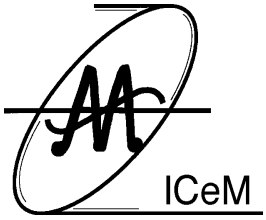
ISSN 1342-6966



The International Information Center for Multiphase Flow

NEWSLETTER

No.15
October 2000

The Japan Society of Multiphase Flow

Book review: Non-linear mass transfer and hydrodynamic stability
Chr. B. Boyadjiev and V. N. Babak, Elsevier, Amsterdam, 2000

by J. Hristov

The non-linear mass transfer theory is under an intensive development with serious contribution of the authors. The book fills a serious gap in the literature considering the non-linear mass transfer effects and becomes a logical continuation of well-known ideas developed by Levich in "Physicochemical hydrodynamics " and Frank-Kamenetzki in "Diffusion and heat transfer in chemical kinetics" discuss the linear mass transfer theory only.

In Part I of the book (Chr. Boyadjiev) the non-linear mass transfer as a result of an intensive interphase mass transfer in the gas (liquid) -solid surface, gas-liquid and liquid-liquid systems is considered. The diffusion boundary layer approximation as well as in flat channels taking the longitudinal diffusion into account is considered. The influence of the direction of the intensive interphase mass transfer on the heat transfer and the multi-component mass transfer is illustrated.

Part II (based on the studies of V. Krylov) discusses the non-linear mass transfer in electrochemical systems with high current density on the examples of the anode dissolving of metals in the electrolyte flow and the electro-separation of metals out of concentrated solutions. The theory of the measured electrochemical treatment of metals and alloys, which is a method of a wide practical use, has been elaborated on this basis.

In Part III (Chr. Boyadjiev) the non-linear mass transfer in the chemically reacting systems is considered in the cases of: non-linearity of the equations of the chemical reaction's kinetics and intensive interphase mass transfer or thermo-capillary effect due to chemical reactions. On this basis, the mechanisms and the macro-kinetics of the chemical transformations in the gas-liquid systems are discussed.

Part IV (V. Babak) concerns the chemical reaction kinetics in stationary two-phase systems at an arbitrary contact time between phases. The large concentration gradients induce secondary flows at the phases interface, which, depending on the direction of the interphase mass transfer, represent suction from or injection into the boundary layer, which enhances or lowers the hydrodynamic stability of the flow in the boundary layer.

In Part V (Chr. Boyadjiev) these effects are considered in the approximations of the linear theory of the hydrodynamic stability of almost parallel flows. In the systems with intensive interphase mass transfer besides the effect of non-linear mass transfer the Marangoni effect could also show up. A comparative analysis of these two effects is made in the book.

Prof. J. Hristov
Dept. Chem. Eng.
University of Chemical Technology and Metallurgy
Sofia 1756, Bulgaria

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Chairman(Editor):
Professor Tomoji Takamasa
Faculty of Mercantile Marine Science
Tokyo University of Mercantile Marine
Eccyujima 135-8533, Japan
Phone +81-3-5245-7410
FAX +81-3-5245-7336
E-mail: takamasa@ipc.tosho-u.ac.jp

Vice Chairman:
Professor Yutaka Abe
Inst. of Engineering Mechanics and Systems
University of Tsukuba
Tsukuba Tennodai, Ibaraki, Japan
TEL&FAX: +81-298-53-5266
E-mail: abe@kz.tsukuba.ac.jp

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

Report on UK-Japan Seminar on Multiphase Flow and Nuclear Safety

by Mamoru Ozawa

The British Council

UK-Japan Seminar on
Multiphase Flow and Nuclear Safety
Imperial College, London
February 10-11, 2000
Programme

Thursday 10 February

09.15-09.30 Welcome
09.30-10.05
K. Mishima: A non-equilibrium mechanistic heat transfer model for post-dryout dispersed flow regime
10.05-10.40
Z. Gao, J. M. Smith and H. Mueller-Steinhagen: Void fraction distribution in sparged and boiling reactors with modern multiple impellers.
10.40-11.00
N. Saito, T. Kunugi and A. Serizawa: Numerical simulation of forced convective subcooled flow boiling
11.00-11.20 Break
11.20-11.55
M. Ozawa: Solved and unsolved problems in boiler systems: Learning from accidents
11.55-12.30
V. Wadekar, **B. Hedley**: Two-phase flow and nucleate boiling
12.30-13.00 Discussion
13.00-14.00 Lunch
14.00-14.35
M. R. Malayeri, J. M. Smith and H. Mueller-Steinhagen: Temperature effects in air/water two-phase pipeline bubbly flows
14.35-15.00
N. Shimada and A. Tomiyama: (N+2)-Field modelling for bubbly flow simulation
15.00-15.30
A. Tomiyama and N. Shimada: Several problems to be solved for the improvement of the (N+2)-field model
15.30-16.00 Break
16.00-16.35
M. Watanabe: Numerical simulation of bubble behaviours in a circular tube - with the existence of other bubbles -
16.35-16.50
E. Serizawa, Y. Matsumoto, M. Ozawa, T. Kunugi and A. Serizawa: Vortex bubble ring: Numerical and experimental approaches
16.50-17.25
T. Takamasa: Detailed measurement on gas-liquid interface using stereo image-processing method and laser focus displacement meters
17.25-18.00 Discussion
19.00- Dinner (170 Queen's Gate)

