



The International Information Center for Multiphase Flow

## NEWSLETTER

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The Japanese Society for Multiphase Flow

**CHT'01: 2<sup>nd</sup> ICHMT SYMPOSIUM ON  
ADVANCES IN COMPUTATIONAL HEAT TRANSFER  
May 20-25, 2001, Palm Cove, Queensland, Australia**

by Graham de Vahl Davis

The symposium **CHT'01: Advances in Computational Heat Transfer** was held at the Novotel Palm Cove Resort, Queensland, Australia. It was sponsored jointly by the International Centre for Heat and Mass Transfer and the CFD Research Laboratory of The University of New South Wales, and covered all aspects of computational heat transfer. The programme featured 15 invited keynote papers, presented orally, and 149 contributed papers given as poster presentations. 178 people from 30 different countries attended; 85% were from outside Australia.

The invited papers included several of interest to workers in multi-phase flow:

Effect of the thermal wall boundary conditions on scalar transport in clear and particle laden turbulent boundary layer. *G Hetsroni, C Li, A Mosyak, I Tiselj & E Pogrebnyak*

Expanded use of CFD in the chemical process industry. *D Choudury, M S Engelman and L Marshall*

Heat transfer and fluid dynamics phenomena in molten droplet-surface interactions. *D Poulikakos*

Multi-scale computational heat transfer with moving solidification boundaries. *W Shyy & H S Udaykumar*

Probability density function approach for turbulent hydrodynamics and heat and mass transfer in two-phase dispersed flows. *I V Derevich*

**Among the contributed papers were:**

Calculation of supersonic mist flow with shock waves by new subsonic method *T Sugiura & M Nakagawa*

Determination of heat transfer to liquid films falling on a vertical surface under different conditions *J Gyls & S Sinkunas*

Interface tracking for the prediction of interfacial dynamics and heat/mass transfer in multiphase flows *D Lakehal, M Meier, J Davis, B L Smith & G Yadigaroglu*

Modeling of high pressure swirl hollow cone fuel spray *G Bella, A De Vita & R Rotondi*

Numerical analysis of heat transfer in mist flow *G Croce, H Beaugendre & W G Habashi*

Numerical modelling of local void fraction profile in subcooled boiling flow at low pressure *G Yeoh & J Tu*

Numerical prediction of axial void fraction distribution in subcooled boiling flow at low pressure *J Tu & G Yeoh*

**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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Numerical simulation of particle trajectory in free board region of a centrifugal fluidized bed *MH Shi & YL Hao*

Two-phase heat transfer on an isothermal vertical surface *F Bazdidi-Tehrani & S Zaman*

The Proceedings were published by Begell House: 1400 pages in two volumes. A CD-ROM was also produced. To purchase either, see [cht01@cfm.mech.unsw.edu.au](mailto:cht01@cfm.mech.unsw.edu.au). In addition, expanded versions of selected papers will be published in *Numerical Heat Transfer* and *International Journal of Heat and Fluid Flow*.

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### **4<sup>th</sup> International Conference on Multiphase Flow ICMF-2001 May 27 to June 1, New Orleans Louisiana, USA**

by Stathis Michaelides

The 4<sup>th</sup> International Conference on Multiphase Flow (ICMF-2001) was a proof that this series of Conferences (ICMF) has matured and attracts all the prominent researchers in the field of Multiphase Flow from all parts of the globe. Approximately 630 delegates representing 46 countries came to New Orleans in order to attend this Conference. Another 250 attendees attended parts of the technical sessions as a result of our "cross-registration" arrangement with the ASME-Fluids Engineering Division Summer Annual Meeting.

