



The International Information Center for Multiphase Flow

**NEWSLETTER**

No.16

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The Japanese Society for Multiphase Flow

**16<sup>th</sup> Annual Conference on Liquid Atomization and Spray Systems  
ILASS-Europe, September 11-13, 2000, Darmstadt, Germany**

by C. Tropea, K. Heukelbach

The ILASS-Europe conference in 2000, held in Darmstadt, Germany, was attended by 173 participants from 19 different countries and 90 scientific papers were presented. The conference began each morning with a plenary lecture, after which the papers were presented in three parallel sessions. A breakdown of papers, according to topic, is given below:

- |   |    |
|---|----|
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| • Fundamentals of breakup and atomization | 11 |
| • Spray impact on walls and films         | 12 |
| • Atomizer design and performance         | 15 |
| • Engine sprays                           | 20 |

Prof. Aldo Coghe from Politecnico di Milano opened the conference on Monday morning with a talk on *Fuel Injection in Internal Combustion Engines*, which also was the first of over 20 papers related to this subject. On Tuesday, Prof. William A. Sirignano from the University of California, Irvine presented work performed together with Dr. Carsten Mehning on the

topic of *Conical and Annular Free Film Liquid Instabilities*.

Also the topic of Fundamentals of Breakup was well represented in the program, with over 11 papers. Prof. Peter Walzel held the final plenary lecture on Wednesday on the topic of *Ranking of Influence Parameters on Drop Formation*.

Ten firms involved in supplying spray equipment or spray diagnostic equipment exhibited parallel to the scientific program in the Foyer of the Luisencenter, with an excellent view over the central square of Darmstadt.

The social program began Monday evening with greetings from Prof. Wörner, the president of the Technical University of Darmstadt and from Mr. Neumann, a town councillor of Darmstadt, who was also responsible for the following reception. The conference banquet was held in the Orangerie in Darmstadt, accompanied by chamber music from musicians from the TU Darmstadt.

The organisers heartily thank all participants and participating companies for their support of this year's conference and we look forward to seeing most of you next year in Zürich, for the 17<sup>th</sup> Annual ILASS-Europe conference.

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**To Join ICeM:**

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

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**INFORMATION about 8<sup>th</sup> INTERNATIONAL SYMPOSIUM  
s.v. "Heat Exchange and Renewable Energy Sources"  
September 18-20, 2000, Szczecin – Leba**

by Zbigniew Zapalowicz

8<sup>th</sup> International Symposium s.v. „Heat Exchange and Renewable Energy Sources“ was held in Leba in the time: 18 – 20.09.2000. The symposium was organized by: Committee of Thermodynamics and Combustion, Polish Academy of Sciences; Department of Heat Engineering, Technical University of Szczecin; „Dolna Odra“ Power Plant Complex Joint Stock Company in Nowe Czarnowo. The symposium was sponsored by Ministry of National Education; Polish State Committee for Scientific Research; Provincial Fund for Environment Protection and Water Conservation in Szczecin; Association of Copyright Collective Administration for Authors of Scientific and Technical Works KOPIPOL in Kielce, “Dolna Odra” Power Plant Complex Joint Stock Company and Szczecin District Heating Distribution Company Ltd.

Altogether, 111 participants and 36 foreign guests from Germany, Tunisia, Slovakia, Sweden, and Russia took part in Symposium.

Altogether, 63 papers were delivered on the plenary and poster sessions. The debates were carried out in Polish and German with the simultaneous translations, as well as in English.

Among others, the following subjects in the scope of multiphase flow were discussed: nucleate pool boiling on horizontal tube, boiling heat transfer on two-layer fins, investigation of electro-hydrodynamic enhancement of heat transfer applied to test shell-and-tube condenser, the bubble nucleation depends on geometry of artificial nucleation site, mechanisms of lateral motion of bubbles in the boundary layer, the wetting and spreading processes of stains and droplets at various surface areas of heat exchange and close-contact melting in a rectangular enclosure.

In the scope of heat transfer were presented: problems of determining mean values of convective heat-transfer coefficient by generalized and unified

Wilson technique; non-stationary measuring techniques in research on heat transfer; methods of visualization of the convective heat exchange by means of the Kihm's method and by means of the Schlieren technique; steps methods in the identification of transient temperatures distribution in solid bodies; problems of mass heat exchange in regenerators, as well as cooperation of two heat exchangers in steady and non-steady conditions by cross flow in crosswise mixed closed circuit.

Increasing interest concerning the wide range of topics in renewable energy sources brought forth numerous papers presented in plenary and poster sessions. The papers concerned, among others, utilization of solar energy altogether with heat accumulation; problems of production and application of biogas obtained in generators or from dumping grounds of municipal refuse; conversion of thermal biomass in solid, liquid, and gaseous fuels; as well as technical-economic problems concerning obtaining and application of geothermal energy. In the above problems, a lot of consideration was given to the ecological effects of production and processing of various energy carriers.

Some of papers, particularly those of foreign guests, concerned new technologies and installations used to obtain the ecological fuels as e.g. hydrogen. Papers concerning decentralized co-generated energy-heat economy with application of fuel cells, co-generated units and heating-cooling systems, as well as the combination of renewable and conventional energy sources.

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**Japanese Society for Multiphase Flow (JSMF)**

<http://flow.human.nagoya-u.ac.jp/JSMF/>

**Summary of the activities of the Global Conference on  
'Flowmetering & control for new millennium'  
September 20-22, 2000 - FCRI, Palakkad, Kerala, India**

by V. Jayaraman

In commemoration of the completion of the 10th year of the FCRI's service to flow product industries, an international conference on 'Flowmetering & control for new millennium' was held at FCRI during 20-22 September 2000. Following are the highlights of the Conference.

- This Conference was supported by the Ministry of Industry & Public Enterprises, New Delhi and co-sponsored by Agencies viz. M/s GAJL, ONGC, CPCL, IOCL, BHEL, IOGPT, DST, VSSC, BRNS, CSIR, Chemtrols, Fisher Rosemount etc. Also few agencies both from the Govt. & Private Sectors came forward to support the Conference financially.
- There were totally about 350 participants for the 3 days of Conference. Out of these, 25 foreign delegates are from international flow centres like NEL UK, NMI Netherlands, KRIS Korea, Underwriters Lab. USA and other institutions from Germany, France etc. There were 250 registered delegates from Indian R&D institutions, academic and flow product organisations.
- 62 technical papers were read during the 3 days of Conference. This includes 10 invited papers from eminent personalities working in the area on flowmetering & control. There were totally 14 technical sessions including 4 parallel sessions.
- On the occasion of Conference, a technical publication was brought out on the technical papers presented during the Conference. An industrial exhibition of flow products was also arranged and about 30 flow product exhibitors participated in this Conference.
- The technical sessions were mainly concentrating on the emerging trends on flowmeters like ultrasonic, thermal mass flowmeters, turbine flowmeters etc. and also new applications like acoustics, flowmeters for special applications in reactors etc. Advances on the flowmetering techniques, open channel flow/calibration and Accuracy improvement of flow labs/multi

phase flow/modeling and simulation etc. are some of other topics covered during the Conference. There were few technical sessions on flow measurement & control and related data acquisition systems.

