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The Japanese Society for Multiphase Flow

Report on "International Seminar on Multiphase Flow Phenomena on the Occasion of Prof. A. Serizawa's Retirement" September 30, 2006, Westin Miyako Kyoto, Kyoto, Japan

By Tomoaki Kunugi and Zensaku Kawara

On the occasion of Prof. Akimi Serizawa's retirement, Prof. A. Serizawa told us that he would like to offer an opportunity of being scientifically encouraged from the world famous and active researchers in multiphase flow science and engineering fields to the young researchers, students and of course the veterans.

According to Prof. A. Serizawa's suggestion, we held an international seminar on multiphase flow phenomena. We believed that the Japanese researchers learned the state of the art and the prospective view of the multiphase flow phenomena, and also established some new connection with the scientific leaders in the multiphase flow fields through this seminar.

The International Seminar on Multiphase Flow Phenomena was held on September 30, 2006 at the Westin Miyako Kyoto, Kyoto, Japan. We invited six leading scientists, and they gave the lectures regarding the various multiphase flow phenomena, the experimental methods, the numerical modeling and some attractive "two-phase flow" arts. The attendee was around 100 people including many younger researchers and students. The seminar program was as follows:

Session I chaired by Prof. John R. Thome (Ecole Polytechnique Fèdèrale de Lausanne, Switzerland)
"Flow Boiling Heat Transfer under Microgravity"
Dr. Gian Piero Celata, ITFD, ENEA, Italian Agency

Photo 1 Prof. Hewitt gave his lecture

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Everybody, who is interested in “multiphase flow”, can be a member of ICeM. You are welcome to join ICeM. Please contact one of the following to register as an ICeM member.

Chairman (Editor):
Prof. Tomoji Takamasa
Faculty of Marine Technology
Tokyo University of Marine Science and Technology
Etchujima,Tokyo 135-8533, Japan
Tel: +81-3-5245-7406
Fax:+81-3-5245-7410
E-mail: takamasa@kaiyodai.ac.jp

Vice Chairmen:
Prof. Yutaka Abe
Inst. of Eng. Mech. & Sys.
University of Tsukuba
Tennodai, Tsukuba 305-8573, Japan
Tel&Fax: +81-298-53-5266
E-mail: abe@kz.tsukuba.ac.jp

Prof. Shigeo Hosokawa
Graduate School of Sci. & Tech.
Kobe University
Rokkodai, Nada, Kobe 657-8501, Japan
Tel: +81-78-803-6132
Fax: +81-78-803-6155
E-mail: hosokawa@mech.kobe-u.ac.jp

for the New technologies, the Energy and the Environment, Italy

"Measurement of Interfacial Area Concentration and Development of Area Transport Equation"

Prof. Mamoru Ishii, Department of Nuclear Engineering, Purdue University, USA

Session II chaired by Prof. Iztok Zun (University of Ljubljana, Slovenia)

"Goodbye Thermodynamic Equilibrium"

Prof. Geoffrey Hewitt, Department of Chemical Engineering and Chemical Technology, Imperial College of Science and Technology and Medicine, UK

"On Some Basic Problems of Compressible Multi-Hydrodynamics: from numerical prediction of interfacial instabilities to capturing discontinuities in effective field modeling"

Prof. Theo G. Theofanous, Center for Risk Studies and Safety, Department of Chemical Engineering and Mechanical and Environmental Engineering, University of California, Santa Barbara, USA

Session III chaired by Prof. Barry Azzopardi (University of Nottingham, UK)

"Still Struggling with Computational Bubble Dynamics"

Prof. Akio Tomiyama, Department of Mechanical Engineering, Kobe University, Japan

"Some Exciting Experiences in Two-phase Flow Studies"

Prof. Emeritus Akimi Serizawa, Kyoto University, Japan

We still have some of lecture notes of this seminar. Please contact us if you interest in it:

E-mail: kunugi@nucleng.kyoto-u.ac.jp
kawara@nucleng.kyoto-u.ac.jp

Photo 2 Prof. Ishii answered the question of attendee

Photo 3 The attendance scenery: Prof. Hewitt and Prof. Serizawa who ask the lecturer some questions in the front row.

Report on the 6th ECI International Conference on Boiling Heat Transfer, ICBHT-6 May 7–12, 2006, Spoleto, Italy

by Gian Piero Celata

The 6th International Conference on Boiling Heat Transfer, has been organized by the Institute of Thermal Dynamics of ENEA on behalf of ECI, Engineering Conferences International. Dr. Gian Piero Celata (ENEA, Italy) has served as Conference Chair, with Prof. Paolo Di Marco (University of Pisa, Italy), Prof. John R. Thome (EPFL, Switzerland), Prof. James Klausner (University of Florida, USA), and Prof. Masanori Monde (Saga University, Japan) as co-Chairs.

This Conference is following previous editions in Santa Barbara, CA, USA (1992), Banff, Canada (1995), Irsee, Germany (1997), Girdwood, Alaska, USA (2000), and Montego Bay, Jamaica (2003), and has established a three-years basis run.

It is a specialist Conference, devoted to the development of *pool boiling* and *forced convective boiling*, thus representing a significant reference for the international scientific community in this field.

A total of 138 abstracts have been received with an acceptance of 126. Eventually 93 full-length manuscripts have been received and 77 have been presented in the oral format at the Conference. More than 85 delegates attended the Conference, from more than 20 Countries, 12 from Asia, 12 from Americas (considering US, Brazil and Canada), and the remaining from Europe, as expected, with Germany top ranking with 12 delegates,

followed by Italy and France.

Seven *keynote lectures* have provided with an update of the state of the art in some specific boiling issues:

Understanding boiling: a review of the basic mechanisms, needs and perspectives
L. Tadrist
IUSTI UMR CNRS, Marseille, France
Critical heat flux induced by flow instability in boiling channels
M. Ozawa
Department of Mechanical Engineering, Kansai University, Japan
Spray cooling heat transfer: the state of the art
J.H. Kim
Department of Mechanical Engineering, University of Maryland, College Park, MD, USA
Local heat flow and temperature fluctuations in wall and fluid in nucleate boiling systems
P. Stephan
Forces on a bubble in convective boiling
C.W.M. van der Geld
Technische Universiteit Eindhoven, The Netherlands
Effect of restriction on boiling in water and surfactants
G. Hetsroni
Department of Mechanical Engineering Technion, Haifa, Israel
Microbubble emission and high heat flux observed in subcooled boiling
K. Suzuki
Department of Mechanical Engineering, Faculty of Science and Technology, Tokyo University of Science, Noda-City, Japan
Nucleate boiling heat transfer: possibilities and limitations of theoretical analysis
V.V. Yagov
Moscow Power Engineering Institute (Technical University), Russia

As far as the technical contents of the Conference is concerned, in addition to the traditional topics of boiling, such as *bubbles, critical heat flux, enhancement of boiling heat transfer, falling film flow boiling, flow boiling, heat exchangers , mixtures, natural circulation, numerical modeling, phase change, pool boiling, rewetting & quenching, spray-jet cooling*, new emerging and frontiers areas have been given a specific attention, such as *boiling in microsystems* and *boiling in microgravity environment*.

The Conference had been organized in five days, during which the 77 contributing papers have been presented in plenary session, besides the 7 keynote lectures. In spite of the intense and tight technical program, discussion has been extensive and animated both after each presentation and during the social time such as coffee-breaks, lunches and dinners. In order to provide the longest time for discussion, social time has been arranged in the conference site, the Cloister of San Nicolò, kindly offered by the Spoleto commune.