Professor Michaelides, the chair of the Conference, opened the Conference at 9:00 am on Monday May 27. Professor Clayton Crowe spoke as the chair of the ICMF Governing Board. Professors Jean Bataille (France) and Yutaka Tsuji (Japan), the two vice-chairs of the Conference from Europe and Asia also addressed the attendees. There was a total of 539 presentations delivered (450 as oral presentations and 89 as poster presentations). In addition, there were 5 invited panel sessions, 22 open forum presentations that were delivered in a poster format and 30 entries in the Gallery of Multiphase Flow, which was arranged by Professor Nikitopoulos. The presentations were distributed in a total of 118 sessions on the following general topics:

- Particulate flow
- Bubbly flow
- Slurry flow
- Droplet flow
- Hydrodynamic interactions
- Interfacial effects
- Colloidal suspensions
- Flow regimes
- Heat transfer
- Phase change
- Combustion

- Nuclear thermohydraulics
- Chemical processes
- Manufacturing processes
- Environmental applications
- Applications of Multiphase flow

Among the highlights of this International Conference were:

#### A. INVITED PLENARY LECTURES:

1. C. T. Crowe  
A review of carrier-phase turbulence in dispersed phase flows
2. J.-M. Delhaye  
Forced convective subcooled boiling
3. J. G. Leal  
Drop deformation, breakup and coalescence in viscous fluids
4. Y. Tsuji  
Discrete Particle Simulation of Particle-Fluid Flows

#### B. INVITED KEYNOTE LECTURES:

1. M. Dudukowic  
Experiments in and Modeling of Multiphase Opaque Flows
2. D. Gidaspow  
Hydrodynamics of Fluidization: Structure and Turbulence
3. G. Hetsroni  
Boiling with surfactants
4. X.-L. Zhou  
Recent Advances in Second-Order Moment Two-Phase Turbulence Models for Gas-Particle and Bubble-Liquid Flows
5. J. T. Jenkins  
Particle collisions in multiphase flows

6. M. Lance  
Turbulence and mixing in bubbly flows
  7. Y. Matsumoto  
Multi-scale analysis of bubbly flows
  8. G. Ooms  
Examples of interesting industrial multiphase-flow problems
  9. A. Prosperetti  
The systematic derivation of averaged equations by DNS
  10. M. Reeks  
The PDF approach to modeling dispersed particle flows
  11. A. Serizawa  
Two-Phase Flow in Micro-Channels
  12. M. Sommerfeld  
Particle measurements
  13. T. Theophanus  
Boiling and Burnout
  14. G. Trygvanson  
Direct Numerical Simulations of Multiphase Flows
  15. Y. Tsirkunov  
Gas-particle flows over bodies-key problems, modeling and numerical analysis
- C. INVITED PANELS
1. Modeling of Multiphase Flows: A. Prosperetti (moderator), Y. Matsumoto, D. Joseph, T. Theophanus and G. Hewitt.
  2. New Horizons for Nuclear Thermal-hydraulics: M. Ishii (moderator), J. -M. Delhayé, H. Ninokata, G. Yadigaroglu, H. C. No, V. K. Dhir.
  3. Latest Developments in Experimental Methods for Two-Phase Flows: J. Sinclair (moderator), E. Longmire, S. Cessio, Y. Hasan and J. Eaton E. Longmire.
  4. Aerosols and Air Pollution: L.-P. Wang (moderator), G. Ahmadi, M. Choi, P. McMurry, M. Reeks.
- D. The colorful pictures and videos of the Gallery and especially, the multi-phase virtual reality show, presented by the group of the University of Illinois at Urbana-Champaign headed by Professor Eric Loth. This virtual reality show attracted the attention of

all the attendees during the coffee hours and free time between sessions.

- E. The International Multiphase Flow Prize presentation, which was awarded to Professor Clayton Crowe of Washington State University for his numerous contributions to the research and education on the subject of Multiphase Flows.

Among the sessions in the ICMF-2001 there were two sessions, chaired by Professor Theo Theophanus, on the Institute for Multiphase Science and Technology (IMuST) and the interactions of the Multiphase Flow Societies and Groups around the world.

On the social level, the reception on May 28 was attended by 580 attendees and some of their spouses, who were entertained by the musical group "the last straw." The Conference banquet on Wednesday May 30, attended by 630 people, was a delightful success, with an incredible presentation of the desert (banana Foster) by the staff of the Marriott Hotel. However, the highlight of the social events was the Jazz Concert on Thursday May 31: Dr. Michael White and his Liberty Jazz Band gave an excellent presentation on the origins and practice of Jazz music highlighted by an excellent performance of some traditional musical pieces.

