Heat Transfer - EURO THERM Seminar 57

Poitiers, FRANCE, July 8-10, 1998

Prof. J.B. Saulnier, Fax: +33 5 49 49 81 01; E-mail: saulnier@let.univ-poitiers.fr

Secretariat: Dr. D. LEMONNIER

Tel: (33) 5 4949 8100 Fax: (33) 5 4949 8101

E-mail: euro57@let.ensma.fr, www: <http://www.werg.casaccia.enea.it/eurotherm/seminar57.html>

9th International Symposium on Application of Laser Techniques to Fluid Mechanics

Lisbon, PORTUGAL, July 13-16, 1998

Prof. Manuel V. Heitor, Dept. of Mechanical Engineering Instituto Superior Tecnico, Av. Rovisco Pais, 1096 LISBOA CODEX PORTUGAL, Tel: 351-1-841 73 79, Fax: 351-1-849 61 56, E-mail: mheitor@termcomb.ist.utl.pt

www: <http://gep.ist.utl.pt/Fluid-Laser-Symp>

OFMPS'98, 1st International Symposium on On-Line Flow Measurement of Particulate Solids

University of Greenwich, Chatham Maritime, Kent, UK, July 14-15, 1998

Dr. Y Yan

Tel: 44-1634-883-495, Fax: 44-1634-883-153

E-mail: y.yan@gre.ac.uk

www: <http://www.gre.ac.uk/OFMPS98>

1998 Joint ASME/JSME Pressure Vessels and Piping Conference

San Diego, CA, USA, July 26-30, 1998

Dr. Vladimir Kudriavtsev, System Engineering, Watkins-Johnson Company, 440 Kings Village Road, Scotts Valley, CA 95066, USA

Tel: 408-439-4533, Fax: 408-438-6826

E-mail: vladimir.kudriavtsev@wj.com

<http://www.netcom.com/~vvk>

5th International Congress on Optical Particle Sizing

Mineapolis, Minesota, USA

August 10-14, 1998

Mrs. S. Sower, University of Minesota Room 125, Mechanical Engineering Mineapolis, MN 55455, USA, Tel: 612-626-2289, Fax: 612-626-

1854, E-mail: sower@me.umn.edu, www: <http://www.me.umn.edu/conferences/ops98>

11th International Heat Transfer Conference

K-yongju, KOREA, August 23-28, 1998

Prof. J. S. Lee,

Tel: +82-2-880-7117 Fax: +82-2-883-0179

E-mail: jslee@gong.snu.ac.kr

<http://ihtc.snu.ac.kr>

IWVF3, 3rd International Workshop on Vortex Flows and Related Numerical Methods

Toulouse, FRANCE, August 24-27, 1998

Professor André Giovannini, Third IWVF

Institut de Mécanique des Fluides de Toulouse UMR 5502 CNRS - INP/ENSEEIH - UPS

118 Route de Narbonne, 31062 Toulouse

Cedex, FRANCE, tel: 33-5-61 55 61 84

fax: 33-5-61 55 83 26, E-mail: iwvf3@imft.fr

www: <http://www.imft.fr/iwvf3>

5th Asian Thermophysical Properties Conference(ATPC '98)

Kyongju, KOREA, August 31-September 2, 1998

Prof. M. S. Kim, Secretary General of ATPC

'98, Dept. of Mecahnical Enginerring, Seoul

National Univ., Seoul 151-742, KOREA

Fax: +82-2-883-0719

E-mail: minskim@plaza.snu.ac.kr

Second International Symposium on Measuring Techniques for Multiphase Flows

Beijing, CHINA, August 31-September 1, 1998

Prof. Xu Yiqian, Thermoenergy Engineering Research Institute, Southeast University, Nanjing 210096, CHINA

Tel: +86-25-3794395, Fax: +86-25-7714489

E-mail: yiqnxu@seu.edu.cn

8th International Symposium on Flow Visualization

Sorrent, ITALY, September 1-4, 1998

8th ISFV- Prof. G. M. Carlomagno, Facoltà di Ingegneria-DETEC, Piazzale Tecchio, 80, 80125 Napoli, ITALY

Tel: +39-81-7682178, Fax: 2390364

E-mail: carmagn@unina.it

www: <http://www.detec.unina.it/8isfv>

Quantitative Infra-red Thermography, QIRT-4 - EURO THERM Seminar 60

Lodz, POLAND, September 7-10, 1998

Prof. B. Wiecek, Fax: +48 42 362 238; E-mail: wiecek@ck-sg.p.lodz.pl
Secretariat: Boguslaw Wiecek, Tel.+48 (42) 312637, +48 (42) 312635, +48 (42) 360065
Fax. +48 (42) 362238, E-mail: qirt98@ck-sg.p.lodz.pl
www: <http://thermo.p.lodz.pl/qirt98/>