- Dr. Michael Reader Harris, who is Head of the flow centre, NEL, UK has given lectures on the NEL's flow activities and also gave a valedictory address on the 3rd day of the Conference. He was of the opinion that a Conference of this type is required to be conducted periodically on a common platform so that people from academic, research institutes and flow industries etc. can have opportunity to discuss the recent advances and requirements of flow industries and look for a suitable solution. He was also of the opinion that this Conference was similar in quality to the one organised by NEL, U.K. regularly at Scotland called "North sea flow measurement workshop".
- As a fall out of the Conference, NEL, U.K. is conducting a Global Conference on 'South East Asia Hydrocarbon Flow Measurement in South East Asia' during 10 - 13 September 2001. The venue of the Conference is Kuala Lumpur, Malaysia. On the Scientific & Technical Committee of the conference, India is represented by FCRI.
- Dr. Iman J Landheer Head of the NNI, Netherlands also attended the Conference. To strengthen the traceabilities of measurement systems of FCRI, an inter comparison study is planned with similar institutions in Europe & USA during the coming year to accredit our lab with the international level of quality measurements.

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**An Announcement from Editor**

The JSMF will start internet-service for ICMF members on January 1, 2001.

You can read updated ICMF NEWSLETTER by visiting JSMF homepage

***<http://flow.human.nagoya-u.ac.jp/JSMF/index-e.html>***



**International Workshop on Current Status and Future Directions  
in Boiling Heat Transfer and Two-Phase Flow  
October 5 and 6, 2000  
Kansai University, Suita, Osaka, Japan**

by M. Ozawa

### Scope and aim of the workshop

The workshop was intended to present the current state of art in boiling heat transfer and two-phase flow and to highlight the future needs in this important area. Main body of the participants was authors of recently published handbook "Handbook of Phase Change" from Taylor & Francis, 1999. Total number of participants was 33 excluding 11 students of Kansai University. It was the principle that every participant had a chance to present his/her own activity on boiling phenomena or to claim his/her problem on boiling. Then the workshop started at 9:00 in the morning and continued to 22:00. Thus every participant could have at least 30 minutes for presentation, followed by relatively long and exciting discussions.

The Organizing Committee members were S.G. Kandlikar, Rochester Institute of Technology; Y. Fujita, Kyushu University; M. Shoji, The University of Tokyo; S. Nishio, The University of Tokyo and myself. Based on the great success of this exciting workshop, the organizing committee is now planning the second workshop after two or three years in Japan including new additional organizers from EU countries, e.g. G. P. Celata, ENEA and H. Auracher, TU Berlin.

The contents of the discussion can be found in the following list of presented titles.

### List of presented papers

- Elementary processes of phase change phenomena of pure liquid in uniform temperature field
- Bubbling from microscopic holes (simulation of nucleate boiling)
- Comparison of boiling curves at reflood test and post-CHF test with 4×4 bundle test section under high-pressure
- Boiling and evaporation from a superhydrophilic surface
- New experimental results on steady-state and transient pool boiling heat transfer
- Molecular dynamics simulation of vapor bubble nucleation on a solid surface
- Nucleate boiling of multicomponent mixtures
- Tube diameter and property effects on boiling heat transfer under low flow rate condition

- The micro/macro-layer model for boiling heat transfer
- The curious history of pool boiling research
- Experiment of subcooled boiling by high heat flux in a short period
- Measurement and control of non-condensable gases for reliable experiment on subcooled boiling
- Overview of studies on flow boiling heat transfer in PWR fuel assembly
- Dynamic neutron radiography: new method of void fraction measurement in subcooled boiling
- Solved and unsolved problems in boiler system: learning from accidents
- Understanding thermal and hydrodynamic mechanisms leading to CHF in pool boiling
- In-tube condensation of a ternary zeotropic refrigerant mixture of HFC32/125/134a
- Experimental study on the critical heat flux (CHF) in a rectangular channel with micro ribs for a solid target and proton beam window design
- Thermal hydraulic design and two-phase flow problems of solid target for high energy accelerator beam in spallation neutron source
- Onset point for annular flow regime under steam-water flow at high pressure and high temperature
- Mechanism of the subcooled flow boiling CHF and application to the high heat flux components
- Criteria for geysering in two dimensions
- Heat transfer and flow pattern of pure refrigerant FC134a evaporating in a horizontal capillary tube
- A rewetting model based on vapor-liquid interface instability mechanism
- Critical heat flux for tight-lattice rod bundle
- Numerical simulation of forced convective subcooled flow boiling
- Some complexities in bubble formation at an submerged orifice

Those who have some interests in this workshop will be welcomed to contact

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## Heat Transfer and Transport Phenomena in Microsystems Ottobre 15-20, 2000, Banff, Alberta, Canada

by Gian Piero Celata

The United Engineering Foundation Conference on Heat Transfer and Transport Phenomena in Microsystems has been held in Banff, Alberta, Canada, during 15-20 October 2000.

The Conference, focused on heat transfer and transport phenomena in microchannels and microstructures has been very well attended (more than 80 participants) with an even distribution of attendees among North America (32 people from the US and 1 from Canada), Europe (26 people, 10 from Germany, 8 from France, 3 from Sweden, 2 from UK and Italy, and 1 from Romania), and Asia (25 people, 13 from Japan, 6 from China, 3 from South Korea, 2 from Taiwan, and 1 from Hong Kong). Participation from industry has been limited but qualified (15 people, mainly, but not only, from the US).

A total of 55 papers have been presented orally in plenary sessions, besides 7 keynote lectures, delivered by distinguished scientists, dealing with the following topics: single-phase heat transfer, heat & fluid flow, heat transfer applications, pressure drop, industrial applications and MEMS, boiling phenomena, thermal radiation, material and thermophysical properties, molecular dynamics

Details about the program can be found in internet at the web page of the United Engineering Foundation ([www.engfnd.org](http://www.engfnd.org))

The objective of the Conference was to update the state-of-the-art in heat transfer and transport phenomena with reference to extreme conditions, microscale and nanoscale, both from the geometrical (size below 1 mm) and the time scale (extremely fast phenomena). Apart from contributing papers, the state-of-the-art is provided by the 7 excellent lectures delivered by Prof. A. Majumdar (Recent Developments in Microscale Temperature Measurement Techniques), Dr. J. Brandner (Microstructure Devices for Applications in Thermal and Chemical Process Engineering), Prof. B. Palm (Heat Transfer in Microchannels), Prof. F. Volklein (Thin Film Thermal Conductivity, Measurement, Phonon Modeling, and Microdevice), Prof. G. Chen (Nonequilibrium Phonon and Electron Transport in Heterostructures and Superlattices), Prof. Z.Y. Guo (Size effect on Flow and Heat Transfer Characteristics in MEMS), and Prof. S. Nishio (Attempts to Apply Micro Heat Transfer to Thermal Management). A Round Table on Micro/Nano-Scale Thermophysical Engineering outlined the main features of these two scale levels

of analysis and study.

Current studies reveal that heat transfer and transport mechanisms in micro-geometry and extremely short time-scale may be sensibly different from those observed in 'conventional' size and time scale.

Conclusions which can be drawn from the Conference depends on the research approach. The theoretical approach is definitely advanced, especially with molecular dynamics modelling, mostly popular and used in Japan. It allows detailed analysis of thermal phenomena and processes which are extremely fast (nanoseconds) or concentrated in microscopic geometries (thermal analysis of the microstructure)

The experimental approach, especially the fundamental research devoted to heat transfer and fluid flow in microchannels, would seem rather 'pioneeristic', often evidencing the lacking of adequate tools and well defined experimental procedures. Among the participants there was a common and general feeling (and agreement) that is necessary to define shortly accurate methodologies for the measurements and test procedures, in order to better make the results comparable, as they are very often contradictory. Also the availability of microsensors and adequate measurement techniques is essential for the correct development of the basic research. Maybe, a change in the mentality of the researcher, used to deal with macroscopic problems, may be useful to get better quality results.