Talking in terms of the scientific outcome it is maybe worthwhile commenting the overall discussion related to the emerging and frontiers topics. In particular, boiling in microsystems has evidenced how the geometric confinement represents a scaling effect which cannot be neglected. It is evident that when the bubble size is comparable with the system geometry (such as the channel diameter) bubble dynamics and motion will be strongly affected by the geometric constraint. Therefore, the whole knowledge pertaining to flow pattern, heat transfer, pressure drop, etc., is definitely bounded to be revised with specific experiments and new predictive tools, being the extrapolation of the conventional scale know how expected to be inadequate for the microscale prediction.

As far as microgravity boiling is concerned, where bubble dynamics and motion is strongly affected by the gravity level (though in forced convection the gravity influence is also linked to the weight of inertial forces with respect to buoyancy force), the main problem is the scarce availability of homogeneous experimental data. This is mainly due to the reduced opportunity of low gravity testing (parabolic flights, drop towers, sounding rockets, international space station) both for the high costs associated with and for the continuous reduction of research funds at the international level. Notwithstanding, it is evident the need to go on producing new homogeneous and integrated experimental data, better if in cooperation with international teams to possibly get a better picture of boiling behavior in microgravity.

The traditional sessions already described have provided a very good view of the current international research on boiling, thus providing a very good reference for the years to come.

The next, 7th International Conference on Boiling Heat Transfer will be held in Spring 2008 in Florianopolis, Brazil, and Prof. Julio Cesar Passos will be the Conference Chair.

Dr. Gian Piero Celata
(ICBHT-6 Chair)
ENEA Casaccia, Institute of Thermal Fluid Dynamics,
Via Anguillarese 301, 00060 Santa Maria di Galeria, Rome, Italy
Tel: +39 06 3048 3905
Fax: +39 06 3048 3026
E-mail: celata@casaccia.enea.it

Overview of ITherm 2006
May 30–June 2, 2006, San Diego, CA, USA

by Bahgat G. Sammakia, Tien-Yu Tom Lee

The tenth Intersociety Conference on Thermal, and Thermomechanical Phenomena and Emerging Technologies in Electronic Systems, ITherm 2006 was held in San Diego, California. ITherm 2006 is sponsored by the Components, Packaging and Manufacturing Technology (CPMT) Society of the Institute of Electrical and Electronics Engineers (IEEE), and co-sponsored by the Heat Transfer Division K-16 Committee on Electronics Cooling, and the Electronics and Photonics Packaging Division (EPPD) of the American Society of Mechanical Engineers (ASME).

ITherm continues to attract outstanding papers in the broad areas of thermal management, mechanics and materials, and emerging technologies in electronic packaging. Out of 320 abstracts initially submitted, the peer review system has yielded about 200 papers for oral and poster presentations. While ITherm continues to be strong in the traditional areas of thermal management and mechanical aspects of electronic packages and systems, and continues to seek papers in new and emerging areas with the inclusion of sessions on nano-scale phenomena, MEMS, and 3D and green packaging.

About 200 papers were presented at ITherm 2006 in sessions along three tracks: Thermal Phenomena (22 Sessions), Mechanics sessions (9 sessions), Emerging Technologies (8 sessions), and five panel discussions. Among these 39 technical sessions, 27 are in Oral Presentation sessions and 12 sessions are in Poster Sessions. Emerging Technologies was a new addition to ITherm 2002 and 2004 to address the multidisciplinary nature of today's electronic components and systems. With this addition, ITherm 2006, while keeping its traditional roots in thermal aspects of electronic systems, diversified into non-thermal areas and into the multidisciplinary aspects of technologies of the future.

The first day of ITherm 2006 covered sixteen short courses. The Technical Program started on the second day of the conference with a keynote speech on "Nanoscale Electronics: Challenges and Opportunities", by Dr. Alain E. Kaloyeros, Vice President and Chief Administrative Officer of the College of Nanoscale Science and Engineering, The University at Albany-State University of New York. The technical sessions on this day covered a wide spectrum of interesting topics in Thermal Phenomena, Mechanics, and Emerging Technologies. Three panel discussions, "Computational Challenges for Emerging Electronics", chaired by Sandeep Tonapi and Bahgat Sammakia, "Passive Cooling Technologies for Micro Electronics" chaired by Unni Vadakkan, and "Challenges in Chip/Processor Level Thermal Engineering", chaired by Mehdi Asheghi and Dereje Agonafer will be held. During luncheon, the ITherm 2006 Achievement Award was presented to Professor Robert Moffat who delivered a keynote lecture on "A Stay of Execution for Air-Cooling". The second part of the afternoon sessions was dedicated to vendor exhibits (no technical sessions), which are combined with ECTC.

The second day of the Technical Program began with a keynote talk by Dr. Cristina H. Amon, Professor and Director of Institute for Complex Engineered Systems, Carnegie Mellon University, on "Hierarchical Modeling of Nano-scale Thermal Transport: Applications to Microelectronics". The sessions on this day covered a diverse range of topics in Thermal Phenomena. The sessions on Mechanics and Emerging Technologies continued, and two panel discussions, "Current Trends/Challenges in Data Center Thermal Management" chaired by Don Beaty, and "Integration Issues in 3D Packaging", chaired by Dereje Agonafer and Bahgat Sammakia were held. A luncheon speech titled "Performance Scaling in Microelectronic Devices and the Resulting Challenges" was presented by Bob Sankman, Intel Corporation. Poster sessions were in the entire afternoon and the best poster paper awards will be selected and given at that time.

The last day of the conference began with a keynote address, "The Engineering of Small Scale Thermal Systems: A National Science Foundation Research Perspective", by Dr. Alfonso Ortega, National Science Foundation. The rest of the day was devoted to sessions from each of the three Tracks. During the lunch break the best paper awards and recognition of the ITherm Program Committee, took place. Recently elected ASME, IEEE, IChemE Fellows and NAE members from the ITherm community were also recognized.

We were very fortunate to have internationally recognized experts serving on the ITherm 2006 Program Committee. It is mainly due to the dedication, hard work, and perseverance of the Chairs and Co-Chairs of the sessions that an excellent program was put together for ITherm 2006. We would also like to thank many of our peers, who have generously given their time to review the manuscripts and help improve the quality of the papers included in the program. Acknowledgements also go to our International Liaisons for their help in promoting ITherm worldwide. We thank Ms. Patricia "Kelly" A. Sutton, for directing us through a maze of

nuances to organize a successful conference. Last, but not least, we are grateful to the members of the ITherm Executive Committee, Dereje Agonafer, Cristina H. Amon, Avram Bar-Cohen, Sushil H. Bhavnani, Gary Kromann, Alfonso Ortega, and Koneru Ramakrishna, for their guidance with the planning and organization of the conference.

We hope that the papers presented in the proceedings will aid in the acceleration of the development of newer technologies, helping them get to the market faster, and will assist in the understanding of the fundamental phenomena underlying these technologies. We also hope this will help ITherm grow into newer areas, thereby staying relevant to the researchers in a constantly changing electronics industry in the information age.

Prof. Bahgat G. Sammakia, General Chair,
Binghamton University-State University of New York
P. O. Box 6000, Verstal Parkway East
Binghamton, NY 13902-6000 USA
Tel: 607-777-6880
E-mail: bahgat@binghamton.edu
Dr. Tien-Yu Tom Lee, Program Chair,
Freescale Semiconductor
2100 E. Elliot Road, Mail Drop EL725
Tempe, AZ 85284-1806 USA
Tel: 480-413-5666
E-mail: tom.lee@freescale.com

Meeting Report
"The Second International Conference on Transport Phenomena in Micro and Nanodevices"
June 11–15, 2006, Il Ciocco Hotel and Conference Center, Barga, Italy

by Mohamed Gad-el-Hak

Interest in micro- and nanoelectromechanical systems (MEMS and NEMS, respectively) has experienced explosive growth during the past few years. Global funding for nanotechnology R&D quintupled from $432 million in 1997 to $2.2 billion in 2002. In about a decade, it is estimated that nanotechnology markets will represent $340 billion per year in materials, $300 billion per year in electronics, and $180 billion per year in pharmaceuticals.

