



The International Information Center for Multiphase Flow

NEWSLETTER

No.25 October 2005

The Japanese Society for Multiphase Flow



Heat Transfer in Components and Systems for Sustainable Energy Technologies Heat-SET 2005 Conference April 5-7, 2005, Grenoble, France

by Bernard Thonon

The growing demand for energy, despite limited fossil fuel reserves and growing environmental concerns, is probably the major challenge of the 21st century. To achieve a sustainable development, the origin and the usage of energy have to be addressed. Advanced energy technologies for both fossil and renewable energy carriers have to be developed, requiring significant progress in research and technology. The application texts of the Kyoto protocol has been signed up by 143 countries. This is the birth of a new hope for mankind and a visible signal for scientists to increase their efforts in research on safe, efficient and sustainable systems. We hope that this conference has modestly contributed to work in this direction and to initiate new studies and collaborations in this field.

The Heat-SET conference aims to provide a platform for researchers from industry and academia to exchange information and identify research needs in the area of heat transfer in components and systems for sustainable energy technologies. The first Heat-SET conference took place in Grenoble, France on 5-7 April

2005; and 165 participants from 35 countries have contributed to the success of the Heat-SET2005 conference. The conference programme included 8 keynote lectures, 36 oral contributions and 85 poster presentations. The abstracts can be downloaded from <http://www.greth.fr/heatset/2005/index5.php>

The conference proceedings, which is available on CD at <http://www.greth.fr/heatset/>, collects 102 articles presented at the Heat-SET 2005 conference. It consists of invited lectures and contributions related to

- Heat recovery, boilers and furnaces
- Air-conditioning and refrigeration
- Heat exchangers
- Solar heating and cooling
- Energy storage and distribution
- Building and district heating
- Heat pumps
- Heat transfer
- Fuel cells
- Energy systems

To Join ICeM:

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.

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The Heat-SET 2005 conference is the first of a series of bi-annual conferences. The Heat-SET 2007 conference will take place in April 2007, Chambéry, France. More information will be available at <http://www.greth.fr/heatset/>.

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Heat Exchanger Fouling and Cleaning - Challenges and Opportunities June 5-10, 2005, Kloster Irsee, Germany

by Hans Müller-Steinhagen

Engineering Conferences International (ECI)

Conference Title: Heat Exchanger Fouling and Cleaning - Challenges and Opportunities

Conference dates/location: June 5- 10. 2005, Kloster Irsee, Germany

Chairman: Prof. Hans Müller-Steinhagen, German Aerospace Centre, Pfaffenwaldring 38-40, D-70569 Stuttgart, Germany

Co-Chairman: Prof. Paul Watkinson, The University of British Columbia, 2216 Main Mall, Vancouver, BC, Canada V6T 1W5

Conference Scientific Secretary: Dr. Reza Malayeri, German Aerospace Centre, Pfaffenwaldring 38-40, D-70569 Stuttgart, Germany

Following the highly successful meetings in San Luis Obispo (1995), Lucca (1997), Banff (1999), Davos (2001) and Santa Fé (2003), the 6th conference in this series for the first time was held in Kloster Irsee, Germany. The goal of this conference was to promote breakthrough thinking and explore new theoretical and

practical approaches to address the challenge of fouling of heat exchangers. This meeting provided an opportunity for experts from around the world to present their latest research and technological developments in fouling and cleaning strategies. It involved overview presentations, technical papers, poster sessions, and panel discussion.

In total, the conference attracted 65 representatives from universities, research institutes and companies presenting 57 lectures and posters. Following a thorough reviewing process, selected papers will be published in Heat Transfer Engineering; the full set of conference proceedings will be available as an electronic publication by Bepress Publishing Company.

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An Announcement from Editor

The JSMF gives internet-service for ICMF members.

You can read updated ICM NEWSLETTER by visiting JSMF homepage

<http://www.jsmf.gr.jp/index-en.htm>

Report on Computational Fluid Dynamics in Chemical Reaction Engineering IV June 19-24, 2005, Barga, Italy

by Anthony G. Dixon

The Fourth Engineering Conferences International (ECI) conference on CFD in CRE was held on June 19-24, 2005 at Il Ciocco Hotel and Conference Center, Barga, Italy. Previous conferences in the series were held in San Diego (1996), Quebec (2000) and Davos (2003).