For any information on the ICMF-2001 or for a copy of the CD-ROM *Proceedings of the ICMF-2001*, contact Dr. Michaelides (emichael@tulane.edu). The 5<sup>th</sup> International Conference on Multiphase Flow will take place in Yokohama, Japan in 2004.

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## Japanese Society for Multiphase Flow (JSMF)

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

**Address at Banquet of 4<sup>th</sup> ICMF  
May 27 to June 1, New Orleans Louisiana, USA**

by G. Matsui

Ladies and Gentlemen,

It is a great honor for me to have the opportunity of giving this address as the chairman of the first Conference, and the former President of JSMF.

Remembering the first Conference, I remember we decided to have a new conference on multiphase flow twelve years ago, although we were not sure if the conference would be held or not in future. At that time, multiphase flow was an interdisciplinary field. It overlaps many existing areas of technology, engineering, and science, such as mechanical engineering, chemical engineering, nuclear engineering, and civil engineering.

We endeavored for researchers in many areas to join the conference in the worldwide. As a result, the conference was great fruitful and successful fortunately. The participants agreed we have the conference continuously in future. I wished the conference would grow up in the world. Therefore, we had the discussion on the organization, venue and chairman of the next conference every days and nights, but we did not have the conclusion unfortunately, although we had many ideas, proposals and comments. After all, they agreed the 2nd Conference would be held in Japan, in Kansai district. About the process or details after that, Profs. Michaelides and Crowe addressed at the opening ceremony of this Conference.

Regarding the name of the conference, the first was "International Conference on Multiphase Flows". The word of "Multiphase flows" was in the plural because of many existing areas. From the 2nd Conference, plural "s" (in multiphase flows) was omitted because "Multiphase flow" was recognized as one new field through the success of the first Conference. And The Governing Board was established to chose or decide the venue and chair of the future conference. I'd like to say that the establishment of this Governing Board is owing to many people including endeavor of Profs. Crowe and Tsuji.

This 4th Conference has about two times as large as the scale of the 1st Conference at Tsukuba. This thing is also owing to many multiphase flow friends in the world. I'd like to say "Congratulations!" to Prof. Michaelides for the success of the Conference. And also I'd like to give my thanks for you here, multiphase flow friends.

Thank you very much for your attention.

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**Report on the 39th European Two-Phase Flow Group Meeting  
June 17-20, 2001, Aveiro, Portugal**

by Gian Piero Celata

The 39th Meeting of the European Two-Phase Flow Group (ETPFGM) has been held in Aveiro on June 17-20, 2001, organized by Prof. A.C.M. Sousa and Dr. M. Oliveira of the Department of Mechanical Engineering, University of Aveiro

The Meeting (which is informal and by invitation) has been attended by about 45 people, with the presentation of about 30 papers, including 3 keynote lectures, confirming its traditional size, both in terms of people

and presentations. The Aveiro meeting has been characterized by a good balance between well known, experienced people and young researchers, featuring its round table style where works in progress can be presented in a friendly atmosphere, with enough time (anyway never sufficient!!!) dedicated to the discussion of the papers. These two aspects (last minute papers and discussion time) are unique features of this Meeting on two-phase flow, which make the discussion useful not only for the debate which comes out but also for the

presenting author which can re-address its research once he is back in his laboratory.

The program has been enriched by three keynote lectures, which highlighted three important topics. The first keynote lectures has been delivered by Prof. T. Theofanous (University of California at Santa Barbara, and President of IMuST), addressing the complexity of multiphase flow, an innovative approach followed in a Project developed within the frame of the IMuST (Institute for Multiphase Science and Technology). Such an approach look very promising though needing an extensive assessment.