The rapid progress in fabricating and utilizing MEMS and NEMS has not been matched by corresponding advances in our understanding of the unconventional physics involved. Providing such understanding is crucial to designing, optimizing, fabricating, utilizing and controlling improved minute devices. Following the successful first meeting that was held in Kona Coast, Hawaii, 17–25 October 2004, the *"Second International Conference on Transport Phenomena in Micro and Nanodevices"* took place in Barga, Italy, 11–15 June 2006. Like the first workshop, the second one in the series was planned with the primary objective of improving our fundamental understanding of the physics of transport phenomena in micro- and nanodevices. Assisted by a 15-member international organizing committee, Mohamed Gad-el-Hak of Virginia Commonwealth University was the technical chair of the meeting.

The conference was held in the fabulous Il Ciocco Hotel and Conference Center nearby the village of Barga and the historical city Lucca, Italy. The meeting brought together 71 researchers from 22 countries, all interested in all aspects of transport phenomena in MEMS and NEMS. That is the transport of mass, momentum, energy and quantum particles in devices with characteristic lengths as small as 1 micrometer and 1 nanometer, respectively. Potential applications included micro- and nanosystems involving particulate and other multiphase flows, mixing, combustion, energy conversion, computing, biochips, photonics, etc. Also included were microfabrication involving transport phenomena, such as spin coating, etching, CVD, etc. Quantum dots and circuits, electronic transport through organic and inorganic materials, molecular electronics, control of electronic wavefunctions in molecules, quantum computations and single-electron devices were also discussed.

The number of attendees was by design less than 100 to maintain a workshop atmosphere where future research directions in the subject field are identified for the benefit of the community in general. There were no parallel sessions, but there were plenty of opportunities for fruitful discussions. A unique aspect of this workshop was bringing together two communities that hardly know much about each other, those of quantum transport and classical transport.

The meeting emphasized quantum transport to complement classical transport (such as mass, momentum and energy flux in solids and fluids), all of

course as taking place in minute devices. Even in classical transport, the continuum-based Navier–Stokes equations—with either the traditional no-slip or slip-flow boundary conditions—work only for a limited range of Knudsen numbers above which alternative models must be sought. These include molecular dynamics (MD), hybrid methods, Burnett equation, Boltzmann equation, Direct Simulation Monte Carlo (DSMC), and other deterministic/ probabilistic molecular models. The two disparate research communities of quantum and classical transports hardly know much about each other and the subject conference was a very important step rectifying this. Guided by an outstanding scientific committee, the meeting attracted first-rate researchers from around the world. All speakers were invited thus ensuring a meeting of the highest quality.

Sixty-one presentations were delivered during the conference, and a panel discussion was held at the end to summarize the results and to decide on the future of the subject matter. The primary results from this meeting are included in a CD proceedings containing 50 papers and 3 presentations. Selected papers will be published in a special issue of the journal *Nanoscale and Microscale Thermophyiscs Engineering*, expected around August 2007.

The third meeting in the series is now planned for the summer of 2008, and a likely venue is either of the two islands Mallorca, Spain, or Madeira, Portugal.

Dr. Mohamed Gad-el-Hak
The Inez Caudill Eminent Professor of Biomedical Engineering and Chair of Mechanical Engineering
Engineering Building; Room 303
601 West Main Street
Virginia Commonwealth University
P. O. Box 843015
Richmond, VA 23284-3015
U.S.A.
Tel: 1 (804) 828-3576
Fax: 1 (804) 827-7030
E-mail: gadelhak@vcu.edu

14th International Conference On Nuclear Engineering ICONE-14 July 17–20, 2006, Miami, Florida, USA

by Yutaka Abe

14th International Conference on Nuclear Engineering (ICONE 14) was held on July 17-20, 2006 in Hotel InterContinental - Miami, Florida, USA, entitled "Nuclear Power - A solution for 21st Century". The ICONE-14 was sponsored by the American Society of Mechanical Engineers (ASME), the Japan society of Mechanical Engineers (JSME) and Chinese Nuclear Society (CNS). The ICONE-10 is a follow-up to the successful meetings held in Tokyo (1991), San Francisco (1993), Kyoto (1995), New Orleans (1996), Nice (1997), San Diego (1998), Tokyo (1999), Baltimore (2000) and Nice (2001), Washington D.C.(2002), Tokyo (2003),Washington D.C.(2004) and Beijing (2005).

In ICONE 14, over 600 peer reviewed full-length papers were presented about the following technical track and ICONE 14 included Nuclear Industry Forum, which had 15 panel sessions and workshops.

TRK-1: Plant Operations, Maintenance and Life Cycle
TRK-2: Component Reliability and Materials Issues
TRK-3: Structural Integrity
TRK-4: Nuclear Engineering Advances
TRK-5: Next Generation Systems
TRK-6: Safety and Security
TRK-7: Codes, Standards, Licensing and Regulatory Issues
TRK-8: Fuel Cycle and High Level Waste Management
TRK-9: Low Level Waste Management, Decontamination and Decommissioning
TRK-10: Thermal Hydraulics
TRK-11: Computational Fluid Dynamics (CFD), Neutronics Methods and Coupled Codes
TRK-12: Near Term Deployment and Promotion of Nuclear Energy

ICONE 14 was held jointly with the 2006 ASME Joint U.S.-European Fluids Engineering Conference (FEDSM06). The combined events had over 1100 presentations. A single registration fee allowed delegates to attend both conferences.

Followed the first day Keynote Session and Plenary Sessions, 15 Panel Sessions were held in the meeting including exhibition by nuclear related companies. The nearly 700 technical presentations were held in ICONE 14. Nuclear Industry Forum, which will have 15 panel sessions and workshops held in ICONE 14 was the

place to get the nuclear professionals need information to be competitive in today's market of important business and technology developments.

The Fluids Engineering Conference jointly held with ICONE 14 was a great place to present your ideas and to meet colleagues as we work to create and advance fluids engineering technology developments and their application.

Please remind you that the next meeting (ICONE-15) will be held in Nagoya, Japan, 2007.

Yutaka Abe, Professor
Department of Engineering Mechanics and Energy
Graduate School of Systems and Information Engineering
University of Tsukuba
1-1-1 Tennoudai, Tsukuba, Ibaraki 305-8573, Japan
Phone & Fax: +81-29-853-5266
E-mail: abe@kz.tsukuba.ac.jp
http://www.kz.tsukuba.ac.jp/~abe/

16th Symposium on Thermophysical Properties and THERMO International 2006 July 30–August 4, 2006, Boulder, Colorado, U.S.A.

by W. M. "Mickey" Haynes

The 16th Symposium on Thermophysical Properties was held in Boulder, Colorado, U.S.A. from July 30 to August 4, 2006. This conference was part of a major international forum designated as THERMO International 2006, which also included the 19th International Conference on Chemical Thermodynamics (ICCT) and the 61st Calorimetry Conference (CalCon). This is the first time that these three conferences have been held jointly at the same site and was scheduled as a one-time event. The technical program of THERMO International 2006 consisted of joint sessions as well as independent sessions each of the individual conferences.