Despite the widespread use of CFD in industry, there is still a lack of fully validated predictive CFD models of many relevant transport and reaction phenomena in chemical reaction engineering, especially in the field of multiphase flows and complex reacting flows. This conference provided a forum for cross-fertilization between CFD model developers and industrial practitioners in order to advance the state of the art and prioritize research needs. CFD in CRE conferences are the only scientific meetings that focus on CFD research in chemical reaction engineering.

Ten keynote speakers were invited who are involved in cutting-edge research in the field. Twenty oral presentations and approximately twenty poster presentations were also made, as well as a "hot topics" discussion session. Over sixty participants gathered from a wide range of countries. The CFD in CRE conferences are relatively small, to encourage informal discussion between participants.

The format of each day was to begin with two keynote talks, each for an hour including discussion, and separated by a coffee break. After a short recess, 4-5 oral presentations of 20-25 minutes each were made, followed by lunch. The afternoon began with short two-minute presentations from the poster presenters. The rest of the afternoon was available for informal discussion or recreation. The poster session was at about 5pm followed by dinner and a social hour. All participants gathered in one room, so that everyone could hear all presentations and discussions. All posters remained up throughout the conference. An exception to this schedule was day 3, which featured an excursion to the nearby historical town of Lucca, followed by a discussion on selected topics of current interest: Lattice Boltzmann methods (Harry van den Akker, Delft), CFD in industrial combustion (Jimmy Li, Air Products), and multiphase flow modeling (Bjorn Hjertager, Aalborg).

Day 1 led off the conference on the topic of gas-solid flows: fluidized bed and riser reactors.

Keynotes were given by Rodney Fox (Iowa State) on CFD models for polydisperse solids and Martin van der Hoef (Twente) on multi-scale modeling of gas-fluidized beds. Day 2 focused on gas-liquid and liquid-liquid flows, with keynotes from Faical Larachi (Laval) on gradient magnetic fields applied to porous media flows and Stephane Zaleski (Univ. Pierre et Marie Curie) on the art of fluid interface CFD. The industrial perspective was featured on day 3, with invited talks from Richard LaRoche (Fluent Inc.) on the evolution of CFD as a tool for chemical engineering and Glenn Price (Nova Chemicals) on CFD perspectives and applications at Nova Chemicals. On day 4 attention turned to chemically reacting flows: CFD with detailed chemistry, fine-particle formation or other processes sensitive to reactive mixing. The keynotes were by Luc Vervisch (LMNF-INSA, CORIA) on DNS and LES of turbulent combustion and Dion Vlachos (Delaware) on simulations of portable microchemical devices. The final half-day was on liquid-solid flows, non-Newtonian and laminar flows and polymer reactors and processes with complex fluids, led by talks from Fernando Muzzio (Rutgers) on reactions in laminar flow and Jos Derksen (Delft) on simulations of dilute to dense solid-liquid suspensions.

I would like to express appreciation to the conference co-chairs, Professor Harry van den Akker of Delft University and Ahmad Haidari of Fluent, Inc.; also to the members of the organizing committee who set up each day's program; and finally to the American Institute of Chemical Engineers and to the Dupont Company for their sponsorship. PDF files of most of the invited talks and oral presentations are available at http://www.wpi.edu/Academics/Depts/CHE/Research/HMTL/CFD_in_CRE_IV/.

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ECI International Conference on Heat Transfer and Fluid Flow in Microscale September 25-30, 2005, Castelvecchio Pascoli (Barga, Lucca)

by Gian Piero Celata

The ECI *International Conference on Heat Transfer and Fluid Flow in Microscale*, organized by the Institute of Thermal-Fluid Dynamics of ENEA, in the frame of the ECI, *Engineering Conferences International*, was held at Castelvecchio Pascoli (Barga, Lucca), from 25 to 30 September 2005.

Such a Conference follows after five years a similar Conference organized by ENEA and ECI (at that time Engineering Foundation). It is therefore possible, considering the rapid growth of research in microscale, to draw some conclusions on the development of microscale research in the field of heat transfer and fluid flow.