9th IUTAM International Summer School on Advanced Turbulent Flow Computations
Udine, ITALY, September 7-11, 1998
CISM, Palazzo del Torso, Piazza Garibaldi 18
33100 Udine, ITALY, Tel: +39-432-248511
Fax: +39-432-248550, E-mail: cism@uniud.it
www: <http://www.uniud.it/cism/homepage.htm>

9th European Symposium on Comminution
Albi, FRANCE, September 8-10, 1998
PROGEP Comminution 98, Florence Foucaud
18 Chemin de la Loge, 31078 Toulouse Cedex 4,
FRANCE, Tel: +33 (0)5 62 25 23 80, Fax: +33
(0)5 62 25 23 18, E-mail: Progep@ensigct.fr
www: <http://www.enstimac.fr/manif/comminution98>

Detailed Studies of Combustion Phenomena - EURO THERM Seminar 61
Eindhoven, THE NETHERLANDS
12-14 October 1998
Prof. L.P.H. de Goey, Fax: +31 40 243 3445; E-mail: flip@wop.wtb.tue.nl
secretariat: Mrs. M.C.J. Tielemans/Mrs. M. Dijk
Tel: ++ 31 40 2472140, Fax: ++ 31 40 2433445
e-mail: rian@wop.wtb.tue.nl, www: <http://www.werg.casaccia.enea.it/eurotherm/seminar61.html>

THE FORTH KSME-JSME FLUIDS ENGINEERING CONFERENCE
Pusan, KOREA, October 18-21, 1998
Prof. Moon J. Lee, FEC4 Secretariat, Dept. of Mechanical Engineering, Pohang Univ. of Science and Technology, Pohang 790-784, KOREA
Fax: +82-0-562-279-3199, 5567
E-mail: mjlee@postech.ac.kr
Prof. Yoichiro Matsumoto, FEC4 Secretariat, Dept. of Mechanical Engineering, The Univ. of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8656, JAPAN, E-mail: ymats@mech.t.u-tokyo.ac.jp
FEC4 Web Site <http://mech.postech.ac.kr/FEC4/>

CSCHE-48, The 48th Annual Conference of the Canadian Society for Chemical Engineering
London, Ontario, Canada, October 4-7, 1998
Dr. Jesse Zhu, MCIC, Technical Program Co-Chair Dept. of Chemical and Biochemical Engineering, The University of Western Ontario
London, Ontario, Canada, N6A 5B9
Tel: 519-661-3807, Fax: 519-661-3498
E-mail: jzhu@julian.uwo.ca, www: <http://www.uwo.ca/engin/chemical/csche48>

IMECE98-CHARACTERIZATION OF FLOW PATTERNS IN MULTIPHASE FLOW SYSTEMS

Anaheim, CA, USA, November 15-20, 1998
Dr. Jovica R. Riznic, Atomic Energy Control Board, Research and Support Section, 280 Slater, P.O.Box 1046, Station B, Ottawa, CANADA KIP 5S9
Tel: 613-943-0132, Fax: 613-943-8954
E-mail: riznic.j@atomcon.gc.ca

Heat Transfer in Evaporation and Condensation; Application to Industrial and Environmental Processes - EURO THERM Seminar 62

Grenoble, FRANCE, November 17-18, 1998
Dr. Ch. Marvillet, Fax: +33 4 76 88 51 61; E-mail: marville@ntp.ceea.fr
Secretariat: Mrs M.J. BASSET, Tel: +33 4 76 88 39 13, Fax : +33 4 76 88 51 61
E-mail : greth@ntp.ceea.fr, www: <http://www.werg.casaccia.enea.it/eurotherm/seminar62.html>

IMECE '98- OPEN FORUM: UNIVERSITY-INDUSTRY COLLABORATIVE RESEARCH IN MULTIPHASE FLOW

Dr. M. C. Roco, National Science Foundation, Engineering Directorate, Suite 525, 4201 Wilson Blvd., Arlington, VA 22230, USA
Tel: 703-306-1371, Fax: 703-306-0319
E-mail: mroco@nsf.gov
<http://www.eng.nsf.gov/ptf>

International Conference on Optical Technology and Image Processing in Fluid, Thermal and Combustion Flow.

Yokohama JAPAN, December 7-9, 1998
Prof.M.Kawahashi, VSJ-SPIE98, Faculty of Engineering, Saitama University, Shimo-Okubo 255, Urawa, Saitama, 338-8570 Japan, Tel: +81-48-858-3443, Fax: +81-48-856-2577, E-mail: vsjspie@vsj.or.jp, www: <http://www.vsj.or.jp/vsjspie>

6th Asian Conference on Fluidized-Bed and Three-Phase Reactors

Cheju Island, KOREA, December 8-12, 1998
(Abstract due: May 31, 1998)
P.T.(Peter) Kim, Chairman Division of Fluidization Engineering The Korea Institute of Chemical Engineers
Secretariat: Dr.Y.Kang, Professor, Department of Chemical Engineering, Chungnam National University, Taejon 305-764, KOREA, Tel: 82-42-821-5683, Fax: 82-42-822-8995, E-mail: kangyong@hanbat.chungnam.ac.kr