The second keynote lecture has been given by Prof. A. Serizawa (Kyoto University) and has dealt with two-phase flow in microchannels. As is known, looking at the program of general and specific conferences, we may realize of a growing interest in microscale, where the thermal-fluid dynamics has found a rich field of investigation, due to the growing applications of microscale heat transfer (space satellites, cooling of electronic components, bioengineering, etc.) and the difficulty of defining the limits of application and extrapolation of the knowledge coming from traditional thermal-fluid dynamics, i.e., for channels larger than one millimeter (or more for two-phase flow). In particular, the presentation of Prof. Serizawa has dealt with flow pattern and maps in pipes ranging from 25 to 100  $\mu$ m, using air/water and steam/water mixtures, in adiabatic conditions. The adequate change of mentality required in the experimental approach to this micropipes is impressive and noteworthy.

The third keynote lectures has been presented by Prof. J. Venart (University of New Brunswick), providing interesting details on two-phase aspects of vessel failure in boiling liquid expanding vapour explosion.

The presentation of keynote lectures, coming from the interaction with Japanese colleagues in the frame of the Japanese-European Two-Phase Flow Group Meeting, is a bit out of the ETPFGM traditions. Needless to say that, with an appropriate choice of the speakers, it represents a very good chance to deepen topics of fundamental and applied interest.

The contributing papers have been grouped in technical sessions dealing with boiling, condensation, numerical simulation, flow regime transition, phase change in unsteady flow, bubbly flow. The complete list of papers presented at the meeting is available in internet at the web page of the ETPFGM:

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

The 40th Meeting of the ETPFG will be held in Stockholm, Sweden, organized by the Royal Institute of Technology (KTH), and dedicated to the memory of Prof. Kurt Becker, who worked at the KTH and was the main founder of the ETPFG and one of the most active Member until his death, in 1993, soon after he organized his Meeting of the ETPFG in Stockholm in 1992.

In 2003, instead, there will be the 3rd European-Japanese Two-Phase Flow Group Meeting, which will be held at the Certosa di Pontignano (a wonderful location close to Siena) from 21 to 27 September, organized by Dr. G.P. Celata with the help of Prof. I. Zun (European co-chair), Prof. A. Tomiyama (Japanese co-chair), and Prof. P. Di Marco (Meeting Secretary). Details about this meeting will be published in due time on the ICeM Newsletter.

At the end of the ETPFGM a meeting of the European Multiphase Systems Institute (EMSI, possible european counterpart to IMuST and JSMF) was held. The meeting, chaired by Prof. G. Hewitt, coordinator of the EMSI Steering Committee (Celata, Schulenberg, Sehgal, Besnard, Delhaye e Giot), tried to activate the Working Groups defined at the Karlsruhe Meeting in 2000: Diabatic Systems (D. Bestion), Adiabatic Systems (B. Azzopardi), Mixing Flows (R. Sehgal), Chemical Reactor Systems (coordinator to be defined), Microscale Heat Transfer (G.P. Celata), Microgravity Systems (P. Stephan). As some key persons were missing, and because of lacking of information before the meeting, the outcome was not exhaustive. It is expected that EMSI programmes will be finalized before the 2002 ETPFGM.

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ExHFT-5 Conference Web page

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

## **Report for the International Conference on Energy Conversion and Application (ICECA'2001)**

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

by W. Liu and G.M. Zhu

The International Conference on Energy Conversion and Application (ICECA'2001) was held on June 17-20, 2001 in Wuhan, P.R. China, which was sponsored by Huazhong University of Science and Technology (HUST, China), University of California at Los Angeles (UCLA, USA), the University of Nottingham (UK), Nippon Institute of Technology (Japan), Hong Kong University of Science and Technology (HKUST) and University of Otago (New Zealand). Chairman of the conference was Professor Ji Zhou, the former president of Huazhong University of Science and Technology and an academician of the Chinese Academy of Engineering. Co-chairmen were from the United States, the United Kingdom, Japan, New Zealand, China and Hong Kong.

It is well known that the energy resource is the material base of the society economy. It plays an important role in the human development. This conference aims to provide an academic rostrum for experts and scholars to exchange their ideas and research results of basic theories and technologies on the energy conversion and application.

The conference received more than 320 papers in total. 285 of them were included in the conference proceedings published formally in two volumes with six

themes. The authors cover most of the key universities inside China and other famous universities in the world. The President Mingwu Fan of Huazhong University of Science and Technology, an academician of the Chinese Academy of Engineering, wrote the preface for the proceedings. The conference was very successful. Nearly 200 experts and scholars from 14 countries and districts attended the conference, and many of them are well-known scientists.