A total of 84 participants attended the Conference and about 60 papers have presented in oral plenary sessions, besides seven keynote lectures. Participation from industry has been good with 11 delegates; about 20 participants were PhD students, while 15 belongs to national labs and the remaining pertains to University. A little less than 20 participants (mostly from industry) did not give a paper at the Conference. Distribution of participants spanned over 18 Countries, and Japan (as very often happens) scored the largest participation: Japan 15, USA 10, Germany 9, Ireland 9, Italy 8, Switzerland 8,). It can be concluded that participation has been pretty good, with an appropriate contribution from young generation, experts and end users.

The format of ECI Conferences, with plenary sessions, with delegates lodged in the same Conference Centre and therefore with the opportunity to interact each other from the breakfast to the after dinner social hours, and with a narrow conference scope, looks very interesting. As a matter of fact, along the conference week there are many chances for discussion: after the paper presentation, during coffee-break, lunch, pre-dinner, dinner and after dinner. All that leads to the opportunity to have a large feedback for delegates research work

The seven keynote lectures, listed hereunder, have covered many aspects of heat transfer and fluid flow in microscale, such as pressure drop, boiling, interface phenomena, instabilities and modeling.

Two-phase flow and boiling in microchannels

J.R. Thome - Heat and Mass Transfer Laboratory

(LTCM), Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland

Interface effects on flow and heat transfer at microscale
X.G. Liang - Department of Engineering Mechanics, Tsinghua University, Beijing, China

Micro- and nanoscale heat transfer: from carbon nanotubes to fuel cells

D. Poulikakos - Laboratory of Thermodynamics in Emerging Technologies, Institute of Energy Technology, Department of Mechanical and Process Engineering, ETH Zurich, Switzerland

Modeling heat transfer and pressure drop for liquid-vapor flows in the elongated-bubble flow regime

A. Jacobi - Department of Mechanical and Industrial Engineering, University of Illinois at Urbana-Champaign, USA

Review on two-phase flow instabilities in narrow spaces

L. Tadriss - IUSTI UMR CNRS, Marseille, France

Locally heated annular liquid films in microchannels and minichannels

O. Kabov - Heat Transfer International Research Institute of Université Libre de Bruxelles and Institute of Thermophysics of Russian Academy of Sciences, Brussels, Belgium

Single-phase pressure drop in microchannels

P.S. Hrnjak - Department of Mechanical and Industrial Engineering, University of Illinois at Urbana-Champaign, USA, Microsoft Corp., USA

The 60 papers, collected in a CD-ROM, have been sorted in sessions on: single-phase fluid flow and heat transfer, adiabatic two-phase flow, flow boiling, phase change, condensation, heat exchangers, measurement techniques, MEMS, microfluidic systems and devices.

As already stated, a comments can be made on the progress of the research in this field, after five years from the first Conference. We may say that until 2000 research in microscale, especially on heat transfer and fluid flow, was rather pioneeristic, with experimental and measurement approach not adequate for the

precision required when referring to very reduced geometric scale.

As an example, the measurement of the channel diameter has to be made with a precision of less than one micron in order to avoid large uncertainty in the evaluation of fluid velocity and friction factor. Also, the experimental evaluation of the surface roughness is another important issue, as it plays a role in heat transfer and fluid flow even in laminar flow (this aspect has not been completely cleared yet). Such measurements have to be made all along the channel axis, as they are supposed to change due to manufacturing process. Use of advanced SEM and laser optical profilometer is highly recommended to get this essential information. Nonetheless, it is clear how such measurements implies the destruction of the test section and have to be made after the tests preventing from repetition of tests on the same microchannel. Pressure drop measurement is quite tough because of the microscopic size of the channels and the consequent problem of carefully drill pressure taps. This sometimes calls for tricky methods leading to a reduction of the uncertainty though always present. Wall temperature measurement in turn requires the development of special micro-thermocouples developed specifically for such applications.

So, considering the above instrumental and experimental troubles, we may say that five years ago it was quite clear the contradictory trend of similar tests conducted in different laboratories, evidencing a large discrepancy with the traditional theories. A general agreement existed that contradictory findings were mainly due to experimental uncertainty and inadequate instrumentation. After five years, as a main conclusion from the present Conference, we may say that, at least as far as single-phase fluid flow (gas or liquid) is concerned, the higher accuracy in the tests and the larger availability of more adequate measurement techniques have lead to a convergence of similar

experimental results and to the general good verification of existing theories for macroscale.