Because of the overlap among areas of interest of these individual conferences and because each of the conferences was slated for North America this year, they were joined to create this unique event. THERMO International 2006 provided opportunities for researchers and practitioners worldwide to meet and discuss a broad spectrum of scientific problems in the fields of thermodynamics and thermophysical properties for a wide variety of systems together with applications in chemistry, biology, chemical engineering, mechanical engineering, physics, and other areas of science and engineering.

This event was organized and sponsored jointly by the National Institute of Standards and Technology, the American Institute of Chemical Engineers (AIChE), the Heat Transfer Division Division of the American Society of Mechanical Engineers (ASME), the International Union of Pure and Applied Chemistry (IUPAC), and the International Association of Chemical Thermodynamics. There were approximately 1000 presentations on the program, representing 750 speakers from 54 countries and 2000 authors from 62 countries. The participation at the conference was global, with about 75% of the approximately 700 attendees from outside the U.S. The featured work impacts some of the larger themes and policy issues of our time: energy efficiency/self-sufficiency, hydrogen-based economy and alternative fuels, global warming, ozone depletion, informatics, simulation, biophysics, etc.

The Touloukian Award, a major honor within ASME and the Symposium on Thermophysical Properties for outstanding achievement in thermophysical properties research was presented to Dr. Anneke Sengers of NIST. The Touloukian Award was awarded "for advancing the theoretical understanding of thermodynamics of pure fluids and mixtures near critical points, and for applying that understanding to improve practical predictions and correlations of the thermodynamic properties for industrial processes and electrical power cycles." Before the award was presented, Nobel Laureate Prof. Carl Wieman of the University of Colorado gave the Touloukian Memorial Lecture, "A Scientific Approach to Teaching Science." The Rossini Award of ICCT was presented to Prof. Alexandra Navrotsky from the University of California at Davis, and the Huffman Award of CalCon went to Prof. Earl Woolley of Brigham Young University.

The keynote address for THERMO International 2006 entitled "Thermophysical Property Measurements: the Journey from Accuracy to Fitness for Purpose" was presented by Prof. William A. Wakeham, University of Southampton, Southampton, United Kingdom. Plenary lectures were given by experts in areas that represented some of the major themes of this forum:

1. "Thermodynamic Problems in Structural Molecular Biology"
   Prof. Peter Privalov (Johns Hopkins University,

Baltimore, Maryland, U.S.A.)
2. "The Mark of an Educated Mind"
Prof. Kenneth R. Seddon (The Queen's University of Belfast, Belfast, Northern Ireland, United Kingdom)
3. "The Fluctuation and Non-Equilibrium Free Energy Theorems - Theory and Experiment"
Prof. Denis J. Evans (Australian National University, Canberra, Australia)
4. "Life, Data and Everything"
Dr. Marco Satyro (Virtual Materials Group, Calgary, Alberta, Canada)
5. "Some Promising Frontiers in the Thermodynamics of Protein Solutions"
Prof. John M. Prausnitz (University of California, Berkeley, U.S.A.)
6. "Structure, Magnetism, and Thermodynamics of Novel Rare-Earth-Based Intermetallic Materials"
Prof. Vitalij K. Pecharsky (Iowa Sate University - U.S. Dept. of Energy, Ames, Iowa, U.S.A.)
7. "Computational Quantum Mechanics: An Underutilized Tool for Applied Thermodynamics"
Prof. Stanley Sandler (University of Delaware, Newark, Delaware, U.S.A.)
8. "Controlling Structure in Associating Polymer-Surfactant Mixtures"
Prof. Lennart Piculell (University of Lund, Lund, Sweden)
9. "Energetics of Free Radicals: Bridges between Gas-Phase and Solution Data"
Prof. José Artur de Sousa Martinho Simões (Lisbon University, Lisbon, Portugal)

More information about the conference, including the technical program, can be found on the web sites at http://symp16.nist.gov and http://thermointernational.org.

Dr. W. M. "Mickey" Haynes
Co-organizer, 16th Symposium on Thermophysical Properties
President, Executive Board of THERMO International 2006
Physical and Chemical Properties Division, 838
National Institute of Standards and Technology
325 Broadway
Boulder, CO 80305-3328
E-mail: william.haynes@nist.gov

Executive Division of The Japanese Society for Multiphase Flow (2006-2007)

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Executive Office of JSMF:
Gakujyutu Shuppan Insatu Co.
2-14-9 Kasugadenaka, Konohana-ku, Osaka, 554-0022, JAPAN
Tel : +81-6-6466-1588 Fax : +81-6-6463-2522
E-mail : office@jsmf.gr.jp
WWW : homepage http://www.jsmf.gr.jp/index.htm

13th INTERNATIONAL HEAT TRANSFER CONFERENCE
August 13–18, 2006, Sydney, Australia
http://ihtc-13.mech.unsw.edu.au/ ihtc13@unsw.edu.au

by Graham de Vahl Davis

The Thirteenth International Heat Transfer Conference was held in Sydney, Australia under the joint auspices of the Australasian Fluids and Thermal Engineering Society and Engineers Australia on behalf of the Assembly for International Heat Transfer Conferences (AIHTC). The International Heat Transfer Conference series has existed for over 40 years, with conferences being held every four years since 1962. IHTC-13 was the first conference to take place in the southern hemisphere.

The goal of the conference was to provide a forum for the exposure and exchange of ideas, methods and results in heat and mass transfer. Papers on all aspects - both fundamental and applied - were presented. The 29 session topics are listed below.

Over 1200 abstracts were submitted. Not all abstracts were accepted, and not all accepted abstracts were turned into papers by their authors. After careful reviewing by members of the International Scientific Committee, who came from the 18 member countries of the AIHTC, 657 contributed papers were accepted and presented. As has been the custom in recent IHTCs, these were all by poster presentation. Eight poster sessions, each lasting two to three hours, were held during the week, including an Open Forum for the presentation of recent (unreviewed) work.

In addition to the contributed poster papers, there were 33 invited lectures. These included: the Fourier Lecture by the President of the Assembly, Professor Jean-Marc Delhaye of France; the inaugural James P. Hartnett Memorial Lecture by Professor D. Brian Spalding of the UK; the Max Jacob Award Lecture by Professor Ping Cheng of China; and the Donald Q. Kern Award Lecture by Professor Sanjoy Bannerjee of the United States. The remaining 29 keynote speakers came from most of the Assembly member countries.

Seven discussion panels were organised. In each, three to five speakers made presentations; contributions were then invited from the floor. The topics were DNS/LES; Heat Transfer Education; Dynamic Control; Optimisation for Sustainability; Nuclear Applications; Meshless Methods; Virtual Reality and CFD.

IHTC-13 welcomed 836 delegates from 55 countries. The largest number – 133 – came from Japan. Other countries sending large numbers of delegates included China (63), France (56), Germany (41), South Korea (58), UK (30) and USA (113). There were 63 delegates from the host country, Australia. A pleasing feature was the number of student delegates: 146, including 17 from Japan and 18 from Australia.

The conference was held in the beautiful harbour-side city of Sydney in almost perfect weather: the temperature ranged between a daily minimum of 9-13 ºC and a maximum of 20-25 ºC. There were clear blue skies for all but about 30 minutes on the Tuesday, when 16 mm of rain and hail fell – at a time when delegates were (or should have been!) indoors listening to a lecture.

The *Annals of the Assembly for International Heat Transfer, Volume 13*, will be published online by Begell House Inc. later in the year, at www.edata-center.com.

IHTC-14 will be held in Washington DC in August 2010. It was decided in Sydney that IHTC-15 will be in Kyoto in August 2014.