The theme of the conference was the effective utilization of energy and the related environmental problems. The topics of the conference were energy conversion and management, heat and mass transfer, thermodynamic systems, combustion theory and equipment, refrigeration and air conditioning, thermal power systems, solar thermal application, solar photovoltaic material and device, energy system in building, energy and environment, measurement technology.

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## **TEMPMEKO 2001, June 19 – 21, 2001 in Berlin, Germany**

by Dieter Westerkamp

Initiated by the TC12 (Technical Committee for Temperature and thermal measurements) of IMEKO the TEMPMEKO symposia are organised every 3 years, and this year the symposium was held from 19 to 21 June in Berlin, Germany. The symposium programme included all aspects of temperature, thermal and humidity measurements and was intended to address possible participants from very different working fields. Compared to the previous events there was again an increase in the number of attendees: 325 scientists and engineers coming from 44 countries, among them many from North America, East Asia and East Europe participated in the conference. About one half of the participants came from national metrology institutes, 30 % from industry and 20 % from universities and research facilities.

As posters or oral presentations more than 230 contributions had been selected by the international programme committee based on the submitted abstracts. Main topics were temperature scales and fixed points, thermodynamic temperature determinations, resistance and thermoelectric thermometry, radiation thermometry, generation and measurement of humidity, and the measurement of thermophysical properties. At the conference finally 6 invited talks, 96 submitted oral presentations and 110 poster presentations were given. The conference proceedings with the fully refereed papers will be available at the beginning of the year 2002.

The importance and attraction of the symposium is also shown by the fact that 18 working groups, most of them with an international membership, took the

opportunity to convene for working meetings. In particular, all 7 working groups of the Comité Consultatif de Thermométrie (CCT) could meet with nearly all members present.

Regarding the scientific content, the development of the temperature scale is - after the adoption of the Provisional Low Temperature Scale PLTS-2000 by CIPM - now focussed on the high temperature range. A topic of main interest including 8 contributions was the development of Eutectic fixed-points, which will enable an improved realisation of the temperature scale up to temperatures of 3000 K and will facilitate development and calibration of advanced high-temperature thermocouples. In this field the close co-operation of contact thermometry and radiation thermometry will result in a rapid progress.

Also in other, quite different areas radiation thermometry is gaining importance. For the determination of thermodynamic temperatures methods based on the absolute measurement of spectral radiant power were considered particularly promising. Several contributions dealt with the improvement of uncertainties in radiation thermometry under reference conditions as well as the determination of the emissivity of practically used surfaces. But it was recognised that in this field there are quite a lot of unresolved problems.

Optical methods are more and more developing into fields, which were in the past dominated by contact thermometry. For example, fibre optic techniques are in use for the leakage detection of pipelines. Up to now not sufficiently solved are the evaluation of the measurement method and the traceability to the temperature scale. It is remarkable that the national metrology institutes are going to consider also such application oriented questions which require inter-disciplinary activities.

For the third time the field of humidity measurement was part of the TEMPMEKO conference topics. Evidently the interest in this area is large: even now 15 % of all contributions dealt with humidity. The extreme upper and lower ends of the range are gaining increasing importance, especially the trace moisture measurement.

Due to the strong participation of the national metrology institutes the international equivalence of the realisation and dissemination of the temperature scale was a topic of main interest. A major point was the key comparisons of the metrology institutes performed in the framework of the Mutual Recognition Arrangement (MRA), where in the meantime also smaller institutions take part intensively. This is accompanied by a harmonisation of the methods for uncertainty calculation, which will lead to increasingly realistic values for uncertainty claims.

TEMPMEKO 2001 showed that this conference series has been developed to the most important meeting on thermometry where fundamental aspects of metrology and industrial applications were discussed in a well balanced mixture. The next TEMPMEKO symposium will be organised in May / June 2004 in Dubrovnik, Croatia.

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### **An Announcement from Editor**

The JSMF is doing internet-service for ICMF members.