We have to be more cautious for single-phase heat transfer, where the uncertainty still associated with the wall temperature and the effect of conjugate heat transfer (due to axial conduction) still prevents a general comprehension of the phenomenon.

Two-phase flow, both adiabatic and with phase change, exhibits a complex situation. Experimental results look fairly consistent but available predictive tools are far from being adequate. This is by all means due to the complexity of two-phase flow and to different flow pattern and bubble dynamics in a microchannel. Let us imagine that a 100 micron bubble in a large pipe may have a dynamics which can be considered independent of the geometric constraints, while the same bubble (or a smaller one) in a microchannel may be even deformed by the channel walls and anyway tends to occupy the whole cross section. In this case an accurate characterization of two-phase flow in microchannels is required along with an upgrade of predictive tools (if not necessary to have new ones), which are generally largely based on an empirical-experimental basis.

Eventually, if we are able to create a deep synergisms between experimentation and modeling this may lead to a great benefit to data analysis, their design and conduction.

The contribution of Conference co-Chairs, Prof. Nobuhide Kasagi, Dr. Satish G. Kandlikar and Prof. John R. Thome, has been very much appreciated.

The next Conference is tentatively planned for Autumn 2005 in Japan.

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The JSMF Annual Meeting 2005 was held at Tokyo, Kogakuin University on 1st-3rd August, 2005. During the Meeting, **the 24th Multiphase Flow Symposium** was held 3rd.

Please visit

<http://www.jsmf.gr.jp/meet2005/index.html>

to check these programs for your reference.

22nd Zurich Short Course on Modelling and Computation of Multiphase Flows March 14-18, 2005, Zurich, Switzerland

by George Yadigaroglu

Courses similar to this one have been offered in the past at Stanford University, at the University of California-Santa Barbara and for 22 years now at ETH-Zurich; over the last two decades, some 1300 participants attended the Zurich courses that are very well known in Europe. The last few years several participants from the US, Asian countries and in particular Japan have also attended the courses.

The courses are organised in a modular form as intensive introductory courses for persons having basic knowledge of fluid mechanics, heat transfer, and numerical techniques, but also serve as advanced courses for specialists wishing to obtain the latest information.

Part I, Bases covered the common background material and emphasised the latest modelling and computational aspects of multiphase flows. After an introduction to the course, the lectures covered first the basics: the empirical and phenomenological models for flow regimes, pressure drop and void fraction as well as two-phase heat transfer. A rigorous introduction to multifield models and closure laws followed. Special attention was given to thermal non-equilibrium flows and multicomponent systems. Numerical methods and an introduction to CMFD completed the basics in *Part I*. Finally a lecture on instabilities in two-phase flow covered both the instabilities of the liquid-gas interfaces, as well as two-phase system instabilities. A lecture on flow and heat transfer in micro-channels introduced this topic of great current interest to the audience.

Part IIA, New Reactor Systems and Methods covered core design and the multiphase phenomena in LWRs as well as advanced computational modelling and scaling for these systems. Some of the most recently proposed advanced reactor system designs (including those in Generation IV) were then reviewed, as well as the state-of-the-art and beyond in modelling and simulation methods for core design and accident analysis.

Part IIB, the module on *Computational Multi-Fluid Dynamics (CMFD)* reflected the growing

interest in the application of CFD techniques to multi-phase flows. This part of the course was again expanded to cover most new computational techniques. It included lectures on the Volume of Fluid (VOF) method, the ghost fluid and level-set methods, embedded interface methods, the phase field method, Lattice Gas Cellular Automata, as well as reviews of applications of all these.

Finally a new module, *CMFD with Commercial Codes* was added this year in response to numerous requests and gave to the participants the possibility to meet the main commercial code developers who presented the two-phase computational capability of their codes.

Numerous movies, videos, animations, and computer simulations, some classical, some produced very recently, were offered again to illustrate the physical phenomena and the numerical techniques.

The lecturers in this series of carefully organized courses are experts in their respective fields but are selected also for their pedagogical capabilities. This year they included: S. Banerjee, M.L. Corradini, G. Hetsroni, G.F. Hewitt, M. Ishii, S. Lo, G. Scheuerer, G. Tryggvason, S. A. Vasquez, G. Yadigaroglu and S. Zaleski.