Prof. Graham de Vahl Davis, Conference Chair
School of Mech. & Manuf. Engineering
The University of NSW,
Sydney, NSW, Australia 2052
Tel: (+612) 9385 4099
Fax: (+612) 9663 1222
Email: ihtc-13@unsw.edu.au
URL: http://www.ihtc-13.com

Bio HT	Environmental HT	HT enhancement	Materials processing	Particulate & porous
Boiling	Equipment	Jets	Mass transfer	Radiation
Conduction	Exp. Techniques	Mixed convection	Math & Comp	Solidification
Combustion, fire	Forced convection	Microscale	Nanoscale	Thermophysics
Condensation	Fouling	Manufacturing	Nuclear	Turbulence
Energy	Heat exchangers	Multiphase	Natural convection	

10th International Congress on Liquid Atomization and Spray Systems (ICLASS-2006) August 27–September 1, 2006, Kyoto, Japan

by H. Gen Fujimoto

The 10th International conference on Liquid Atomization and Spray Systems was held in Kyoto Citizens Amenity (Kyoto Terrsa) from 27th August to 1st September 2006. The first ICLASS was open in Tokyo in 1978 advocated by the late Dr. P. Eisenklaum of Imperial College. The succeeding locations of the conference were Madison (USA) in USA in 1982, London in UK in 1985, Sendai in 1988, Gaithersburg in USA in 1991, Rouen in France in 1994, Seoul in Korea in 1997, Pasadena in USA in 2000 and Sorrento in Italy 2003. The 10th Conference was held in Japan after 19 years succeeding to Sendai. The number of participants was 353. Second thirds were the foreigners. It is very much rare case in the international conference opened in Japan.

The first day was only the registration and the welcome reception where about a hundred attendees gathered. At the second day, the opening ceremony was held firstly, thereafter, all the sessions were started in the five rooms. The main title of the sessions were "Fundamental Research of Atomization", "Characteristics of Steady Spray and Unsteady Spray", "Combustion of Steady Spray And Unsteady Spray", "Measurement Technique of Atomization", "Soot Formation through Reciprocating Engine" and so on. The main presentations were as follows:

Key-Note Speech Three key-note speeches were given.

1. Prof. G. Gouesbet (Rouen University)

"Laser Scattering Theory and Practice: Beyond Velocity and Size Measurement Techniques"

2. Prof. G. Reishl (Vienna University)
   "The Characteristics of Particulate Motor Viechle Emission by Electrostatic Measurement Technique"
3. Emeritus Prof. H. Hiroyasu (Hiroshima University)
   "Professor Yasusi Tanasawa's Achievements, the International Conference on Liquid Atomization and Spray Systems, and the Tanasawa Award"
   The late Prof. Y. Tanasawa was just the pioneer in the field of liquid atomization. However, almost all the researchers do not always his works because he had very few papers written by Japanese. Thus, Prof. H. Hiroyasu introduced his works by English.

Invited Speech Only one invited speech was given.
Prof. N Chiegier (Carnegie Mellon University)
"Challenges for Future Reseach in Atomization and Spray Technology"

General Presentation The number of the general presentation was 227. From Asian countries the number was 111 in which 68 was from Japan, from European countries the number is 94 and the American countries the number was 22. The number of sessions was 73.

Round Table Discussion The three kinds of round table discussion were held to discuss the hot issues relating to the atomization field. The titles were "Ultra Fine Spray", "New Spray Modeling" and "Global View of Atomization and Spray Systems".

Tanasawa Award The Award is the memorial award for the achievements of the late Prof. Y. Tanasawa. It is given to just the best paper presented at the former ICLASS. Prof. H. Hiroyasu gave the winner of the Award at the Get-together Party.

Best Presentation Award The Award was set for the first time in the history of ICLASS Conference. Two young presenters received the Award. The winners will be open in the official site (http://comb.doshisha.ac.jp/ /iclass2006/) near future.

Excursion The excursion was hold at the last day. The contents were the visit Horiba which is the vary famous maker of the instruments of the analyzer of exhaust gas emission through a reciprocating engine and the visit Byudouin.

Exhibition 11 companies collaborated to exhibit their newest instruments and 7 companies to do their catalogue. The exhibition was very much useful for all the participants.

Partners' Program The program was planned for the partners of attendees during the conference to introduce the traditional culture in Kyoto such as the tea ceremony, the no-play and the flower arrangement. About 20 persons attended the program.

Students Community It is very much important for younger researchers to exchange their opinion relating to researches and the others. The organizing committee supported their community for the first time in the history of ICLASS. About 30 students joined the community.

Lastly I would like to express my sincere thanks to many persons who collaborates the great success of ICLASS 2006 in Kyoto.

Prof. Dr. H. Gen Fujimoto
Organizing Committee Chairperson
Doshisha Univ., Dept. of Mech. Engrg.
Miyakodani 1-3, Tatara, Kyoutanabe
610-0321 JAPAN
E-mail : hfujimot@mail.doshisha.ac.jp

Report on 17th International Symposium on Transport Phenomena September 4–8, 2006, Toyama, Japan

by Takeshi Seta

17th International Symposium on Transport Phenomena (17th ISTP) was held in Toyama during 4-8 September 2006. This symposium was the 3rd one held in Japan, following in Tokyo in1987 and in Kyoto in 1997.

The 1st ISTP was organized in Honolulu in 1985, sponsored by the Pacific Center of Thermal-Fluids and Engineering which is a non-profit organization and has been registered in the State of Hawaii. This multidisciplinary international conference provides a forum for the researchers, scientists and practitioners from all over the world to exchange information, to present new information, and to discuss the future directions and priorities in the areas of transport phenomena, including the flow of fluids, heat and mass, electricity, neutrons and particles.

The 195 research papers from 29 countries covered a wide variety of transport phenomena in the thermal-fluids engineering from fundamental sciences to applied technologies. Following keynote lectures were given by four internationally renowned researchers.

Thermo-Mechanical Challenges in Stacked Packaging, Prof. Dereje Agonafer (University of Texas at Arlington, U.S.A.)

A Unified Approach to the Analysis of Time-dependent Rotating Flows, Prof. Jae Min Hyun (KAIST, Korea)

The Way We Were and Are Going on Cooling High Power Processors in the Industries, Dr. Masataka Mochizuki (Fujikura Ltd., Japan)

The Evolution of Air Cooling in Electronic Systems and Observations about its Limits, Dr. Alfonso Ortega (National Science Foundation, U.S.A.)

The symposium had an opportunity for a panel session to honor Dr. Nakayama's 70th birthday entitled *Electronic Equipment Cooling*. Based on their practical experiences in electronic equipment cooling, the panelists and participants had serious discussion and indicated a lot of workable solutions, problems, and future works that attracted everyone's attention.

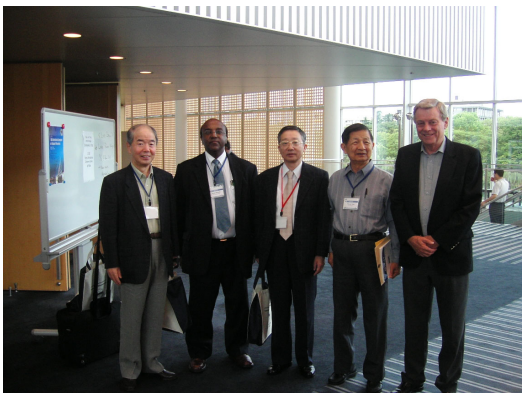


Photo 1 Keynote speakers.

I am very impressed with three people with whom I worked as the local executive committee; Prof. M. Ishizuka, Dr. S. Nakagawa (Toyama Prefectural University) and Mr. T. Hayashi (Proactive Inc., http://www.pac.ne.jp). Mr. Hayashi had really robust support for all of participants at the registration desk. He worked so hard that I felt like I wasn't able to do anything without him. Prof. M. Ishizuka extended an eager welcome to everyone as the chairman of the symposium and made the symposium successful with Dr. Nakagawa's dedicated support.