Talking in terms of technological development, in terms of capability to produce microcomponents (micro-heat exchangers, etc.) it is to be said that the current status is satisfactory. This is probably due to drag offered by the electronic industry, where miniaturisation always played an important role on the developments in this field.

The Banff Conference has represented an important event in this field, offering relevant time for the discussion (during and, especially, after the presentation), which is the most typical feature of the United Engineering Foundation Conferences; very specialistic and residential events.

At the end of the Conference, participants expressed their intention to have a second Conference on the same topic in two years, i.e., in the year 2003.

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**Report on MFTP-2000**  
**International Symposium on Multiphase Flow and Transport Phenomena**  
**November 5-10, 2000, Antalya, Turkey**

by David Moalem Maron

The recent (second) conference “**MFTP-2000**” covered the area of two-phase flow and transport phenomena.

The first conference took place on 3-7 November 1997 and focused almost entirely on issues relating to **liquid-liquid systems** that were aimed at initiating specific views of liquid-liquid systems.

Some of the participants from the first conference recommended including in the second conference some of the following aspects: the relation between academic and industrial studies; the inclusion of microscale modeling in multiphase systems, taking into consideration the interactions between turbulent eddies of continuous phase and the dispersed phase. Also, some participants were in agreement that the second conference should contain more areas on sprays, droplets, which are of paramount importance to many industrial applications.

Indeed, the second conference includes wide aspects of **multiphase systems** - gas-solid, liquid-liquid and solid-liquid systems, with special focus on liquid-liquid. Also, some aspects were added on gas-liquid beyond the classic subjects of flow characterization, flow patterns, stability of transition in multiphase systems. Some attention was given to transport phenomena in gas-liquid systems and liquid-liquid systems. We received contributions on pollution control technology

and other multiphase contacting equivalent and application of equipment.

The conference held 14 sessions with 48 presented abstracts and 20 poster presentations. The 7 keynote lectures were presented on a wide variety of topics by leading scientists in their fields from all over the world. In all, participants from over 20 countries attended the conference.

In my opinion, the outcome of a successful conference is not only the framing of a good program but also the contribution of the participants. Their involvement made the conference a fruitful and interesting one.

I wish to thank everyone – in particular, the Leading Scientists, the Organizing Committee (Prof. Brauner, Prof. Garti, Prof. Gutfinger, Prof. Hetsroni and Prof. Marmur). Special thanks are given to **Prof. Brauner and Prof. Gutfinger** who worked with me intensively in preparing the program. Also, to my secretary, **Mrs. Barad**.

Last, but not least, I would like to take this opportunity of thanking **Prof. Faruk Arinc** and his colleagues for their cooperation in making the conference such a success.

Prof. David Moalem Maron  
Chairman of the Organizing Committee  
Holon Academic Institute of Technology, Israel

### **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.

**Report on the 4th EUROMECH Fluid Mechanics Conference  
November 19-23, 2000, Eindhoven University of Technology, The Netherlands**

by GertJan F. van Heijst

The 4<sup>th</sup> EUROMECH Fluid Mechanics Conference (EFMC-4) was held at Eindhoven University of Technology, 19-23 November 2000. This meeting brought together more than 300 fluid dynamics experts from 31 different countries – mostly European, but also from outside Europe (USA, Asia, Australia).

At the opening of EFMC-4 a few memorial addresses in honour of the former EUROMECH Presidents Prof. George K. Batchelor and Prof. David G. Crighton were presented by Prof. Hans Fernholz (President of EUROMECH) and Profs Keith Moffatt and Tim Pedley.

A total of eleven Invited Lectures were given in plenary sessions, and more than 200 contributed lectures were delivered in six parallel sessions. Topics according to which these sessions were arranged were:

- Turbulence
- Boundary layers
- Stability
- Waves
- Bubbles, drops and particles
- Multiphase flows
- Rotating flows and vortex dynamics
- Buoyancy-driven flows
- Simulation & numerical methods
- Mixing & dispersion.

Besides, the programme included three Mini-Symposia on

- Non-Newtonian fluid mechanics
- Biological fluid mechanics
- Environmental fluid mechanics,

each of which was organised in the form of a number

of parallel sessions.

In addition, more than 100 posters were presented during the poster exhibition.

The aim of the EFMC – to provide a platform for discussion and exchange of expertise and experience between fluid dynamicists – has been reached convincingly. Generally, the quality of the oral poster presentations was high, probably also due to the strict selection of the papers submitted for presentation.

More than 96 participants (> 35%) were younger than 33 years (i.e. born in 1968 or later). These young scientists were in principle candidates for the two EUROMECH Prizes for the best Lecture and the best Poster: winners were Mr. Nicola Parolini (Politecnico di Milano, Italy) with his lecture on “First Hopf bifurcation in the singular driven cavity flow” and Mrs. Astrid Manders (Netherlands Institute for Sea Research) with her poster on “Spatial behaviour of inertial waves in a rectangular basin with a sloping boundary”. The winners received an official Prize Certificate and an envelope containing 500 Euro.

In addition to providing a scientific setting, EFMC-4 also provided a relaxed social ambience, including a bus trip to Antwerp (B) and the conference dinner in Oud-Turnhout (B).

The follow-up meeting – EFMC-5 – will be held in Toulouse (Fr) in 2003.

GertJan F. van Heijst  
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## To Members

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.

## Report on the First Asian Particle Technology Symposium (APT 2000) December 13-15, 2000, Bangkok, Thailand

by T. Tanaka

The First Asian Particle Technology Symposium (APT2000) was held at the Mandarin Hotel in Bangkok, Thailand, December 13-15, 2000. This symposium was co-organized by Thai Powder Technology Center and the Society of Powder Technology, Japan, and was the first particle-technology-related symposium covers wide Asian countries. APT2000 is the first of a series of symposium on this subject to intend to fulfil the following objectives:

1. To exchange new ideas and initiate new developments in particle research among academic and industrial people in Asian area.
2. To strengthen the relations and promote cooperation among particle-technology research and academic communities in Asian region.
3. To complement the series of quadrennial World Congress on Particle Technology.

The symposium had 297 participants from 20 countries. Most participants from foreign countries were Japan (134), Korea (48), India (18), Australia (9), Taiwan (8), P. R. China (7) and Vietnam (7). A total of 2 plenary lectures, 21 invited lectures and 171 oral presentations were presented. The preliminary program was composed of more than 231 oral presentations, so unusually many presentations were canceled.

The symposium was opened by the plenary lecture:

“The current situation of particle technology in Thailand”,

W. Tanthapanichakoon,  
Culalongkorn University, Thailand

Prof. Tanthapanichakoon, the co-chairman and the host of the symposium, offered an overview of the current situation of particle technology in Thailand, and activities of Thai Powder Technology Center (TPTC) in Culalongkorn University. The invited lectures and general presentations were organized in the following 19 technical sessions and 3 invited seminars.

### [Particle Science and Engineering]

- Particle characterization (10 & 1 invited)
- Particle & powder mechanics (5)
- Bulk processing and bulk handling (5)
- Particle modification and design (7 & 1 invited)

- New frontier (9)
- Particle formation (26 & 1 invited)
- Fluid/particle separation (18 & 1 invited)
- Particulate materials science (14 & 1 invited)
- Aerosol technology (9 papers)
- Multiphase flow, fluidization & conveying (16 & 1 invited)
- Modeling and simulation (22 & 1 invited)

### [Particle Technology Applications]

- Mineral processing & powder metallurgy (25 & 1 invited)
- Catalysis (4 papers)
- Ceramics (12 & 1 invited)
- Waste management (11 & 1 invited)
- Environment & Health (6 & 1 invited)
- Combustion & Energy (11 & 1 invited)
- Food & bio-technology (3)
- Pharmaceutical (18)

### [Seminar]

- Pharmaceutical excipients (2 invited)
- Ceramics (3 invited)
- Particle formation (3 invited)

The numbers in parentheses express the numbers of oral presentations and invited lectures in the preliminary program. It was impressed that the sessions covered very wide range of particle-technology-related subjects. Concerning the field of granular and fluid-particle flows, many studies using Lagrangian type numerical simulations, especially DEM simulations, were presented.