You can read updated ICeM NEWSLETTER by visiting JSMF homepage

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

**Chemical Reactor Engineering 2000: Novel Reactor Engineering for the New Millennium”  
June 24-29, 2001, Barga, ITALY**

by Hugo de Lasa

The CRE VIII Conference on “Novel Reactor Engineering for the New Millennium” was held on June 24 to 29, 2001 in the magnificent resort “Il Ciocco” in Castelvechio Pascoli, Barga, Italy. This conference was part of a prestigious series of conferences coordinated by the United Engineering Foundation of New York, NY (USA). The format of these conferences limits the participation to relatively small groups with the aim of maximizing interactions and discussions. The conference attracted over 120 participants representing academia and industry from 20 different countries around the world, and the conference themes focused on Energy Technologies, Environmental Research, Biotechnology, Catalysis, Recycling Processes and New Trends in Reactor Engineering and Design.

We are particularly indebted to the authors and special guests for their plenary lectures and oral and poster presentations. Each of the more than 90 oral contributions was followed by a poster presentation providing increased opportunities for thorough discussions with the authors. We would like to acknowledge all the participants, who contributed with innovations, new research approaches, novel modeling and simulation efforts and invaluable critical comments. A special issue of Industrial and Engineering Chemistry Research journal (I&ECR) is going to be published shortly with a number of refereed publications of the manuscripts selected from amongst those presented.

We are also indebted to the ten outstanding plenary lecturers who highlighted the conference themes with their contributions: Dr. Leo Behie, University of Calgary; Dr. M. Dente, Politecnico di Milano; Dr. A. Dixon, Worcester Polytechnic Institute; Dr. M. Dudukovic, Washington University, St. Louis; Dr. Fogler, University of Michigan; Dr. Lettieri, BP Chemicals; Dr. B. McCoy, University of California, Davis; Dr. A. Renken, Swiss Federal Institute of Technology;

Dr. B. Subramaniam, University of Kansas; and Dr. T. Tsotsis, University of Southern California.

We are particularly grateful to the Conference Organizing Committee, Manuk Colakyan from Dow Chemicals, Thierry Gauthier from IFP-France, Raffaella Ocone from Heriot Watt University, and Silvio Sicardi from Politecnico di Torino, for their support and advice during the conference planning. We would also like to express our thanks to Mr. S. Afara from the University of Western Ontario, Canada for his valuable assistance in the organization of the conference. Special thanks go to the staff of the Engineering Foundation who helped so effectively with the coordination of the conference, calls for papers and conference development.

Among the conference sponsors, we wish to acknowledge the University of Western Ontario, The American Institute for Chemical Engineering, Dow Chemical Company, the United Engineering Foundation, the Institut Francais du Petrole, and the Chemical Reactor Engineering Centre of the University of Western Ontario.

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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.



**Third International Conference on Compact Heat Exchangers and Enhancement Technology  
for the Process Industries  
July 1-6, 2001, Davos, Switzerland**

by Ramesh K. Shah

The Third International Conference on Compact Heat Exchangers and Enhancement Technology for the Process Industries was held in Davos, Switzerland during July 1-6, 2001. It was sponsored by The United Engineering Foundation, New York, USA.

The Conference theme was to facilitate the introduction and use of advanced heat exchanger technology into the process industries. The Conference objectives were to identify: (i) present applications of advanced heat exchanger technology, evaluating benefits and drawbacks; (ii) further areas where advanced heat exchanger technology could be used; (iii) barriers, real and perceived, to further applications; and (iv) actions which can be taken by the various parties and disciplines to overcome these barriers, and to provide communication channels to the several segments of the technical community.

The Conference was attended by 97 delegates (41 from industrial/industrial research organizations, 44 from academic institutes and 5 from governmental labs) from 17 countries with 67 contributed papers and 7 keynote lectures. This third specialists' Conference was also highly successful as the previous two with 20% more attendees than the second conference and over 60% better attendance than average for United Engineering Foundation conferences. The first International Conference on Compact Heat Exchangers for the Process Industries was held during June 22-27, 1997 in Snowbird, Utah. The second International Conference on Compact Heat Exchangers and Enhancement Technology for the Process Industries was held during July 18-23, 1999 in Banff, Canada. The attendance was 79 and 82 respectively.