13TH AUSTRALASIAN FLUID MECHANICS CONFERENCE

Monash University, AUSTRALIA, December 13-18, 1998

Secretariat: 13th Australasian Fluid Mechanics Conference, Dept. of Mechanical engineering, Monash University, Clayton, Victoria 3169, AUSTRALIA

Tel: 61-3-9905-9646, Fax: 61-3-9905-3558
E-mail: afmc@monash.eng.edu.au
<http://www.monash.edu.au/mecheng/seminars/afmc>

25th National Conference on Fluid Mechanics & Fluid Power and 1st International Conference on Fluid Mechanics & Fluid Power

Indian Institute of Technology, Delhi, INDIA, December 15-17, 1998

Prof. S N. Singh, Organising Secretary, Dept. of Applied Mechanics, Indian Institute of Technology, Delhi, Hauz Khas, New Delhi-110 016, INDIA

Energy-Related Process Integration Technologies - EUROTHERM Seminar 52

Manchester, UK, 1998
Prof. B. Linnhoff, Fax: +44 161 236 7439

STAIF-99, Space Technology & Applications International Forum

Albuquerque, NM, USA, January 31-February 4 1999

Prof. Mohamed S.El-Genk, UNM-ISNPS, Farris Engineering Center, Room 239, Albuquerque, NM 87131-1341, Fax: 505-277-2814, Email: mgenk@unm.edu

Maureen Alaburda, UNM-ISNPS, Tel: 505-277-0446, Fax: 505-277-2814

Email: alaburda@unm.edu, www: <http://www.chne.unm.edu/isnps/isnps.htm>

A.Conference on Life and Microgravity Sciences and Applications

Raymond P.Whitten, NASA Headquarters
Fax:202-358-1996

B.Conference on Global Virtual Presence

Christine Anderson, Air Force Research Laboratory, Fax: 505-846-6243

Peter Ulrich, NASA Headquarters, Fax: 202-358-0357

C.Conference on Applications of Thermophysics in Microgravity & Breakthrough Propulsion Physics

Ad Delil, National Aerospace Laboratory, NETHERLANDS, Fax: 31-5272-48229

Mare Millis, NASA Lewis Research Center, Fax: 216-977-7537

D.Conference on Next Generation Launch Systems

Harry Karasopolous, Air Force Research Laboratory, Fax: 973-255-5419

William A.Gaubatz, The Boeing Company, Fax: 714-896-5855

E.16th Symposium on Space Nuclear Power and Propulsion

Michael G.Houts, Los Alamos National Laboratory, Fax: 505-665-4336

William J.Emrich, NASA Marshall Space Flight

Center, Fax: 205-544-7504

ICHMT PLASMA-99, 2nd International Symposium on Heat and Mass Transfer Under Plasma Conditions

Antalya, TURKEY, April 19-23, 1999
(Abstracts due: October 15, 1998, for poster presentations: January 30, 1999)

Prof.Dr. Pierre FAUCHAIS, Faculte des Sciences Universite de Limoges 123 Avenue A.Thomas 87060 Limoges Cedex-France

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Email: fauchais@unilim.fr

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Email: arinc@metu.edu.tr
www: <http://ichmt.me.metu.edu.tr>

9th International Conference CMEM 99 -Computational Methods and Experimental Measurement-

Sorrento, ITALY, April 27-29, 1999
(Abstract due: August 18, 1998)

Prof.G.M.Carlomagno, University of Naples, Piazzale Tecchio 80125 Naples, ITALY

Prof.C.A.Brebbia, Wessex Institute of Technology, Ashurst Lodge, Ashurst Southampton, SO40 7AA, UK

secretariat: Sally Radford, Wessex Institute of Technology

Ashurst Lodge, Ashurst, Southampton SO40 7AA, UK

Tel: 44-0-1703-293223, Fax: 44-0-1703-292853
Email: sradford@wessex.ac.uk

Fluid Particle Interactions V

Santa Fe, New Mexico, May 9-14, 1999

Prof.John G.Yates, Department of Chemical Engineering University College London Torrington Place, London WC1 E7JE, UK

Tel: 171-419-3837, Fax: 171-383-2348

Email: john.yates@ucl.ac.uk

Dr.John.S.Maulbetsch, EPRI 3412 Hillview Avenue Palo Alto, CA 94304, USA Tel: 415-855-2438, Fax: 415-855-2287

Email: jmaulbet@msm.epri.com

PSFVIP-2, The 2nd Pacific Symposium on Flow Visualization and Image Processing

Honolulu, Hawaii, May 16-19, 1999

Prof. S. Mochizuki, Dept. of Mechanical Systems Engineering Tokyo University of A & T Nakacho, Koganei, Tokyo 184-8588, JAPAN

Tel/Fax: +81 423-88-7088

E-mail: psfvip-2@mmlab.mech.tuat.ac.jp

www: <http://www.cc.tuat.ac.jp/~psfvip-2>

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

Pisa, ITALY, May 23-25, 1999

(Abstracts due: May 15,1998)