It was decided to hold the APT symposium every two years. But the second one will be held in Malaysia in 2003 instead of 2002 to avoid collision with the World Congress on Particle Technology.

Detailed information on APT2000 is still available on the following web site:

<http://www.ap2000.org/>

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**Report on the International Symposium on Chemical Engineering  
February 8-10, 2001, Cheju Island, Korea.**

by Yong Kang

This international symposium on Chemical engineering was held to provide a forum to promote the exchange of technical, strategical and scientific information in the government as well as academic and industrial sectors in the fields of Chemical, Environmental and Energy Engineering. In this symposium, seventy eight papers were presented covering wide range of multiphase flow or contacting systems from the fundamental aspects to the practical applications; seven papers were dealing with catalytic reaction and multiphase flow reactors, ten papers were energy and environmental engineering, twenty six papers were fluidized bed and bubble column reactors or contacting flow systems, nine papers were fuel cell and energy systems, ten papers were hydrodynamics and filter systems of multiphase, ten papers were materials and its related processes and six papers were separation of multiphase and its related processes.

Almost 250 researchers, professors and government peoples from 5 countries (Japan, Russia, China, USA

and Korea) attended the symposium and discussed on the update advanced topics related to the Chemical Engineering field. Moreover, the special lectures on the government strategies as well as processes and technologies for solid waste treatment and its utilization recovery were provided in this symposium by means of parallel sessions with the oral presentations.

This symposium was jointly organized by the Korean Institute of Chemical Engineering and Korea University. The presented papers selected from the proceeding of this symposium will be published in the Korean Journal of Chemical Engineering after peer review.

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**POST CONFERENCE REPORT  
BETECH 2001**

**14th International Conference on Boundary Element Technology  
March 12 - 14, 2001, Orlando, Florida, USA**

by Karen Neal

BETECH 2001 was the 14th International Conference in the series on Boundary Element Technology; taking place from 12 - 14 March 2001 at the University of Central Florida (UCF), USA. The meeting was co-organised by this Institution and the Wessex Institute of Technology (WIT), UK, and sponsored by the International Journal of Engineering Analysis with Boundary Elements (EABE), the International Society of Boundary Element Methods (ISBE) and the Wessex Institute Foundation.

The BETECH conference series provides an established platform for the exchange of ideas between Boundary element researchers, research code developers and Industrial users to discuss novel advances in the Boundary Element Method (BEM).

**CONFERENCE OPENING**

Professor Brebbia opened the meeting, welcoming the delegates to BETECH 2001. He pointed out that the conference had been arranged this year in the USA

to provide a forum for those colleagues who could not participate in the 23rd International Conference on Boundary Element Methods, which is being held in Greece later this year.

He went onto speak about the vitality of BEM research, how BETECH 2001 attracted a number of well-known researchers as well as younger participants, and through this unique combination how BEM research continued to prosper.

He said: "BEM has now come of age as the technique is well established and highly respected by the computational mechanics community. This development is in great part due to the pioneering efforts of the BEM Conference Series first started in 1978 and the BETECH Seminars, which commenced in 1985. The career of Alain Kassab himself demonstrates, in my opinion, the vitality of BEM research. I first met Alain when he joined the Faculty of UCF as a Junior Professor, he is now not only a Full Professor, but also a world recognised authority in BEM."

Professor Brebbia stressed that there were many pioneers and BEM scientists at the BETECH meeting but he was only able to mention the achievements of a few in the time available. In particular he highlighted the work of those giving keynote addresses saying: "First and foremost, our friend and colleague Alex Cheng to whom I will refer in more detail when introducing his lecture. The diversity and originality of his output makes him one of the foremost BEM researchers in the world.

The other keynote speaker, Derek Ingham, who has contributed so much to our better understanding of how to apply BEM to fluid dynamics and general field problems. Richard Bialecki from the University of Gliwice, the third keynote speaker. He is now visiting UCF and has in the past visited many other institutions, including WIT when he started his original work on heat transfer, particularly in radiation problems. Henry Power himself, co-organiser of this meeting and, until recently, a WIT staff member, where he worked for nearly 10 years. He has now been appointed to a Professorial chair in the well known University of Nottingham. This is well-deserved recognition of his work on fluid dynamics using BEM."

Following this Professor Brebbia said, "I would also like to mention another occasion for rejoicing. This conference sees the launching of a long expected book by our friend and colleague, Giora Rosenhouse of the Technion. The topic of the book is "Active Noise Control" and although not essentially a BEM book, it is an important contribution, which can open new areas of research for our community. Acoustics is one of the most interesting and successful areas of application for BEM. Giora's book follows the recent launching in Cambridge (BEM 22) of two other volumes written by Tim Wu and Otto von Estorf, both on BEM for Acoustics.

The above mentioned activities are only a few of many, which demonstrate the importance of these conferences as a focus for the exchange of ideas and the promotion of new initiatives. All these books, as well as many projects and other activities have originated through personal contacts, which took place at the BEM meetings.

A time may come when meetings on BEM may not be needed, in the same way, as there is little need of general FEM conferences nowadays. I think that this will be a very welcome development as having no need of more battles, will mean that we have won the war!"

Professor Brebbia then proceeded to introduce Alex Cheng, the main keynote speaker at the meeting. He recalled, "I became aware of Alex's work through his implementation of the application of statistical methods using boundary integral equations." This was a topic

that they discussed when meeting for the first time at a conference in Vermont in 1984. "Since then" he said, "we have continued to be in constant contact, collaborating through a series of initiatives, including the organisation of several major international conference, book series projects; working together as Co-Editors of EABE and in many other ways."

Professor Brebbia continued, praising the high quality work Alex produced and his considerable output in terms of papers in learned Journals, chapters in books, editor of different state of the art volumes and more recently, author of a well received monograph.

Following the keynote address from Professor Cheng on a topic, which he has carried out much pioneering work. Professor Brebbia thanked Professor Cheng for his clear exposition and his support of BEM. He then proceeded to present the "Eminent Scientist Award" medal to Alex Cheng for his contribution to the development of the method. The medal is only awarded to scientists of the highest reputation and integrity.