The Conference sessions (including one panel discussion) were scheduled in the mornings, afternoons, and/or evenings, with breaks in the formal program to allow small group interactions. There were no parallel sessions. The one poster session was very well attended with excellent discussions between the authors and delegates. The discussions following the presentations

were excellent, due in part to the large number of attendees from industry and good amount of time allocated for discussion after the presentations. All participants stayed at the Conference site. Conference registration fee included complete room and board, Conference proceedings and other related Conference material, and coffee/tea breaks. This format employed in United Engineering Foundation Conferences allows maximum interaction, discussion and networking among the Conference participants being together from early morning to late evening. This was one of the important networking approaches that the delegates appreciated and acknowledged. The conference facilities and staff support from the United Engineering Foundation were superb. The excursion to Alps mountain region was the highlight of the social program. With this informal as well as formal Conference program, the Conference objectives were very well accomplished.

The Conference proceedings are available through Begell House Publishers, 79 Madison Avenue, Suite 1205, New York, NY 10016. ISBN No. 1-56700-164-5. Price US \$99.50 plus shipping & handling. E-mail: [orders@begellhouse.com](mailto:orders@begellhouse.com)

The next Conference will be scheduled in a Greek Island in Summer or early Fall of 2003. For further information, contact United Engineering Foundation at [engfnd@aol.com](mailto:engfnd@aol.com), or R.K. Shah at [shahrk@asme.org](mailto:shahrk@asme.org).

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**THE THIRD INTERNATIONAL SYMPOSIUM  
ON MEASUREMENT TECHNIQUES FOR MULTIPHASE FLOWS  
August 1-3,2001, Fukui, Japan**

by Shuji Hattori

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**Program of 2001 UK-Japan Seminar on Multiphase flow  
September 19-21 2001, Bury St Edmunds (Keio House)**

by Koichi Hishida

**Session 1**

A Study of a Vertically Falling Film Flow of Liquid Metal NaK in a Transverse Magnetic Field

F-Ch. Li \*+, A. Serizawa and T. Kunugi, Kyoto University

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R.I. Issa, A.Behzadi, H. Ruschev, Imperial College

Surface Tension Force Dominant Regime of Single Bubbles Rising through Stagnant Liquids,

Akio Tomiyama\*, Satoru Yoshida, and Shigeo Hosokawa, Kobe University

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A Study on Bubbly Two-Phase Flow in Transient Conditions

Tadayoshi Matsumoto\* et al. Osaka University

Interfacial area transport of bubbly flow under microgravity environment

Tatsuya HAZUKU\*, Tomoji TAKAMASA, Takashi HIBIKI and Mamoru ISHII, Tokyo University of Mercantile Marine

**Session 2**

Some Applications of Novel Interferometric Technique to Measurements on Size and Velocity Spatial Distribution of Spray and Bubble Flows

Masanobu Maeda\*, Keio University

Measurements of Lagrangian Particle Statistics in Swirling Flows and Droplet impingement on solid surfaces

Yannis Hardalupas\*, Imperial College

TWO-PHASE FLOW PHENOMENA AT A VERTICAL REGULAR T-JUNCTION

G. Conte and B. J. Azzopardi\*, University of Nottingham

Generation of Entrained Droplets from an Imitated Disturbance Wave and their Deposition on the wall.

Tohru Fukano\*, Takanari Inatomi, Yohei Matsuzawa, Kyushu University

The Phase Separation Capabilities of Two T-Junctions Placed in Series

E. Wren\* and B.J. Azzopardi, University of Nottingham

Bubble Dynamics in Volcanic System: Acoustic Properties of Liquids Containing Gas Bubbles

Masaharu Kameda and Mie Ichihara, Tokyo University of Agriculture and Technology

Flow Oscillation in a Parallel-Channel Boiling System

Mio Hirayama\*, Hisashi Umekawa and Mamoru Ozawa, Kansai University

### Session 3

Multi-scale Dynamics in Turbulent Bubbly Flows  
*Yoichiro Matsumoto\**, *Shu Takagi*, *Kazuyasu Sugiyama*, The University of Tokyo