Dr. G.P.Celata, Heat Transfer Unit Head, Via Anguillarese, 301 1-00060 S.M. di Galeria, Rome, Italy

Tel: +39-6-3048-3905, Fax: 3026

Email: celata@casaccia.enea.it

Dr. Paolo Di Marco, Energy Department, University of Pisa, Via Diotisalvi 2ml-56126 Pisa, ITALY, Tel: +39-50-569-610, Fax: +39 50-569-666, E-mail: p.dimarco@ing.unipi.it
www: <http://docenti.ing.unipi.it/~d6600/pisa99/>

4th International Symposium on Engineering Turbulence Modelling and Measurements

Corsica, France, May 24-26, 1999

Prof. W. Rodi, Institut für Hyromechanik, Universität Karlsruhe, Kaiserstraße 12, D-76128 Karlsruhe, Germany, Tel: +49-721-608-3535, Fax: +49-721-608-2202/4260

E-mail: etmm4@ifh.bau-verm.uni-karlsruhe.de
www: <http://www.ifh.verm.uni-karlsruhe.de/etmm4>

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

E-mail: Peter.Schiavone@ualberta.ca

The Combustion Institute and ICHMT MCS-99, -Mediterranean Combustion Symposium- Antalya, TURKEY, June 19-23, 1999

(Abstract due: November 1, 1998)

Prof. 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, Email: arinc@metu.edu.tr
www: <http://ichmt.me.metu.edu.tr/upcoming-meetings/MCS-99/announce.html>

The Second International Conference on PNEUMATIC AND HYDRAULIC CONVEYING SYSTEMS

Davos, SWITZERLAND, June 20-25, 1999

(Abstracts due: November 1, 1998)

Engineering Foundation, 345 East 47th Street, New York, NY 10017, USA

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

E-mail: engfnd@aol.com

<http://www/engfnd.org>

7th International Symposium on Gas-Liquid Two-Phase Flows, 1999 ASME FED Summer Meeting

San Francisco, USA, June 22-26, 1999

(Abstract due: July, 1998)

Dr. Upendra S. Rohatgi, Brookhaven National Lab., Dept. of Nuclear Energy, Upton, NY 11973, USA

Tel: +1-516-282-2475, Fax: +1-516-282-2613

E-mail: rohatgi@bnl.gov

8th International Symposium on Gas-Particle Flows, ASME-JSME Fluids Engineering Conference

San Francisco, USA, July 18-23, 1999

(Abstracts due: August 14, 1998)

Prof. David E. Stock, Dept. of Mech. & Matls. Engrg., Washington State Univ., Pullman, WA 99164-2920, USA

Tel: +1-509-335-3223, Fax: +1-509-335-4662

E-mail: stock@mme.wsu.edu

4th Liquid Matter Conference

Granada, Spain, July 3-7, 1999

Prof. Dr. Pedro Tarazona, Departamento de Física Teórica de la Materia Condensada Universidad Autónoma de Madrid E-28049 MADRID, SPAIN

Tel.: ++34-91-3974950, FAX: ++34-91-3974907

E-mail: pedro@fluid5.fmc.uam.es

Prof. Dr. Roque Hidalgo-Álvarez, Departamento de Física Aplicada Universidad de Granada Campus de Fuentenueva E-18071 GRANADA SPAIN Tel.: ++ 34 - 958 - 24 32 13 FAX: ++ 34 - 958 - 24 32 14, e-mail: liquid99@ugr.es
www: <http://www.ugr.es/~liquid99/>

6th International Conference on Circulating Fluidized Beds Dechema E.V.

Würzburg, Germany, August 22-27, 1999

DECHEMA e.V., Cpmgrrs Office, Attn.: Christiane Mitter, P.O.B. 15 01 04, D-60061 Frankfurt am Main, Tel: +49-69-7564-280, Fax: +49-69-7564-304, E-mail: nick@dechema.de, www: <http://dechema.de/cfb-6>

Prof. Dr. Ulrich Mueller, Forschungszentrum Karlsruhe GmbH Institut fuer Angewandte Thermo-und Fluidodynamik Postfach 36 40 76021 Karlsruhe GERMANY, Tel: (07247)82 3450, Fax: (07247)82 4837

E-mail: ulrich.mueller@iatf.fzk.de

or secretary@iatf.fzk.de

Single-Phase and Two-Phase Natural Circulation - EUROTHERM Seminar 63

Genova, ITALY, September 6-8, 1999

Prof. M. Misale, Tel.: +39 10 353 2576; Fax: +39

10 311 870; E-mail: misale@ditc.unige.it,

www: <http://www.werg.casaccia.enea.it/eurotherm/frame.html>

1st International Symposium on Turbulence and Shear Flow Phenomena

DoubleTree Resort, Santa Barbara, September 12-15, 1999

Prof. Nobuhide Kasagi, Chair of Organizing Committee, The University of Tokyo, Department of Mechanical Engineering, Hongo 7-3-1, Bunkyo-ku, Tokyo 113-8656, JAPAN, Tel: +81-3-3812-2111/6417, Fax: +81-3-5800-6999