## KEYNOTE ADDRESS

### 1. DAY ONE

Boundary Element Methods in Poroelasticity  
*A H D Cheng*, University of Delaware, USA

### 2. DAY TWO

The Effect of Surface Tension and Surface Friction on the Free Surface Flow in a Two-dimensional Channel  
*D B Ingham*, University of Leeds, UK

### 3. DAY THREE

Interaction of Radiation with other Heat Transfer Modes  
*R A Bialecki*, University of Gliwice, Poland

## PAPERS

There were papers presented from 18 different countries, with the USA submitting the greatest number. Practically all of these have been published in the Conference Book. The topics comprised:

- Acoustics
- Dual Reciprocity Methods
- Numerical Techniques
- Electrical Problems
- Industrial Applications
- Fluid Mechanics
- Fluid Structure Interaction
- Soil Structure Interaction
- Heat Transfer
- Potential Problems

## INVITED SPEAKERS

1. Hybrid Boundary Element Formulation in Acoustics

*L Gaul & M Wagner*

2. BEM Analysis of Sound Wave Propagation in Ducts with Obstacles, Cross-section Variations and Bypass Elements

*G Rosenhouse & O Findling*

3. Domain Integral Reduction in BEM: The Foundations

*D W Nicholson, A J Kassab & I Ionescu*

4. Issues and Needs for Health Monitoring of Naval Structures

*V G DeGiorgi*

5. DRBEM Solution of Temperatures and Velocities in DC Cast Aluminium Slabs

*B Sarler & J Perko*

6. Approximation of Functions and their Derivatives by Radial Basis Functions

*C S Chen*

7. Integral Equation Solution of Heat Extraction from a Fracture in Hot Dry Rock

*A H D Cheng, A Ghassemi & E Detournay*

8. TFFB Coupling BEM/FVM Algorithm for Multidimensional Conjugate Heat Transfer

*E Divo, E Steinthorsson & A J Kassab*

9. Adaptive Refinement Scheme for the last-squares Fundamental Solution Method for Potential Problems

*I Saavedra & H Power*

## MEETINGS

### 1. *International Society of Boundary Elements (ISBE)*

The members of the International Society of Boundary Elements (ISBE) met to discuss the new developments in the Society's Journal, Boundary Element Communications (BEC). The Journal will start publishing a section on Boundary Element Fundamentals called a Primer to help the training of new engineers. It will also increase the number of short papers as well as research and industrial notes.

### 2. *Fellows of the Wessex Institute of Technology*

New Fellows received their Diplomas during the Conference, including, S.P. Zhu from Woolgong University in Australia; Lothar Gaul from University of Stuttgart; Dick Dippery from Kettering University in the USA; Giaro Rosenhouse from Technion in Israel; Alex Cheng from University of Delaware; Virginia Di Giorgi from Naval Research Laboratory in the USA; and Oke Ohuejekwe from the University of Durban in South Africa. The award confers special privileges to members when visiting the

Wessex Institute of Technology and in many other activities related to the Institute.

### 3. *International Advisory Committee*

During a special meeting of the International Advisory Committee, the objectives and topics of the conference were discussed. It was decided to hold the next conference in Detroit, with the venue and dates to be decided shortly. Dr Cha of Philips and Dr Dippery of Kettering University, are both from that area and will actively collaborate to organise the meeting with the participation of local industry.

### 4. *Advances in Boundary Elements Book Series*

The Editorial Board of the Book Series, Advances in Boundary Elements, met to discuss how its publication is progressing. Several new volumes were suggested with topics of interest to the Community. The conclusions of the meeting will be circulated to WIT Press.

## INFORMAL CONFERENCE ACTIVITIES

In addition to a reception during the first day, many of the delegates had ample occasion to meet informally. One such occasion was during the conference banquet held at a restaurant in Orlando, renowned for its excellent cuisine and cellar.

The conference was as always very successful, with the delegates having opportunity for numerous discussions in a friendly atmosphere.

## CONFERENCE PROCEEDINGS

The Proceedings of the conference entitled "Boundary Element Technology XIV" (408 pages) are available from WIT Press (ISBN: 1-85312-861-9 £149 / US \$231). They are published in hard cover book form and are available to delegates at the time of registration. In addition the Proceedings are widely distributed after the conference through the international book trade. For further details please contact

Helen Arnold, WIT Press Marketing Co-ordinator.

Email: [marketing@witpress.com](mailto:marketing@witpress.com)

or visit their website at [www.witpress.com](http://www.witpress.com).

The full report, including pictures and web links to the Proceedings, is available at:

<http://www.wessex.ac.uk/conferences/2001/betech01/>

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Please visit the WIT website at:

<http://www.wessex.ac.uk>

## Future Meetings

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

### 4th International Symposium on Mixing in Industrial Processes

Toulouse, France, May14-16, 2001

E-mail: [progep-ismip4@ensigct.fr](mailto:progep-ismip4@ensigct.fr)

<http://www.univ-inpt.fr/~ISMIP4>

### 2nd ICHMT International Symposium on Advances in Computational Heat Transfer

Palm Cove, Queensland, Australia, May 20-25, 2001.

Professor Graham de Vahl Davis

The University of New South Wales

Fax: (+61 2) 9663 1222

Email: [g.devahldavis@unsw.edu.au](mailto:g.devahldavis@unsw.edu.au)

<http://www.cht01.mech.unsw.edu.au>

### The 10th International Conference on Fluidization: Fluidization for Sustainable Development

Bijing, China, May 20-25, 2001

Prof. Mooson Kwauk

Fax: +86-10-6255-8065

E-mail: [moodon@lcc.icm.ac.cn](mailto:moodon@lcc.icm.ac.cn)

<http://www.engfnd.org/engfnd/1aa.html>

### International Parallel CFD2001 Conference

Egmond aan Zee, The Netherlands, May 21-23, 2001

Prof. Dineke Heersma

Delft University of Technology

Fax: +31-15-278-2440

E-mail: [mailto:d.heersma@wbmt.tudelft.nl](mailto:mailto:d.heersma@wbmt.tudelft.nl)

<http://www.parcfd.org/2001conf/index.html>

### ICMF 2001-New Orleans 4th International Conference on Multiphase Flow

New Orleans, Louisiana, USA, May 27-June 1, 2001

Prof. E. Michaelides

School of Engineering, Tulane University

New Orleans LA 70118, USA

Fax: +1-504-862-8747

E-mail: [emichael@mailhost.tcs.tulane.edu](mailto:emichael@mailhost.tcs.tulane.edu)

<http://alpha2.eng.lsu.edu/icmf2001/>

### The 6th Asian Symp. on Visualization (ASV-6)

Masan and Changwon, Korea, May 28-31, 2001

<http://pivptv.kmaritime.ac.kr/ASV6/>

### 2001 Fluids Engineering Division Summer Meeting

New Orleans, Louisiana, USA, May29 - June 1, 2001

Dr. G. Raman

Nyma Inc., NASA Lewis

Fax: 216-977-1269

E-mail: [ganesh.raman@lerc.nasa.gov](mailto:ganesh.raman@lerc.nasa.gov)

<http://www.asme.org/conf/fed01/cfp.htm>

### 4th Int. Topical Mtg. on Neutron Radiography

State College, Pennsylvania USA, June 3-6, 2001

<http://www.me.psu.edu/itmnr-4/>

### Tenth International Conference on Computational Methods and Experimental Measurements 2001

Alicante, Spain, June 4 – 6, 2001.

<http://www.wessex.ac.uk/conferences/2001/CMEM01/>

### 35th National Heat Transfer Conference

Anaheim California, USA, June 10-12, 2001

Dr. C. B. Panchal

Energy Concept Co.

Fax: 973-882-1717

E-mail: [torresm@asme.org](mailto:torresm@asme.org)

<http://www.asme.org/conf/ht01>

### Radiation-2001, Third International Symposium on Radiative Transfer

Antalya, TURKEY, June 10-15, 2001

(Abstract due: December 15, 2000)

Prof. Faruk Arinc

Middle East Technical University

Fax: +90 312 210 1331

<http://ichmt.me.metu.edu.tr/upcoming-meetings/Rad-01/announce.html>

### Third International Conference on Compact Heat Exchangers and Enhancement Technology for the Process Industries

Davos, Switzerland, June 10-15, 2001.