18th International Symposium on Transport Phenomena is going to be held in Daejeon, Korea in August 2007. The committees hope to see all of you in Daejeon next year.

By Takeshi Seta, Dr.-Eng.
Dep. of Mechanical and Intellectual Systems Engineering, University of Toyama,
3190 Gofuku, Toyama-shi, Toyama 930-8555, Japan
E-mail: seta@eng.u-toyama.ac.jp

An Announcement from Editor

The JSMF gives internet-service for ICMF members.
You can read updated ICeM NEWSLETTER by visiting JSMF homepage
http://www.jsmf.gr.jp/index-en.htm

12th International Symposium on Flow Visualization September 10–14, 2006, Göttingen, Germany

by Jürgen Kompenhans

The 12th International Symposium on Flow Visualization (ISFV12) was held at Göttingen, Germany, September 10-14, 2006. It has been organized by the *Deutsches Zentrum für Luft- und Raumfahrt (DLR)*, supported by the *Georg-August Universität Göttingen (Drittes Physikalisches Institut)*, the *Max-Planck-Institut für Dynamik und Selbstorganisation and the Laser-Laboratorium Göttingen*. These research institutes represent the strong scientific and technical competence and long tradition on measurement techniques in the Göttingen area.

Finally, 360 participants from 31 countries attended ISFV12. The majority came from *Japan* (108 attendants) and *Germany* (98 attendants). Between 10 and 30 delegates have been sent from France, Korea, Russia, Taiwan, the United Kingdom and the USA. Australia, Belarus, China, India, Israel, Italy, the Netherlands and Turkey have been represented by 3 to 9 delegates each. The rest of the participants (with less than 3 participants each) came from Algeria, Austria, Belgium, Brazil, Canada, Czech Republic, Finland, Greece, Luxembourg, Malaysia, Poland, Portugal, Singapore, South Africa, and Switzerland.

Five Special Sessions have been organized during the symposium focusing on topics of high current interest: Measurement and visualization of shock waves, Micro and nanoscale flow visualization, Visualization of Art, Measurement and visualization of multi-phase flows, and Visualization in Life Sciences.

Eight international experts form different areas of flow visualization have been invited to present the state-of-the art of flow visualization in their special field of interest:

- *Quantitative Flow Visualization in Supersonic and Hypersonic flows* by Fulvio Scarano, The Netherlands,
- *Visualization of the Controlled Flow Patterns for Slender Bodies at High Angle of Attack*, by Xiao Ming, China,
- *Micro and Nanoscale Flow Visualization*, by Steve Wereley, USA,
- *Experimental Investigation of a Flapping Bird Model: Some Challenges from Instationary Aerodynamics*, by Cameron Tropea and Tatiana Hubel, Germany,
- *Experimental and Computational Visualization of Blood Flows in Macro and Micro Scales*, by Marie Oshima, Japan / Ryo Torii, UK,
- *Flow Visualization, a Useful Tool for Applying Shock Waves to Medicine* (Leonardo Da Vinci Memorial Lecture), by Kazuyoshi Takayama, Japan,
- *High Resolution Flow and Particle Distribution Measurements in the Laboratory and in the Ocean Using Digital Holography*, by Joseph Katz, USA,
- As Public Lecture a general lecture with experiments related to the history and present understanding of vortical flows has been given as well: *The DaVinci Vortex*, by Wolfgang Send, Germany.

The traditional awards in the series of the International Symposia of Flow Visualization, the Asanuma Award and the Leonardo da Vinci Award, have been presented for Outstanding Achievements in the Field of Flow Visualization. The laureates of ISFV12 are: *Prof. Cameron Tropea (TU Darmstadt, Germany) - The Asanuma Award and Prof. Kazuyoshi Takayama (Tohoku University, Japan) - The Leonardo da Vinci Award*. In addition, three awards have been presented to young scientists to acknowledge their scientific work and presentation at the symposium.

The symposium was accompanied by an Exhibition of vendors of flow visualization equipment, a Social Excursion of the delegates including the Symposium Banquet and a Technical Excursion to research institutes and companies in Göttingen.

The Organizing Committee of ISFV12 cooperated with the editors of leading scientific journals such as: *Experiments in Fluids, Journal of Visualization, Measurement, Science and Technology, and Shock Waves - An International Journal* to provide authors presenting papers at ISFV12 with the possibility to submit their paper to an issue of the respective journal focusing on the 12th International Symposium on Flow Visualization. After the ISFV12 conference the editors of the different journals have invited prospective authors to submit their manuscript, subject to the normal review process.

The presentation of the Leonardo Da Vinci Award

All papers for ISFV12 submitted before the deadline have been published in the ***CD ROM Proceedings*** of ISFV12 (ISBN 0-9533991-8-4). More details about ISFV12, including some papers, submitted after the deadline, may be found at the ISFV12 website http://www.isfv.org.

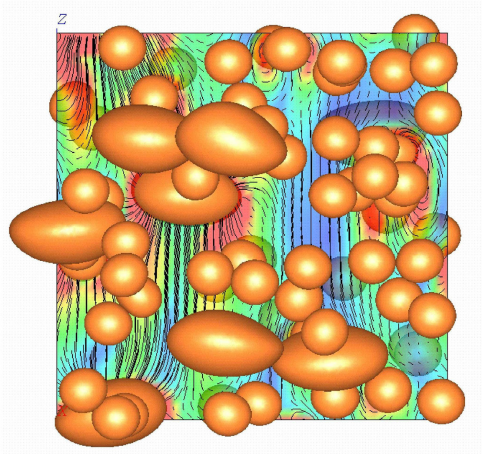
The next International Symposium on Flow Visualization (ISFV13) is scheduled for July 1-4, 2008 in Nice, France.

Dr. Jürgen Kompenhans
Chairman of ISFV12
DLR, Göttingen, Germany
Telefon + 49 551 709 2460
Telefax + 49 551 709 2830
E-mail: juergen.kompenhans@dlr.de
http://www.DLR.de/as

ICMF 07
International Conference on Multiphase Flow
Leipzig 9.- 13. July 2007

Conference Centre Leipzig (CCL)

www.icmf2007.org



Chairman: Prof. Dr.-Ing. Martin Sommerfeld
Martin-Luther-Universität Halle-Wittenberg
e-mail: martin.sommerfeld@iw.uni-halle.de

Co-Chair: Prof. Dr.-Ing. Cameron Tropea
Technische Universität Darmstadt
e-mail: ctropea@sla.tu-darmstadt.de

Contact Address:
Martin-Luther-Universität Halle-Wittenberg
Fachbereich Ingenieurwissenschaften
D-06099 Halle (Saale), Germany
Tel.: +49-(0)3461-462879
Fax: +49-(0)3461-462878
e-mail: info@icmf2007.org

Local Organising Committee
Prof. D. Bothe, RWTH Aachen
Prof. A. Delgado, Technische Universität München
Prof. U. Fritsching, Universität Bremen
Prof. M. Kraume, Technische Universität Berlin
Prof. E. Laurien, Universität Stuttgart
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Prof. H.-J. Warnecke, Universität Paderborn
Prof. F.-P. Weiß, Forschungszentrum Rossendorf e.V.
Prof. K.-E. Wirth, Universität Erlangen-Nürnberg

Schedule:

Deadline for abstracts:	15. November 2006
Notification of acceptance:	31. January 2007
Deadline for full paper:	31. March 2007
Early registration until:	31. March 2007