E-mail: kasagi@thtlab.t.u-tokyo.ac.jp
www: <http://www.thtlab.t.u-tokyo.ac.jp>

NURETH-9, Ninth International Topical Meeting on Nuclear Reactor Thermal Hydraulics

San Francisco, California, October 3-8, 1999
(Abstract Due: September 1, 1998)
Virgil E. Schrock, Tech.Prog.Chair, Department of Nuclear Engineering, University of California, Berkeley, CA 94720-1730
Tel: 510-642-6431, Fax: 510-643-9685

E-mail: schrock@nuc.berkeley.edu
www: <http://www.nuc.berkeley.edu/NURETH9/NURETH9.html>

- Boiling and Condensation Heat Transfer
- Experimental Methods and Instrumentation

3rd European Thermal Sciences Conference
Heidelberg, GERMANY, September 10-13, 2000
Prof. E. Hahne, Fax: +49 711 685 3503; E-mail: pm@itw.uni-stuttgart.de, www: <http://wwwerg.casaccia.enea.it/eurotherm/frame.html>

A Note from the Editor

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- Any questions/comments are also welcome.

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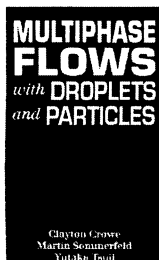
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MULTIPHASE FLOWS with DROPLETS and PARTICLES

Clayton Crowe

*Washington State University,
Pullman, Washington*

Martin Sommerfeld

*Martin Luther University,
Halle-Wittenberg, Germany*

Yutaka Tsuji

*Osaka University,
Osaka, Japan*

This book provides a clear, pedagogical approach to the fundamentals of gas-particle and gas-droplet flows. It includes separate chapters on numerical simulations and experimental methods. The book is written for graduate students and professions and can be used both as a text book and to complement research programs. Exercises and computer programs are included to support the learning process. Contents: Introduc-

tion/Properties of dispersed phase flows/Size distribution/Particle-fluid interaction/Particle-particle interaction/Continuous phase equations/Particle-droplet cloud equations/Numerical modeling/Experimental methods. The book is available through CRC press at \$64.95 (US) per copy plus shipping charges and can be ordered through the web site, <http://www.crcpress.com>.

CALL FOR PAPERS

**9th International Conference, CMEM 99,
Computational Methods and Experimental Measurements
April 27 - 29, 1999, Sorrento, Italy**

OBJECTIVES

The International Conference on Computational Methods and Experimental Measurements provides a forum for the review of the latest work on interaction between numerical methods and experimental measurements. The Conference series is unique in this field and is now well established following the success of the first seven meetings.

While computer models have been increasingly successful in simulating an ever widening range of engineering problems, it is nevertheless essential that advances in these models are validated and verified against experiment.

Experimental measurements are themselves conditioned to the requirements of the computational models. Hence it is important that scientists working on experiments communicate with researchers developing computer codes as well as those carrying out measurements on prototypes. The orderly and progressive concurrent development of all these fields is essential for the progress of engineering sciences.

CONFERENCE CHAIRMEN

Prof G M Carlomagno
Prof C A Brebbia

FIELDS OF APPLICATION

Fluid Dynamics / Fluid Flow, Heat Transfer

Structures & Stress Analysis, Geomechanics, Vibrations, Turbulent Flow, Water Resources, Material Problems & Identification, Damage Tolerance, Computational Methods, Other (please specify)

CALL FOR PAPERS

Papers are invited on the topics outlined overleaf and others falling within the scope of the Conference. Three copies of an abstract of no more than 300 words clearly stating the purpose, results and conclusion of the work to be described in the final paper should be submitted to the Conference Secretariat by 18 August 1998. Final acceptance will be based upon the review of the full length paper.

The camera-ready manuscript of the full length paper must be received by 15 December 1998. The author must attend the conference to present the paper, if accepted. The language of the conference will be English.

CONFERENCE SECRETARIAT

Sally Radford,
Conference Secretariat, CMEM 99
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Ashurst, Southampton, SO40 7AA, UK
Tel: 44 (0) 1703 293223
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Email: sradford@wessex.ac.uk

at the symposium can be automatically submitted to the Journal of Flow Visualization and Image Processing. Publication in the journal will depend upon passing a further review conducted after the symposium.