<http://www.engfnd.org>

### International Conference on Energy Conversion and Application ( ICECA' 2001 )

Wuhan, P. R. China, June 17-20, 2001

Prof. Wei Liu

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Huazhong University of Science and Technology

Fax: (86) 27-8754-0724

E-mail: [weiliu@public.wh.hb.cn](mailto:weiliu@public.wh.hb.cn)

<http://www.hust.edu.cn/new/english/ICECA2001.htm>

### 39th European Two-Phase Flow Group Meeting

Aveiro, Portugal, June 17-20, 2001

Prof. A.C. M. Sousa and Prof. J.J.A. Grácio

University of Aveiro

E-mail: [39etpfgm@mec.ua.pt](mailto:39etpfgm@mec.ua.pt)

### ANS Annual Mtg

Milwaukee, June 17-21, 2001

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

**8th International Symposium on Temperature and Thermal Measurements in Industry and Science (Tempmeko 2001)**

Berlin, GERMANY, 19 – 21 June 2001

Fax: +49-2116214-161

E-mail: [tempmeko@vdi.de](mailto:tempmeko@vdi.de)

<http://www.vdi.de/gma/tempmeko2001.htm>

**CAV 2001 Fourth International Symposium on Cavitation**

Pasadena, California, USA, June 20-23, 2001

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**Chemical Reactor Engineering 2000: Novel Reactor Engineering for the New Millennium**

Barga, ITALY, June 24-29, 2001

Prof. Franco Berruti

University of Saskatchewan

Fax: +1-306-966-5205

E-mail: [F.Berruti@enr.usask.ca](mailto:F.Berruti@enr.usask.ca)

**Second International Symposium on Turbulence and Shear Flow Phenomena**

Stockholm, SWEDEN, June 27-29, 2001

Prof. M. A. Leschziner (QMW, U. London) and Prof.

N. Kasagi (Univ. Tokyo)

<http://www.mech.kth.se/tsfp2>

**Third International Conference on Compact Heat Exchangers and Enhancement Technology for the Process Industries**

Davos, Switzerland, July 1-6, 2001

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**Third International Symposium on Computational Technologies for Fluid/Thermal/Chemical Systems with Industrial Applications in conjunction with the ASME PVP Division Conference**

Atlanta, Georgia, USA, July 22-26, 2001

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<http://www.asme.org/divisions/pvp/index1.htm/>

[pvp\\_home.html](http://www.asme.org/divisions/pvp/index1.htm/pvp_home.html).

**The Annual Summer Meeting of KICeE, 2001**

Kumho Resort, Chungmu, Korea, July 25-27, 2001

<http://www.kiche.or.kr>

**EPMESEC'VIII (EPMESEC: Enhancement and Promotion of Computing Methods for Engineering and Science)**

Shanghai, China, July 25-28, 2001

<http://www2.sjtu.edu.cn/epmesec>

**36th Intersociety Energy Conversion Engineering Conference**

**“Energy Technologies Beyond Traditional Boundaries”**

July 29 - August 2, 2001

William D. Turner, Ph.D., P.E.

Energy Systems Lab

Fax : 979/862-8687

E-mail: [wtd5451@esl.tamu.edu](mailto:wtd5451@esl.tamu.edu)

<http://www.asme.org/conf/iecec01/cfp.htm>

**The 3rd Int. Symposium on Meas. Tech. For Multiphase Flows**

Fukui, Japan, August 1-3, 2001

<http://mech.fukui-u.ac.jp/ismtmf>

**Particle Imaging Velocimetry (PIV) Challenge 2001**

Göttingen, Germany, September 14 - 15, 2001

Dr. Koji OKAMOTO

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**4th International Symposium on PARTICLE IMAGE VELOCIMETRY**

Göttingen, Germany, September 17 - 19, 2001

Dr. Jürgen Kompenhans

DLR

Fax+ 49 551 709 2830

<http://www.sm.go.dlr.de/piv01>

**5th International Conference on GAS-LIQUID and GAS-LIQUID-SOLID Reactor Engineering**

Melbourne, September 23-27, 2001

(As part of the 6th World Congress of Chemical Engineering)

<http://www.eng.newcastle.edu.au/cg/GLS5/index.htm>

**6th World Congress of Chemical Engineering**

Melbourne Australia, September 23-27, 2001

E-mail: [chemeng@meetingplanners.com.au](mailto:chemeng@meetingplanners.com.au)

<http://www.chemengcongress.com>

**5th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics**

Thessaloniki, GREECE, September 24-28, 2001

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<http://docenti.ing.unipi.it/exhft5/>

**VIM-01, International Symposium on Visualization and Imaging in Transport Phenomena**

Antalya, TURKEY, October 14-19, 2001

Prof. S. Sideman

Technion

Fax: +972 4 822 4131

E-mail: [sam@biomed.technion.ac.il](mailto:sam@biomed.technion.ac.il)

<http://ichmt.me.metu.edu.tr/upcoming-meetings/Vim-01/announce.html>

**2nd International Conference on Computational Heat and Mass Transfer**

Rio de Janeiro, BRAZIL, October 22-26, 2001

Prof. R. Cotta

Fax: +55 21 290 6626

E-mail: [cotta@serv.com.ufrj.br](mailto:cotta@serv.com.ufrj.br)

<http://www.ltcc.com.ufrj.br/ICHMT/>

**ANS 2001 Winter Meeting**

Reno, USA, Nov 11-15, 2001

E-mail: [topical@ncsd.ans.org](mailto:topical@ncsd.ans.org)

Fax: (240)248-2588

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

**International Mechanical Engineering Congress and Exposition**

New York, USA, November 11-16 2001

<http://www.asme.org/conf/congress01/index.htm>

**The 14<sup>th</sup> Symposium on Chemical Engineering (Taejon/Chungnam-Kyushu)**

Chungnam National University, Daeduk Science Town Taejon, Korea, November 30 - December 2, 2001

Prof. Yong Kang

Department of Chemical Engineering

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Daeduk Science Town, Taejon 305-764

Korea.

E-mail: [kangyong@hanbat.cnu.ac.kr](mailto:kangyong@hanbat.cnu.ac.kr)

Fax: +82-42-822-8995

**The 8th Int. Symposium on Flow Modeling and Turbulence Measurements (FMTM2001)**

Tokyo, JAPAN, December 4-6, 2001

Dr. N. Tanaka, CRIEPI

Fax: +81 471 84 7142

E-mail: [fmtm2001@dcc.co.jp](mailto:fmtm2001@dcc.co.jp)

<http://fmtm2001.dcc.co.jp/>

**16th National Heat and Mass Transfer Conf. and 5<sup>th</sup> ISHMT/ASME Heat and Mass Transfer Conf.**

CALCUTTA, India, January 3-5, 2002

[http://education.vsnl.com/announcement\\_nhmt/](http://education.vsnl.com/announcement_nhmt/)

**1st Int. Conf. on Heat Transfer, Fluid Mechanics & Thermodynamics**

Skukuza Restcamp, Kruger National Park, South Afrika

April 8-10, 2002

<http://www.walthers.co.za/conference/hefat/>

**The 7th International Conference on Circulating Fluidized Beds (CFB7)**

Niagara Falls, Canada May 5-8, 2002.

<http://publish.uwo.ca/~jzhu/cfb7>

**Heat and Mass Transfer in Solid-Liquid Phase Change Processes – EURO THERM Seminar 69**

Bistra, Liubljana, SLOVENIA, June 26-28, 2002

<http://termserv.casaccia.enea.it/eurotherm/futureseminars.html>

**11th International Symposium on Applications of Laser Technique to Fluid Mechanics**

Lisbon Portugal 8-11 July 2002

Abstract by 15 December 2001

<http://in3.dem.ist.utl.pt/lisboa-laser/>

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## 4th International Conference on Multiphase Flow, ICMF2001

May 27- June 1, 2001, Marriott Hotel, New Orleans, U.S.A.