Scope of the Conference

The conference will be devoted to all aspects of Multiphase Flow. Researchers from all over the world should gather in order to introduce their recent advances in the field and thereby promote the exchange of new ideas, results and techniques. The conference should be a key event in Multiphase Flow and support the advancement of science in this very important field. The major research areas relevant for the conference are:

- Elementary processes for particles, droplets, bubbles and nano-particles (dispersed Multiphase Flows)
- Interaction phenomena in dense dispersed multiphase flows (collision, agglomeration, coalescence)
- Discontinuous multiphase flows (annular, slug, wavy and stratified flows, flow pattern regimes and instabilities)
- Multiphase flows with phase change (boiling, evaporation and condensation, reactive flows)
- Numerical methods for multiphase flows (Euler/Euler, Euler/Lagrange, DNS, LES, VOF, interface tracking, population balance, molecular modelling)
- Instrumentation for multiphase flow analysis (holography, tomography, LDA, PDA, imaging techniques)
- Applications (chemical engineering, biotechnology, nuclear engineering, combustion, automotive, nano-technology, life science, environment)

Future Meetings

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

Modeling and Measurements of Two-Phase Flows and Heat Transfer in Nuclear Fuel Assemblies
Royal Institute of Technology (KTH), Stockholm, Sweden, October 10-11, 2006
Prof. Henryk Anglart, KTH, Sweden
E-mail: henryk@kth.se

International Workshop on Process Intensification in Fluid and Particle Engineering (IWPI2006)
Kobe University Centennial Hall, Kobe, Japan, October 15-18, 2006
Prof. Yushi Hirata, Osaka University, Japan
Prof. Hiromoto Usui, Kobe University, Japan
E-mail: iwpi@kobe-u.ac.jp
http://www2.kobe-u.ac.jp/~iwpi/

Sixth International Symposium on Advanced Fluid Information (AFI-2006)
Institute of Aerospace Technology, JAXA, Tokyo, Japan, October 26-27, 2006
Dr. Shohei Takagi, IAT/JAXA
Prof. Yasuaki Kohama, IFS/Tohoku University
E-mail: afi-2006@chofu.jaxa.jp
http://www.iat.jaxa.jp/info/event/afi-2006.html

ASME International Mechanical Engineering Congress and Exposition
Chicago, Illinois, November 5-10, 2006
Dr. Said Jahanmir
MiTi Heart Corporation
E-mail: sjahanmir@mitiheart.com
http://www.asmeconferences.org/Congress06

ANS Winter Meeting and Nuclear Technology Expo
Albuquerque, NM, November 12-16, 2006
Dr. Robert W. Kuckuck, Los Alamos National Laboratory
Dr. Thomas O. Hunter, Sandia National Laboratory
http://www.ans.org/meetings/index.cgi?c=n

The 5th International Symposium on Measurement Techniques for Multiphase Flows (ISMTMF2006-Macau)
Macau, China, December 10-13, 2006
Prof. Zonghu Lin, Chinese Academy of Engineering, China
E-mail: smwang@seu.edu.cn
http://www.ismtmf.org/

Fifth International Conference on Computational Fluid Dynamics in the Process Industries
Melbourne, Australia, December 13-15, 2006
Dr. M P Schwarz
CSIRO Division of Minerals
Box 312, Clayton South Vic 3169, Australia
Tel: +61 3 9545 8500
Fax: +61 3 9562 8919
E-mail: cfd@minerals.csiro.au
http://www.cfd.com.au/cfdconf/

3rd BSME - ASME International Conference on Thermal Engineering
Dhaka, Bangladesh, December 20-22, 2006
Prof. M. H. Khan
Prof. A.K.M. Sadrul Islam
Dept of Mechanical and Chemical Engineering Islamic University of Technology
Board Bazar, Gazipur-1704, Bangladesh
E-mail: sadrul@iut-dhaka.edu, sadrul@me.buet.ac.bd
http://www.iutoic-dhaka.edu/bsme_asme_icte2006/

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International Conference on Thermal Issues in Emerging Technologies Theory and Application (ThETA)
Cairo, Egypt, January 3-6, 2007
Prof. Mohamed-Nabil Sabry, Université Française d'Egypte, Egypt
Dr. Bernard Courtois, TIMA lab., Grenoble, France
E-mail: thetaconf@gmail.com
http://www.thetaconf.org

Seminar and Training on Scaling, UNcertainty and 3D COuPled Code Calculations in Nuclear Technology (3D S.UN.COP 2007: 6th Seminar)
College Station, Texas, USA, January 22 - February 9, 2007
Dr. A. Petruzzi, University of Pisa
E-mail: a.petruzzi@ing.unipi.it
http://dimnp.ing.unipi.it/3dsuncop/2007/index.html

International Conference & Exhibition for Filtration and Separation Technology (FILTECH 2007)
Wiesbaden, Germany, February 27 - March 1, 2007
Dr. Harald Anlauf, University of Karlsruhe, Germany
Prof. Dr. Eberhard Schmidt, University of Wuppertal, Germany
Filtech Exhibitions Germany
PO Box 12 25
40637 Meerbusch - Germany
Tel: +49 (0)2132 93 57 60
Fax: +49 (0)2132 93 57 62
E-mail: info@filtech.de
http://www.Filtech.de

Heat Transfer in Components and Systems for Sustainable Energy Technologies (Heat-SET 2007)
France, April 18-20, 2007
Dr. Bernard Thonon, GRETh, France
E-mail: info@greth.fr
http://www.greth.fr/heatset/

15th International Conference on Nuclear Engineering (ICONE15)
Nagoya Congress Center, Nagoya, Japan, April 22-26, 2007
Dr. Takahiko Ito, Chubu Electric Power Co., Inc., Japan
E-mail: icone15@jsme.or.jp
http://www.icone15.org/

The 6th Pacific Symposium on Flow Visualization and Image Processing (PSFVIP-6)
Hawaii, USA, May 16-19, 2007
Prof. Manabu Iguchi (Japan)
Division of Materials Science and Engineering,
Graduate School of Engineering,
Hokkaido University,
Sapporo, 060-8628 Japan
Tel: +81-11-706-6335
Fax: +81-11-706-7810
E-mail: psfvip-6@eng.hokudai.ac.jp
http://fox27.hucc.hokudai.ac.jp/indexHAWAII.html

9th Asian Symposium on Visualization (9ASV)
Hong Kong, June 4-9, 2007
Email: 9asv@ust.hk
http://www.me.ust.hk/~9asv/

ENERGY 2007, First International Conference on Energy and Sustainability
The New Forest, UK, June 20-22, 2007
Prof. C A Brebbia, Wessex Institute of Technology, UK
Prof. V Popov, Wessex Institute of Technology, UK
E-mail: rgreen@wessex.ac.uk
http://www.wessex.ac.uk/conferences/2007/energy07/index.html

5th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT2007)
Sun City, South Africa, July 1-4, 2007
Prof. JP Meyer, University of Pretoria, South Africa
E-mail: jmeyer@up.ac.za
http://www.africaspecials.com/hefat2007/

International Conference on Multiphase Flow (ICMF Leipzig 2007)
Leipzig, Germany, July 9-13, 2007
Prof. Dr.-Ing. Martin Sommerfeld
Martin-Luther-Universität Halle-Wittenberg
Fachbereich Ingenieurwissenschaften
Institut für Verfahrenstechnik
Lehrstuhl Mechanische Verfahrenstechnik
D-06099 Halle (Saale), Germany
Tel: +49-(0)3461-462879
Fax: +49-(0)3461-462878
E-mail: martin.sommerfeld@iw.uni-halle.de
E-mail: info@icmf2007.org
http://www.icmf2007.org