Deadlines

- Aug. 1, '98 Three copies of abstract due
- Sep. 1, '98 Notification of abstract acceptance
- Oct. 31, '98 Three copies of full-length manuscript due
- Dec. 15, '98 Notification of final paper acceptance
- Jan. 20, '99 Final manuscript due

Proceedings

The conference proceedings will be released on CD-ROM. Authors are allowed to include in their papers: color figures, video clips and animations. For further information, please directly contact the editor for electronic publication: Prof. K. Okamoto, University of Tokyo, Nuclear Eng. Research Lab, Tokai-mura, Ibaraki 319-1106, Japan. Phone: (+81) 29 287 8411, Fax: (+81) 29 287 8488, Email: okamoto@tokai.t.u-tokyo.ac.jp

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Background

The second Pacific Symposium on Flow Visualization and Image Processing will be held on May 16-19, 1999 in Honolulu, Hawaii, U.S.A. under the auspices of the Pacific Center of Thermal-Fluids Engineering. The objective of the Symposium is to provide a forum for communication and information exchange in the fields of both flow visualization and image processing over the entire range of disciplines.

Scope

Papers describing current research on flow visualization and image processing from principles to applications are hereby solicited. Those pertaining to fundamental techniques and applications are appropriate. Topics include, but are not limited to, flow-field visualization, surface flow visualization, computer-assisted flow visualization, graphical display of data sets, digital image processing and others.

Selection of Papers

The official language is English. Initial selection will be based on a submitted abstract of about 500 English words. The abstract should contain: (1) paper title, (2) five key words in descending order of importance, (3) authors' names, affiliations and full address for all authors, and (4) name, address, phone number, fax and E-mail address of the author to whom subsequent correspondence should be directed. The abstract should contain sufficient information to enable the scope and nature of the paper to be assessed. Abstracts can be submitted by regular mail, email or fax. The review will be a two step process. After the abstracts are received and the authors are notified of the results, the selected authors will be asked to submit a full manuscript for review. Final acceptance will be based on review of the full manuscript. All accepted papers will be published in the CD-ROM proceedings to be distributed prior to the symposium.

Selection of Journal Papers

If desired by the authors, those papers that are presented

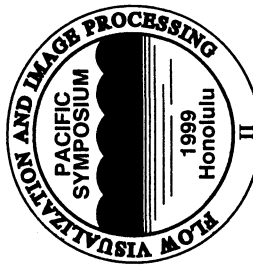
First Announcement and Call for Papers

PSFVIP-2

The 2nd Pacific Symposium on Flow Visualization and Image Processing (Tentative)

May 16-19, 1999

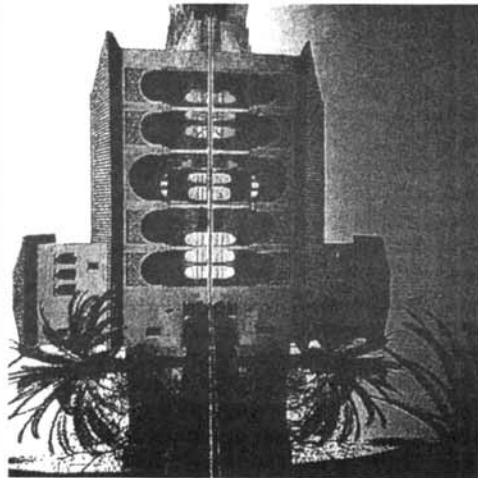
Sheraton
 Princess Kaiulani Hotel
 Honolulu, Hawaii



Sponsored by
Pacific Center of Thermal-Fluids Engineering (PCTFE)



European Physical Society



**Liquid
Matter
Conference**

University of Granada
Granada, Spain

3-7 July, 1999

FIRST ANNOUNCEMENT

FIRST ANNOUNCEMENT

This is the fourth Conference on Liquid Matter, promoted by the Liquids Section of the Condensed Matter Division of the European Physical Society and co-sponsored by the University of Granada (UGr). The first of the series was held in Lyon (1990), the second in Firenze (1993), and the third in Norwich (1996).

The fourth Conference will be held during 1999 in Granada, Spain. The sessions will run from Saturday July 3rd in the morning until Wednesday, July 7th in the afternoon.

The aim of the Conference is to bring together liquid state physicists and chemists to discuss the microscopic, mesoscopic and macroscopic aspects of this rapidly growing field. Of importance is the promotion of exchange with scientists active in applied research as in the chemical, pharmaceutical, food and oil industries.

The Conference will include plenary lectures, topical symposia and poster sessions. Contributed papers will be presented in the form of posters and a limited number of these will be selected for oral presentation within the symposia. A Conference abstracts booklet will be distributed to the participants and the highlights of the proceedings will be published.

Symposia

1. Simple Liquids and Solutions, Classical and Quantum
2. Molecular Liquids and Reaction Dynamics
3. Ionic Liquids and Liquid Metals
4. Liquid Crystals
5. Polymers, Polyelectrolytes and Gels
6. Colloids, Surfactants, Emulsions and Foams
7. Membranes and Biological Liquids
8. Fluids in Confined Geometries, Films and Interfacial Phenomena
9. Supercooled Liquids and Glasses
10. Phase Transitions and Nucleation Phenomena
11. Rheological Properties of Liquids
12. Powder and other Granular Matter

Conference Chairman

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THE CITY OF GRANADA

In the South West of Spain, in Eastern Andalusia, we find the province of Granada extending over a surface area of 12,500 km². Over the centuries, each one of the peoples who have inhabited this city has left its mark and for this reason it has such a rich and varied heritage. The Arab era provided us with the fortress-palace of the Alhambra. The Christian era has left many outstanding legacies of which we may highlight the following from the various styles: the Renaissance Cathedral and Carlos V Palace, the Gothic Royal Chapel, the Baroque "La Cartuja" Monastery... All these together with its picturesque quarters and its countryside, filled with contrasts, combine to make Granada one of the most attractive cities in the world.