URL : <http://boss.me.tulane.edu/icmf2001/>

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American Institute of Chemical Engineers  
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Japanese Society for Multiphase Flow  
Tulane/Xavier Center for Bioenvironmental Research  
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Prof. S. W. Yoon	



ICMF 2001 will be held in New Orleans during the week of May 27 to June 1, 2001.

This is the fourth in a series of International Conferences on Multiphase Flow, of which the first was held in TSUKUBA, Japan, in 1991, the second, ICMF'95, in KYOTO, Japan, in 1995, and the third, ICMF'98, in LYON, France, in 1998.

The aim of these conferences is to bring together researchers from all countries and from all disciplines and applications involving multiphase flow, to promote the exchange of new ideas, results and techniques.

We hope that this conference will facilitate and encourage communications between all those working on multiphase flows.

The ASME FED Summer Meeting will also take place in New Orleans, LA from May 29 to June 1 in the Sheraton Hotel, which is located across the street from the headquarters of ICMF 2001. All registered attendees for the ICMF 2001 will be entitled to participate in all the technical events of the ASME FED, they will receive a complimentary ASME FED program and the set of the meeting proceedings, free of charge. Reciprocal arrangements will be made for the attendees of the ASME FED meeting.

For further information, visit ASME FED's website at [www.asme.org/conf/fed01/](http://www.asme.org/conf/fed01/)

For further information about the ICMF-2001 Conference, please contact one of the following:

#### Conference Chairman

Prof. E. E. Michaelides,  
School of Engineering,  
Tulane University,  
New Orleans, LA  
phone: +1-504-865-5819,  
e-mail: [emichael@mailhost.tcs.tulane.edu](mailto:emichael@mailhost.tcs.tulane.edu)

#### Conference Secretary

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phone: +1-225-388-5903,  
fax: +1-225-388-5924  
e-mail: [icmf2001@me.lsu.edu](mailto:icmf2001@me.lsu.edu)



## **ICMF 2001 GENERAL INFORMATION**

### ***Conference venue***

Mariott Hotel, New Orleans (Phone: 504-581-1000, Fax: 504-523-6755)

A block of rooms has been reserved for the attendees of ICMF-2001 at the general Conference rate of \$115.00 plus 14% tax (double or single occupancy).

For students (with a student identity) a very limited number of rooms has been reserved at \$81.00 plus 14% tax (double or single occupancy).

For State and Government employees the standard government per diem rate of \$88.00 plus 14% tax (double or single occupancy) will be honored by the Hotel.

Reservations may be made by calling the Marriott Hotel directly at 1-800-228-9290 (within the USA) or 1-504-581-1000 from anywhere in the world.

The rates Conference rates represent very deep discounts on the normal Hotel rates. The Marriott Hotel will honor these rates for reservations until 5:00 pm April 27, 2001. To get the Conference rates please specify to the reservation agent that you are attending the International Conference on Multiphase Flow

### ***How to reach New Orleans***

By Air to New Orleans International Airport :

There are direct daily links with many major US airports, including New York, Dallas, Chicago, Washington, Nashville, Atlanta, Newark and St. Louis.

### ***Weather***

The weather towards the end of May and beginning of June in New Orleans is generally sunny and hot, brief afternoon showers are not unusual.

### ***Language***

The official language will be ENGLISH

### ***Certificates***

Certificates of Attendance will be provided as necessary.

## **REGISTRATION AND FEES**

Participants must be registered, and badges must be worn to gain entrance into all sessions and events of ICMF-2001. The registration fee includes:

- The CD-ROM Proceedings of the ICMF-2001
- The CD-ROM Proceedings of the ASME-Fluids Eng. Summer Annual Meeting
- Jazz-Band Conference Reception (Monday)
- Conference Dinner/Banquet (Wednesday)
- Jazz Recital (Thursday)
- Coffee and refreshments during breaks
- Authors' breakfast

If you wish to take advantage of the lower early pre-registration rate of \$520 (\$390 for students), you can pre-register by mailing, faxing or sending electronically your completed registration form before May 14, 2001. After this date, you may pre-register at any time, but the on-site registration fee of \$570(\$420 for students) will apply. Click here to get the registration form in Microsoft Word or pdf format.

Please note that all registered attendees at the ICMF-2001 will be entitled to receive a program and to participate in all the technical events of the ASME-FED (which will take place in the Sheraton Hotel from May 29 to June 1, 2001). The ICMF-2001 attendees will receive a complimentary ASME FED program and the set of the meeting proceedings, free of charge. Reciprocal arrangements will be made for the attendees of the ASME FED meeting.

## **ONLINE REGISTRATION**

To register online, please visit the ICMF2001 web site at: <http://boss.me.tulane.edu/icmf2001/>

## **ON-SITE REGISTRATION HOURS**

The registration desk will open on Sunday May 27 2001 at 2:00 pm in the Marriott Hotel. If you have pre-registered, you will be able to pick your badge, program, proceedings and tickets to the events. If you have not been pre-registered, you will be able to register on site during the following hours:

- |                                     |                                       |
|-------------------------------------|---------------------------------------|
| Sunday, May 27: 2:00 pm to 7:00 pm  | Wednesday, May 28: 9:00 am to 5:00 pm |
| Monday, May 28: 7:00 am to 5:00 pm  | Thursday, May 28: 9:00 am to 5:00 pm  |
| Tuesday, May 28: 8:00 am to 5:00 pm |                                       |

## **CANCELLATION POLICY**

The cancellation policy of the ICMF-2001 is as follows: For cancellation requests received before May 15, 2001 the full registration fee of \$520 will be refunded. For cancellation requests received between May 14, 2001 and May 24, 2001, \$450 of the registration fee will be refunded. No refunds will be made after May 24, 2001.

Registration cancellations may be made by letter, telephone (1-504-865-5819) or by sending an e-mail to: [icmf@tulane.edu](mailto:icmf@tulane.edu). A cancellation number will be issued for all such requests.

### **HOTEL RESERVATION THROUGH THE INTERNET**

The web site of the hotel requires as input the "group code." Below are the codes for the ICMF-2001 rates:  
 regular attendee rate: MPFMPFA  
 student rate (must present letter or student ID at front desk); IMFIMFA  
 government rate: IMUIMUA

If there is any difficulty, please contact the Hotel by telephone.

Mariott Hotel, New Orleans  
 (Phone: 504-581-1000, Fax: 504-523-6755)

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For students (with a student identity) a very limited number of rooms has been reserved at \$81.00 plus 14% tax (double or single occupancy).

For State and Government employees the standard government per diem rate of \$88.00 plus 14% tax (double or single occupancy) will be honored by the Hotel. These rates apply for the duration of the Conference as well as for three days previous and three days after the conference (that is from Thursday 4/24 to Sunday 6/3, 2001).

Reservations may be made by calling the Marriott Hotel directly at 1-800-228-9290 (within the USA) or 1-504-581-1000 from anywhere in the world.

The Conference rates represent very deep discounts on the normal Hotel rates. The Marriott Hotel will honor these rates for reservations until 5:00 pm April 27, 2001. To get the Conference rates please specify to the reservation agent that you are attending the International Conference on Multiphase Flow

For further information, visit Marriott Hotel, New Orleans.

### **PANELS**

Modeling of Multiphase Flows:

*A. Prosperetti (moderator), G. Hetsroni, Y. Matsumoto, D. Joseph and G. Hewitt.*

New Horizons for Nuclear Thermal-hydraulics:

*M. Ishii (moderator), J. -M. Delhaye, H. Ninokata, G. Yadigaroglu, H. C. No, V. K. Dhir.*

Latest Developments in Experimental Methods for Two-Phase Flows:

*J. Sinclair (moderator), E. Longmire, S. Cessio, Y. Hassan, J. Eaton.*

Aerosols and Air Pollution:

*L.-P. Wang (moderator), G. Ahmadi, M. Choi, P. McMurry, M. Reeks.*

Microgravity Two-Phase Flow: What have we learned?