Possible Mechanisms of Turbulent Drag Reduction with Micro-Bubble Injection to the Boundary Layer  
*Kwing-So Choi\**, University of Nottingham

MICRO-SCALE STRUCTURE OF TURBULENCE MODIFICATION IN AN UPWARD BUBBLY FLOW

*Koichi HISHIDA\**, *Akiko FUJIWARA* and *Tomohiko TANAKA*, Keio University

Turbulence Modification due to Immiscible Droplets Moving in near-Wall Regions of Turbulent Liquid Flows

*Yoshimichi Hagiwara\**, Kyoto Institute of Technology

Liquid Velocity Field Measurements during Bubble Formation and Detachment at an Orifice

*W. Dempster\**, University of Strathclyde

Turbulence Modification and Reynolds Stresses in Dispersed Two-Phase Flows in Vertical Pipes

*Shigeo Hosokawa\** and *Akio Tomiyama*, Kobe University

Experimental Study on Particle Motion and Turbulent Modification by means of phase-Doppler anemometer

*Tuneaki Ishima\** and *Tomio Obokata*, Gunma University

Experimental Data-base Construction for Bubble-Bubble Interaction

*Yuichi Murai\**, Fukui University

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Ignition Behaviour of Predried Pulverised Lignite Fuel  
*Prassas,I.*, *Taylor,A.M.K.P.*, *Yamanishi.*, Imperial College

Measurement of Interfacial Area Concentration of Air-Water Flow in a Large Diameter Tube

*K. Mishima\**, *Y. Inoue*, *H. Nakamura*, and *Y. Saito*, Research Reactor Institute, Kyoto University

Experimental Observation of Bubble Motion in a Vertical Pipe

*Tomio Okawa\** et al. Osaka University

Enhancement of Boiling Heat Transfer by Radiation Catalytic Semiconductor-Coated Material

*Tomoji Takamasa\**, Tokyo University of Mercantile Marine

Temperature Effects in Air-Water Bubbly Flows

*John M Smith\**, University of Surrey

Boiling Heat Transfer of Liquid Nitrogen Downward Flow in Pipe

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News items of general interest to ICM 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.

## Future Meetings

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

### **ANS 2001 Winter Meeting**

Reno, USA, Nov 11-15, 2001

E-mail: 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 14th Symposium on Chemical Engineering (Taejon/Chungnam-Kyushu)**

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

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

Tokyo, JAPAN, December 4-6, 2001

Dr. N. Tanaka, CRIEPI

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E-mail: fmtm2001@dcc.co.jp

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

### **16th National Heat and Mass Transfer Conf. and 5th ISHMT/ASME Heat and Mass Transfer Conf.**

CALCUTTA, India, January 3-5, 2002

[http://education.vsnl.com./announcement\\_nhmtc/](http://education.vsnl.com./announcement_nhmtc/)

### **AIChE 2002 Spring National Meeting**

Hilton New Orleans, New Orleans, Louisiana, March 10-14, 2002

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

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

Skukuza Restcamp, Kruger National Park, South Afrika

April 8-10, 2002

JP Meyer

Rand Afrikaans University, South Africa

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

### **10<sup>th</sup> Int. Conf. On Nuclear Engineering**

Arlington, Virginia, USA, April 14-18, 2002

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### **Advanced Computational Methods in Heat Transfer**

Halkidiki, Greece, April 22-24, 2002

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<http://www.wessex.ac.uk/conferences/2002/ht02/index.html>

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

Niagara Falls, Canada May 5-8, 2002.

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**Fourth International Conference on Advances in Fluid Mechanics**

Ghent, Belgium, May 15-17, 2002

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**13<sup>th</sup> Int. Sympo. on Transport Phenomena (ISTP'13)**

Victoria, USA, July 14-18, 2002

Dr. Sadik Dost

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**IHTC'12, 12<sup>th</sup> Int. Heat Transfer Conf.**

Grenoble, France, August 18-23, 2002

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