FURTHER INFORMATION

The second circular, giving more details about the programme, the general arrangements and registration forms will be mailed in November 1998. If you wish to receive the second circular please return the attached reply form to the Chairman of the Local Organising Committee before September 1998:

PROFESSOR ROQUE HIDALGO-ÁLVAREZ

Congresos GESTAC

Palacio de Exposiciones y Congresos de Granada

Local nº6. Paseo del Violón s/n · 18006 Granada, Spain

Information on the Conference, Granada, University of Granada (UGr) and travel is available on the World Wide Web: <http://www.ugr.es/~liquid99>

The deadline for registration and submission of Abstracts will be February 28, 1999.

**FIRST ANNOUNCEMENT AND CALL FOR PAPERS
THE COMBUSTION INSTITUT
and
THE INTERNATIONAL CENTRE for HEAT and MASS TRANSFER
MCS-99
MEDITERRANEAN COMBUSTION SYMPOSIUM
Antalya, Turkey, June 19-23, 1999**

PRESENTATION

The Mediterranean Combustion Symposium aims at the common efforts of the scientific communities from countries around the Mediterranean Sea in soliciting works and promoting the participation of scientists, engineers and students from the same area. Participants from all countries of the World are welcome and submission of papers from groups not located in this region is greatly appreciated since it is considered a valuable contribution to enrich different points of view as well as to communicate last achievements in the field. All topics and all the scientific / technological approaches in the Combustion field are pertinent to this Symposium. Topics related both to the Combustion and the Mediterranean Sea will be included in the program if they are identified by the Advisory Board, but they are not the primary objectives. The technical program will consist of oral presentation of contributed papers and work-in-progress communications. Invited lectures will be given by eminent specialists from all over the World. Contributed papers and work-in-progress communications will be organised into Colloquia on topics of special interest.

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Submission

Send one camera-ready paper and (3) copies of the paper plus (1) 3.5" floppy disk containing in a Word file only the Title, Authors, Affiliation and Abstract to:

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Deadlines

November 1, 1998 : Submission of full paper
March 1, 1999 : Notification of acceptance

WORK IN PROGRESS PRESENTATION

Submission

Send one camera-ready abstract and two copies to:

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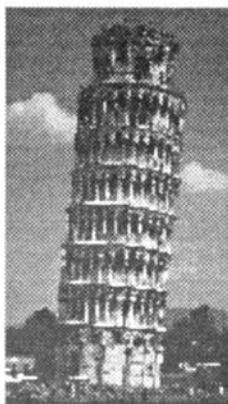
Deadlines

February 1, 1999 : Deadline for receipt of abstracts
March 1, 1999 : Notification of acceptance

Requests for further information concerning the local arrangements for the Symposium should be addressed to:

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URL: <http://ichmt.me.metu.edu.tr/upcoming-meetings/MCS-99/announce.html>



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

**May 23-26, 1999
Pisa, Italy**

The first International Symposium on Two-Phase Flow Modelling and Experimentation was held in Rome, and was attended by about 220 delegates from more than 35 countries.

The objectives of the Symposium are to bring together researchers, designers, experimentalists, modellers, and numerical analysts from industry, laboratories and academia active in the area of two-phase flow to present the state-of-the-art, to exchange their expertise and experiences and to further stimulate their research activities. The Symposium is organized by the Assembly of World Conferences on Experimental Heat Transfer Fluid Mechanics and Thermodynamics, and the ENEA Institute of Thermal-Fluid Dynamics, with participation of the Japan Society of Multiphase Flow.

Contributed papers are solicited dealing with experimental work, theory, analysis, design, numerical studies, modelling on fundamentals and applications of two-phase flow, including heat and mass transfer, fluid mechanics and thermodynamics aspects. Papers are also solicited reporting measurement techniques, visualization techniques, instrumentation, and analysis of experimental data as well as theory or numerical results. Some of the subject areas are as follows: annular flow and entrainment, coalescence phenomena, countercurrent flow and flooding, critical flows, flow pattern identification, horizontal and inclined flows, interfacial phenomena, phase distribution and separation, pressure drop, stratified flow, turbulence, waves on interfaces, boiling heat transfer, boiling of mixtures, critical heat flux, direct contact boiling, flow instabilities, subcooled boiling, thermodynamic non-equilibrium, condensation, condensation of mixtures, direct contact condensation, transient flow phenomena, zero gravity flows, flow visualization, measurement techniques and instrumentation, and code development. Pertinent papers in areas other than those listed above are also welcome.