*K. Rezakallah (moderator), V. Dhir, H. Ohta, J. Fabre, C. Colin, J. Navickas, C. Rogers*

### **INVITED LECTURES**

#### **PLENARY LECTURES:**

A review of carrier-phase turbulence in dispersed phase flows:

*C. T. Crowe*

Forced convective subcooled boiling:

*J.-M. Delhaye*

Drop deformation, breakup and coalescence in viscous fluids:

*J. G. Leal*

Discrete Particle Simulation of Particle-Fluid Flows:

*Y. Tsuji*

#### **KEYNOTE LECTURES:**

Experiments in and Modeling of Multiphase Opaque Flows:

*M. Dudukowic*

Hydrodynamics of Fluidization: Structure and Turbulence:

*D. Gidaspow*

Boiling with surfactants:

*G. Hetsroni*

Recent Advances in Second-Order Moment Two-Phase Turbulence Models for Gas-Particle and Bubble-Liquid Flows:

*X.-L. Zhou*

Particle collisions in multiphase flows:

*J. T. Jenkins*

Turbulence and mixing in bubbly flows:

*M. Lance*

Multi-scale analysis of bubbly flows:

*Y. Matsumoto*

Examples of interesting industrial multiphase-flow problems:

*G. Ooms*

The systematic derivation of averaged equations by DNS:

*A. Prosperetti*

The PDF approach to modeling dispersed particle flows:

*M. Reeks*

Multiphase phenomena and processes at the nanoscale:

*M. Roco*

Two-Phase Flow in Micro-Channels:

*A. Serizawa*

Particle measurements:

*M. Sommerfeld*

Boiling and Burnout:

*T. Theophanus*

Direct Numerical Simulations of Multiphase Flows:

*G. Trygvanson*

Gas-particle flows over bodies-key problems, modeling and numerical analysis:

*Y. Tsirkunov*

### **SPOUSES' PROGRAM**

There will not be a special "Spouses' Program" organized by the ICMF-2001. The City of New Orleans offers a great deal of attractions for everyone's taste and budget. There are several tour companies that operate in the city with at least fifty activities/tours (information on the tours may be easily found in the Lobby of the Hotel). Among the available activities we recommend the following:

Bus City Tour: Includes City Park, the Botanical Gardens, The Garden District, the Lake front area, St. Charles Avenue.  
Stroll in the Audubon Park (accessible by the famous New Orleans streetcar).  
Stroll in (or take a tour of) the Garden District (accessible by the famous New Orleans streetcar).  
Visit the Aquarium of the Americas (allow 2-3 hours).  
Visit the Children's Museum.  
Visit the New Orleans Zoo.  
Visit the "French Market" (a short walk from the Hotel).  
Visit the Mississippi promenade and Woolenber park (a short walk from the Hotel).  
Take the Mississippi ferry to the west bank (free service to the public).  
Walking tour of the French Quarter (just a stroll from the Marriott Hotel)  
Visit the New Orleans Museum of Art (by taxi).  
Visit the Longue Vue House and Gardens (tour or taxi ride).  
Swamp tour in the Jean Lafitte National Park (allow for 5-6 hours).  
Plantation tours (there are at least five plantations within 40 miles radius, allow 4-5 hours).  
Cooking classes and demonstrations in the French Quarter.  
Short (2-3 hours) Riverboat cruises on the Mississippi.  
Sailing in the Lake Pontchartrain.  
...

#### ICMF 2001 CONTACT INFORMATION

For information about the ICMF-2001 Conference, please contact one of the following:

**Conference Chairman**

Prof. E. E. Michaelides,  
School of Engineering,  
Tulane University, New Orleans, LA70118  
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email: emichael@tulane.edu  
or: icmf@mailhost.tcs.tulane.edu

**Conference Secretary**

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Mechanical Engineering Department,  
Louisiana State University, Baton Rouge, LA 70803  
phone: +1-225-388-5903  
, fax: +1-225-388-5924,  
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## THE THIRD INTERNATIONAL SYMPOSIUM ON MEASUREMENT TECHNIQUES FOR MULTIPHASE FLOWS

August 1-3, 2001, Fukui, Japan

URL: <http://mech.fukui-u.ac.jp/~ismtmf/>

### ORGANIZERS

The Japanese Society for Multiphase Flow  
The Chinese Society for Measurement  
Southeast University, China  
Fukui University, Japan

### SPONSORSHIP

The Visualization Society of Japan  
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Prof. Dr. Shuji HATTORI

### Members :

Prof. Masaaki ISHIKAWA  
Prof. Keiichi SATO  
Prof. Nobuhide TAKASUGI

### PLACE and DATE

The 3rd International Symposium on Measurement Techniques for Multiphase Flows (ISMTMF) will be held at Fukui University, Fukui, Japan during August 1-3, 2001.

### PURPOSE

The objective of this symposium is to develop measurement techniques for multiphase flows by exchanging new information among scientists and engineers working in universities, industries and other fields.

People who are interested in experiment and practical application of multiphase flows, such as gas-solid, gas-liquid, liquid-solid, and so on, are welcome to attend the symposium.

### TOPICS

General areas of interest are measurement techniques for multiphase flows.

- (1) Novel sensors, probes and devices
- (2) Optical, non-intrusive and other advanced measurement techniques
- (3) Flows visualization and image processing, PIV
- (4) Data processing
- (5) Discussion of comparison between numerical simulation and experimental results
- (6) Information technology for multiphase flows
- (7) Industrial application and problems

### LANGUAGE

English

### TIME SCHEDULE

Jan. 12, 2001 Three copies of abstracts due  
less than 500 words, figures and tables

Jan. 31, 2001 Notification of abstract acceptance

Mar. 31, 2001 Full-length draft paper due

May 15, 2001 Notification of draft paper acceptance

June 15, 2001 Camera ready paper or PDF file manuscript due

### CORRESPONDENT ADDRESS

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Phone : +81-776-27-8546 (Office)  
Fax : +81-776-27-8748 (Dept. Mech. Eng.)  
E-mail : hattori@mech.fukui-u.ac.jp

### REGISTRATION FEE

The symposium fee on site registration is 300 US\$ and that in advance is 250 US\$.

This fee covers the symposium proceedings, welcome reception, banquet, attending all sessions and refreshments.

The registration fee for a student is 150 US\$ on site and 125 US\$ in advance.

### LAB TOUR AT NUCLEAR POWER PLANTS

There are 15 units of nuclear power plants in Fukui Prefecture.

We are planning to visit two sites of them on 4th of August in Tsuruga City which is 50km far from Fukui City.

Please apply to the lab tour using the registration form, which will be available in our home page later.

### HOW TO COME TO FUKUI, JAPAN

- (1) From Osaka Kansai Int. Airport (Kansai-kuko Line)---1.0 hour--- Shin-Osaka (Tokaido Line)---0.5 hour--- Kyoto (Kosei Line)---1.5 hours--- Fukui
- (2) From Tokyo Narita Int. Airport (Narita Line)---1.0 hour--- Tokyo (Tokaido Shinkansen)---2.5 hours--- Maibara (Hokuriku Line)---1.0 hour ---Fukui
- (3) From Nagoya Nagoya Int. Airport (Airport Bus)---0.5 hour--- Nagoya (Tokaido Line)---1.0 hour--- Maibara (Hokuriku Line)---1.0 hour--- Fukui
- (4) From Komatsu Komatsu Int. Airport (Airport Bus)---1.0 hour--- Fukui