The course was hosted, as usual by the Swiss Federal Institute of Technology (ETH) in Zurich, Switzerland. The participants received an extensive set of lecture notes and copies of all the standardised presentations. The course language was English. The exact schedule and contents of lectures can be found in the Course web site: <http://www.ascomp.ch/ShortCourse>.

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Future Meetings

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

6th International Symposium on High Temperature Air Combustion and Gasification (HiTACG 2005)

Essen, Germany, October 17-19, 2005
Dr.-Ing. M. Flamme
Gaswarme-Institut e.V. Essen, Hafenstrasse 101, D-45356 Essen, Germany
Tel: +49-201-3618269, Fax: +49-201-3618238
E-mail: mflamme@gwi-essen.de
<http://www.gwi-essen.de/hitacg/>

Third International Conference on Computational Methods in Multiphase Flow 2005

Portland, Maine, USA, October 31-November 2, 2005
Prof. C. A. Brebbia,
Wessex Institute of Technology, UK
Prof. A. A. Mammoli,
University of New Mexico, USA
<http://www.wessex.ac.uk/conferences/2005/mpf05/index.html>

2005 ASME International Mechanical Engineering Congress and Exposition (IMECE)

Orlando, Florida, USA, November 5-11, 2005
Prof. Michael J. Askew
E-mail: askewm@uakron.edu
<http://www.asmeconferences.org/Congress05/>

ANS Winter Meeting and Nuclear Technology Expo

Omni Shoreham Hotel, Washington, D.C., November 13-17, 2005
Dr. Thomas A. Christopher, AREVA
Dr. Michael Wallace, Constellation Generation
<http://www.ans.org/meetings/docs/2005/wm2005-cfp.pdf>

The Fifth International Symposium on Advanced Fluid Information (AFI2005)

Tohoku University, Sendai, Japan, December 8-9, 2005

----- 2006 -----

The 18th National & 7th ISHMT/ASME Heat and Mass Transfer Conference

Indian Institute of Technology, Guwahati, India,
January 4-6, 2006
Prof. P. S. Robi
Organizing Secretary

Prof. Subhash C. Mishra
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E-mail: hmte@iitg.ac.in
<http://www.iitg.ac.in/hmte/>

The Eleventh International Symposium on Transport Phenomena and Dynamics of Rotating Machinery

Honolulu, Hawaii USA, February 26 - March 2, 2006
Prof. Knox T. Millsaps
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Monterey, CA 93943 USA
E-mail: millsaps@nps.navy.mil (millsaps@nps.edu)
<http://www.isromac.org/>

Eurotherm Seminar 78 "Computational Thermal Radiation in Participating Media II"

Poitiers, France, April 5-7, 2006
Dr. Denis Lemonnier, Heat Transfer Laboratory,
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Tel.: +33 5 49 49 81 16
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The Fifth World Congress on Particle Technology

Orlando, Florida, USA, April 23-27, 2006
Prof. George E. Klinzing
University of Pittsburgh
Tel: (+1) 412-624-0784
E-mail: confchair@wcpt5.org
<http://www.wcpt5.org/>

6th International Conference on Boiling Heat Transfer VI

Spoleto, Italy, May 7-12, 2006
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<http://www.engconfintl.org/6ak.html>

ASME ATI Conference

Milan Italy, May 14-17, 2006
ATI Sez. Lombardia
Tel: +39.02.78.49.89
Fax: +39.76.00.94.42

E-mail: atilombardia@atilombardia.overweb.it
<http://www.asmeati2006.it>

The Eleventh Asian Congress of Fluid Mechanics (11ACFM)

Kuala Lumpur, Malaysia, May 22-25, 2006
Prof. C. S. Ow
E-mail: acfm@iem.org.my
<http://11acfm.mmu.edu.my/>

ITherm 2006

San Diego, CA, USA, May 30 - June 2, 2006
Prof. Bahgat G. Sammakia
Director, Integrated Electronics Engineering Center
State University of New York at Binghamton
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Binghamton, NY 13902-6000 USA
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E-mail: bahgat@binghamton.edu
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ANS Annual Meeting