DEADLINES

May 15, 1998 Three copies of abstracts due to the Lead Scientists closest to your region.

May 29, 1998 Authors to be notified of abstract acceptance.

July 24, 1998 Full length manuscript due to the Lead Scientist.

December 10, 1998 Authors to be notified of paper acceptance.

February 18, 1999 Author-prepared mats due.

For the list of Lead Scientists and for any further information and abstract see:
<http://www.ing.unipi.it/ISTP99/>

or contact:

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Dr. Paolo Di Marco, Symposium Secretary, University of Pisa, Energy Department, Via Diotisalvi 2, I-56126 Pisa, Italy, Tel: +39-50-569-610, Fax: +39-50-569-666; E-mail: p.dimarco@ing.unipi.it

CALL FOR PAPERS

BOILING AND CONDENSATION HEAT TRANSFER

**Ninth International Topical Meeting on
Nuclear Reactor Thermal Hydraulics
NURETH-9
San Francisco, California
October 3 - 8, 1999**

Papers are invited for a technical session on BOILING AND CONDENSATION HEAT TRANSFER at the International Topical Meeting on Nuclear Reactor Thermal Hydraulics, NURETH-9, to be held in San Francisco, California, October 3 - 9, 1998. The objective of the session is to provide a forum for presentation of new results, reviews of the state of the art, and discussion on the perceived needs and direction of future research in the area of boiling and condensation heat transfer as applied to thermal-hydraulics and safety of existing and advanced reactors. The papers can be either theoretical/numerical or experimental in nature. The topics for this session include, but are not limited to the following:

Subcooled nucleate boiling at low pressures; critical heat flux; annular flow boiling; the effect of flow regime on boiling heat transfer from the tube wall; numerical simulations of flow boiling; condensation in tubes and large volumes with or without noncondensibles; species stratification in large volumes as a result of condensation; direct contact condensation; water hammers and stability and heat transfer associated with evaporation of falling films.

The schedule for this session is:

Abstract Due:	September 1, 1998
Notification of Abstract Acceptance:	October 15, 1998
Full Length Paper Due for Review:	January 7, 1999
Notification of Paper Acceptance:	April 1, 1999
Final Paper on Mats Due:	June 1, 1999

Two copies of the abstract (100 - 500 words) should be submitted to one of the session organizers:

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Professor J.L. Munoz-Cobo
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An electronic copy of the abstract indicating the session (Boiling and Condensation Heat Transfer) should also be sent by e-mail to the NURETH-9 Technical Program Chairman, Professor Virgil E. Schrock, at NURETH9@nuc.berkeley.edu. For more information on abstract submissions and the conference, please visit the conference web site at: <http://www.nuc.berkeley.edu/NURETH9/NURETH9.html>.

Announcement and Call for Papers for a technical session on Experimental Methods and Instrumentation

to be held at the
Ninth International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-9)
Cathedral Hill Hotel, San Francisco, CA
October 3-8, 1999

Papers are invited for a technical session on EXPERIMENTAL METHODS AND INSTRUMENTATION at the Ninth International Topical Meeting on Nuclear Reactor Thermal Hydraulics-NURETH-9. Full technical papers encompassing, but not limited to, the following areas are invited to this technical session:

- Measurement Techniques in Single- and Two-Phase Flow
- Local Flow Structure and Velocity Studies
- Measurements of Turbulence in Channels or in Specific Equipment
- Bubble and Droplet Disintegration and Coalescence
- Interfacial Area Measurement in Multi-Phase Flows
- New Flow Visualization Techniques
- Advances in Radiographic, Laser and Sonic Measurement Techniques
- Computer Enhanced Measurement Techniques
- Fluid Mixing Measurement Techniques
- Multi-Phase Flow-Pattern Studies in Industrial Equipment
- Experiments/Analysis Related to or Relying on Measurements

All accepted papers will be published in the Conference Proceedings available at the meeting. Papers judged to be of archival quality will be published after the meeting in the Journal of Nuclear Engineering and Design or one of the ANS Journals (Nucl. Tech. or Nucl. Sci. & Eng.) The Following schedule will be adhered to:

- 100-400 word Abstract due to session organizer: September 1, 1998
- Notification of abstract acceptance: October 15, 1998
- Full-length paper due to session organizers for review: January 7, 1999
- Notification of paper acceptance: April 1, 1999
- Author prepared final paper on mats due: June 1, 1999

Please send two (2) copies of abstracts to the Session Organizers:

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An electronic copy of the abstract indicating the session (Experimental Methods and Instrumentation) should also be sent by e-mail to the NURETH-9 Technical Program Chairman: Professor Virgil F. Schrock at NURETH9@nuc.berkeley.edu.

For more information on abstract submission and the conference, please visit the conference web site at: <http://www.nuc.berkeley.edu/NURETH9/NURETH9.html>