5th International Symposium on Turbulence and Shear Flow Phenomena (TSFP-5)
TU Munich, Germany, August 27-29, 2007
Prof. R. Friedrich, Techn. Univ. München
Prof. N. Kasagi, University of Tokyo
http://www.aer.mw.tum.de/TSFP5/

18th International Symposium on Transport Phenomena (ISTP-18)
Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea, August 27-30, 2007
Prof. Sang Yong Lee, Department of Mechanical Engineering, KAIST
Tel: +82-42-869-3026
Fax: +82-42-869-8207
E-mail: sangyonglee@kaist.ac.kr
http://www.istp-18.org

5th World Congress on Industrial Process Tomography (WCIPT5)
Bergen, Norway, September 3-6, 2007
Prof. Hugh McCann, UK
Prof. Geir Anton Johansen, Norway
E-mail: jenefer.cockitt@manchester.ac.uk
http://www.vcipt.org/wcipt5/

9th International Symposium on Fluid Control, Measurements, and Visualization (FLUCOME2007)
Tallahassee, FL, USA, September 16-19, 2007
Prof. Ching-Jen Chen
Dean of College of Engineering
Florida A&M University-Florida State University
2525 Pottsdamer Street
Tallahassee, Florida 32310
E-mail: cjchen@eng.fsu.edu
http://www.eng.fsu.edu/flucome9/

The 1st International Colloquium on Dynamics, Physics and Chemistry of Bubbles and Gas-Liquid Boundaries
Niseko, Hokkaido, Japan, September 25-28, 2007
Prof. Shigeo Fujikawa, Japan
Division of Mechanical and Space Engineering
Hokkaido University
Kita 13 Nishi 8 Kita-ku, Sapporo 060-8628
Japan
Tel: + 81-11-706-6429
Fax: + 81-11-706-7889
E-mail: fujikawa@eng.hokudai.ac.jp

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10th World Filtration Congress (WFC10)
Leipzig, Germany, April 14-18 2008
Dr. Harald Anlauf
E-mail: info@wfc10.com
http://www.wfc10.com/

Corresponding Members

CANADA
Prof. M.Kawaji
University of Toronto
TEL: +1-416-978-3064, FAX: +1-416-978-8605
E-MAIL: kawaji@ecf.toronto.edu
Prof. S.B.Savage
McGill University
TEL: +1-514-398-6864, FAX: +1-514-398-7361

FRANCE
Prof. J.M.Delhaye
CEA/GRENOBLE
TEL: +33-2--76-88-42-75, FAX: +33-2-76-88-31-96
TLX: 320 323,
E-MAIL: DELHAYE@DTP.CEA.FR
Prof. G.Gouesbet
INSA de Rouen
TEL: +33-2-35-52-83-91, FAX: +33-2-35-52-83-90

F.R.G.
Prof. M. Sommerfeld
Martin-Luther-Universitat
TEL: +49-3461-462879(or 2806), FAX: +49-3461-462878
E-MAIL: martin.sommerfeld@vt,uni-halle.de

ITALY
Dr. G.P. Celata
Heat Transfer Unit Head
TEL: +39 6 3048 3905, FAX: +39 6 3048 3026
E-MAIL: celata@casaccia.enea.it,
TLX: 613296 ENEACAI

ISRAEL
Prof. G.Hetsroni
Israel Institute of Technology
FAX: +972-8-432-4538
E-MAIL: MERHGO1@TECHNION.BITNET

JAPAN
Prof. T.Fukano
Kyushu University, Fukuoka 812-8581, Japan
TEL: +81-92-641-9744 Ext.5440, FAX: +81-92-641-9744
E-MAIL: fukanot@mech.kyushu-u.ac.jp
Prof. M.Maeda
Keio University, Yokohama 223-0061, Japan
TEL: +81-45-563-1141 Ext.3120, FAX: +81-45-563-5943
E-MAIL: maeda@mech.keio.ac.jp
Prof. T.Masuyama
Tokai University, Shimizu, 424-8610, Japan
TEL: +81-543-34-0411 Ext.2278, FAX: +81-543-34-9840
E-MAIL: masuyama@scc.u-tokai.ac.jp
Prof. Y.Matsumoto
University of Tokyo, Tokyo 113-8656, Japan
TEL: +81-3-3812-2111 Ext.6286, FAX: +81-3-3818-0385
E-MAIL: ymats@mech.t.u-tokyo.ac.jp
Prof. K.Ohba
Kansai University, Osaka 564-8680, Japan
TEL: +81-6-6388-1121 Ext.5793, FAX: +81-6-330-63370
E-MAIL: ohbak@ipcku.kansai-u.ac.jp
Prof. A.Serizawa
Kyoto University, Kyoto 606-8501, Japan
TEL: +81-75-753-5829, FAX: +81-75-753-5845
E-MAIL: serizawa@kuiae.kyoto-u.ac.jp

KOREA
Dr. M.K.Chung
Korea Advanced Institute of Science and Technology
Dept. of Mechanical Engineering
TEL: +82-42-869-3002, FAX: +82-42-861-1694
Prof. Yong Kang
Department of Chemical Engineering
College of Engineering
Chungnam National University
TEL: +82-42-821-5683,6600
FAX: +82-42-822-0098
E-MAIL: kangyong@hanbat.cnu.ac.kr

NORWAY
Prof. K.H.Bendiksen
Institute for Energiteknikk
TEL: +47-63-80-60-00
+47-63-80-62-01 (Direct Line)
FAX: +47-63-81-11-68

P.R.CHINA
Prof. H.Chen
The Ministry of Communications P.R.C
Water Borne Transportation Institute
TEL: +86-10-6-2018898, FAX: +86-10-6--2011659
Prof. L.Zhou
Tsinghua University
TEL: +86-10-6278-2231/5419
FAX: +86-10-6277-5569
TLX: 22617 QHTSC CN
E-MAIL:zhoulx@mail.tsinghua.edu.cn

RUSSIA
Prof. R.I.Nigmatulin
(Tyumen) Russian Academy of Sciences Siberian Branch,
TEL,FAX: [7] 3452/ 24-36-48
(Moscow) Michurinskiy pr. 1, Institute of Mechanics Lomonosov University of Moscow, Moscow, GSP, V-192, 119899, Russia
TEL,FAX: [7](0)95/939-30-88, FAX: [7](0)95/253-90-04 (Int. Line), TLX: 413311

SLOVENIA
Prof. I.Zun
University of Ljubljana
TEL,FAX: +386-61-1771-403
FAX: +386-61-1254-217
TLX: 32240 FAKSTR 51
E-MAIL: iztok.zun@fs.uni.lj.si

U.K.
Prof. G.F.Hewitt
Imperial College of Science, Technology and Medicine
TEL: +44-171-594-5562 or 5563 FAX: +44-171-594-5564 or 5604,
E-MAIL: g.hewitt@ic.ac.uk

U.S.A.
Prof. M.Ishii
Purdue University
TEL: +1-317-494-4587, FAX: +1-317-494-9570
Prof. R.T.Lahey, Jr.
Rensselaer Polytechnic Institute
TEL: +1-518-276-6614, FAX: +1-518-276-8788
E-MAIL: laheyr@rpi.edu
Prof. M.C.Roco
National Science Foundation
TEL: +1-703-306-1371, FAX: +1-703-306-0319
E-MAIL: mroco@nsf.gov
Prof. E. Michaelides
Leo S. Weil Professor and Associate Dean for Graduate Studies and Research
School of Engineering
TEL: +1-504-865-5764, FAX: +1-504-862-8747
E-MAIL: emichael@mailhost.tcs.tulane.edu