Reno, NV, USA, June 4-8, 2006
Dr. Joseph Parrish, Energy Northwest
Dr. Louis E. Pardi, Washington Group International, Inc.
<http://www.ans.org/meetings/index.cgi?c=n>

13th International Symposium on "Applications of Laser Techniques to Fluid Mechanics"

Lisbon, Portugal, June 26-29, 2006
Prof. R. J. Adrian, Arizona State University, USA
Prof. D. F. G. Durao, Universidade Lusiada, Portugal
Prof. K. Hishida, Keio University, Japan
Prof. A. L. Moreira, Instituto Superior Tecnico, Portugal
Prof. C. Tropea, Technical University of Darmstadt, Germany
E-mail: llaser@dem.ist.utl.pt
<http://in3.dem.ist.utl.pt/1x1laser2006/>

Sixteenth Symposium on Thermophysical Properties

Boulder, CO, USA, July 30 - August 4, 2006
Prof. Dan Friend
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National Institute of Standards and Technology
325 Broadway
Boulder, CO 80303 U.S.A.
Fax: 303-497-5224
Prof. Andreas Mandelis
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<http://symp16.boulder.nist.gov/>

International Heat Transfer Conference (IHTC-13)

Sydney, NSW, Australia, August 13-18, 2006
Prof. Graham de Vahl Davis
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Tel: +61 2 9385 4099
Fax: +61 2 9963 1222
E-mail: ihtc-13@unsw.edu.au
<http://ihtc-13.mech.unsw.edu.au/>

The 5th International Conference for Conveying and Handling of Particulate Solids (CHoPS-05)

Hilton Hotel, Sorrento, Italy, August 27-31, 2006
Prof. Paolo Massacci
Tel: +39-06-44585-605
Fax: +39-06-44585-618
E-mail: paolo.massacci@uniroma1.it
<http://www.ortra.com/solids/>

17th International Symposium on Transport Phenomena (ISTP-17)

Toyama International Conference Center, Toyama, Japan, September 4-8, 2006
Prof. Masaru Ishizuka, Toyama Prefectural University
Department of Mechanical Systems Engineering
E-mail: ishizuka@pu-toyama.ac.jp
E-mail: istp17@pac.ne.jp
<http://www.pac.ne.jp/istp17/>

12th International Symposium on Flow Visualization

Gottingen, Germany, September 10-14, 2006
Prof. Jurgen Kompenhans
German Aerospace Center (DLR)
Institute of Aerodynamics and Flow Technology,
Bunsenstrasse 10,
37073 Gottingen, Germany
Tel: + 49 551 709 2460
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<http://www.as.go.dlr.de/ISFV12/>

IUTAM Symposium 2006 NAGOYA, "Computational Physics and New Perspectives in Turbulence"

Integrated Building in Nagoya University, Nagoya, Japan, September 11-14, 2006
E-mail: iutam-nagoya@fluid.cse.nagoya-u.ac.jp
<http://www.fluid.cse.nagoya-u.ac.jp/%7Ekaneda-lab/iutam2006/>

The 8th International Heat Pipe Symposium

Kumamoto University, Kumamoto, Japan, September 24-27, 2006

Prof. Hideaki Imura

Department of Mechanical Engineering and Materials Science, Faculty of Engineering, Kumamoto University

2-39-1 Kurokami, Kumamoto, 860-8555

Tel & Fax: (+81)-96-342-3752

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<http://www.mech.kumamoto-u.ac.jp/8ihps/>

3rd BSME - ASME International Conference on Thermal Engineering

Dhaka, Bangladesh, December 20-22, 2006

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_ict2006/

----- 2007 -----

ANS Winter Meeting and Nuclear Technology Expo

Albuquerque, NM, USA, 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>

6th International Conference on Multiphase Flow

Leipzig, July 9-13, 2007

Executive Division of The Japanese Society for Multiphase Flow (2005-2006)

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Vice Presidents Y. Tsuji (Osaka University)
A. Shimizu (Kyushu University)
T. Narabayashi (Toshiba Corporation)

Chair of Informatics Division
K. Tsuchiya (Doshisha University)

Chair of General Affairs Division
K. Nishida (Hitachi, Ltd.)

Chair of Planning Division
M. Seki (Kansai University)

Chair of International Intercourse Division
T. Tanaka (Osaka University)

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