Friday 11 February

09.30-10.05
T. Hibiki and M. Ishii: Two-group interfacial area transport equations at bubbly-to-slug flow transition in a vertical round pipe
10.05-10.40
R. I. Issa and **M. Kempf**: Numerical simulation of slug initiation and development in nearly horizontal pipes
10.40-11.10 Break
11.10-11.45
B. J. Azzopardi: The division of horizontal slug flow at a small diameter T-junction (preliminary report)
11.45-12.20
W. M. Dempster, and M.T. Stickland: Liquid velocity field measurements at the plug/slug transition in horizontal pipes
12.20-12.45 Discussion
12.45-13.45 Lunch
13.45-14.20

Photo 1 Participants

Photo 2 Prof. Hewitt and student

A. Serizawa: Experimental and numerical study of 2-dimensional behaviour of liquid film flow and liquid droplets in rod bundle geometry with spacers
14.20-14.55
G. F. Hewitt and **J. Barbosa**: Multi-component droplets: A new dimension in annular flow modelling
14.55-15.25 Break
15.25-16.00
T. Okawa: Numerical simulation of annular-dispersed flows in round tubes and annuli using a multi-fluid model
16.00-16.35
R. I. Issa and D. Adechy: A numerical model for annular flow
16.35-17.15 Discussion and Closure

Professot Mamoru Ozawa
Dept. of Mechanical Engineering
Kansai University
Suita, Osaka, Japan
E-mail:ozawa@kansai-u.ac.jp

Report on the 8th Italian National Heat Transfer Conference Cernobbio, Italy

by Alfonso Niro

The 18th Italian National Heat Transfer Conference was held in Cernobbio, Italy, and it was organised by the Politecnico of Milan under the auspices of UIT, the Italian society for thermal-fluid dynamics. Since UIT conferences were started in 1983, they have become established as a premier forum for the Italian researchers in thermal sciences and heat transfer where scientific and technical ideas may be exchanged.

Cernobbio is a charming town on Lake Como coast, 5 chilometers from Como itself. For the beauty of the landscape and the richness of the historical-artistic patrimony, the Lake Como is a favorite place of the international tourist in northern Italy.

The Conference followed broadly the same pattern as in the late UIT conferences, namely, with 4 invited lectures and the technical papers presented in 6 Poster Sessions. Each poster session was introduced by the chairman who gave a critical presentation of the contributed papers.

The invited lectures of this year were the following:

- Pushing Back the limits for CFD, by Dr. Michael Engelman, Fluent Inc.
- Some implications of non-newtonian fluid dynamics on heat transfer, by Prof. Giuseppe Marrucci, University of Naples Federico II, Italy.
- Multi-scale analysis of diabatic bubbly flow, by Prof. Iztok Zun , University of Ljubljana, Slovenia.
- Visual investigation of boiling phenomena in CHF subcooled flow boiling, by Dr. Gian Piero Celata, ENEA, Institute of Thermal-Fluid Dynamic, Rome, Italy.

The first lecture offered an important point of view on the state-of-art of CFD technology and research activities. Among the challenges for the CFD developers, the most important ones are a robust interface with CAD and a mesh handling technology, a new mathematical approach with automatic convergence control and tools for adaptive geometric design based on the CFD analysis results. In his lecture, Prof. Marrucci faced implications risen on heat transfer by viscoelastic fluids, inasmuch as most of the industrial chemicals and many fluids in the food processing and biochemical industries are viscoelastic and undergo heat exchange process either during their preparation or in their application Finally, the last two lectures dealt with two-phase flow. The former critically considered mesoscale vs. microscale phenomena in a diabatic bubbly flow, providing a computational framework to predict both global and local characteristics, such as convective coefficients and CHF. The latter presented a detailed and very intersting analysis, supported by visual observations by means of high speed moovies support and quantitative measurements, of events and mechanisms leading to CHF in subcooled flow boiling from the onset of thermal crisis up to heater burnout.

The technical papers presented were 77 (41 in English) and most of them showed a good scientific or engineering relevance. The papers were concerned with the conference themes as below

1. thermal-fluid dynamics of single-phase flow system (21 papers);
2. thermal-fluid dynamics of two- phase flow system (19 papers);
3. computational thermal-fluid dynamics (17 papers);
4. heat transfer in high density power plants (9 papers);
5. heat transfer in the enviromental control system (7 papers);
6. bio-fluid dynamics (4 papers).

Among the papers of the first session, 6 papers reported experimental results obtained by means of non-intrusive optical methods, ranging from dynamic thermography to speckle photography, whereas thermal characteristics of enhanced surfaces were the object of other 5 papers. In the two-phase flow session, 5 papers faced boiling problems

including bubble dynamics and electric-field effects, 3 papers dealt with convective condensation with both traditional and new refrigerants, and 4 papers were concerned with adiabatic two-phase flows. Among 17 papers of the computational fluid-dynamics session, more than half ones (9) reported on work performed by commercial code, further confirming that CFD codes are a current tool in the engineering activities. Most papers of the session 4 dealt with modelling of thermal-hydraulic phenomena in fission or fusion reactors. Thermal analisys of building components were considered in 5 papers of the session 5, whereas the other two were concerned with heat transfer in porous media. Finally, in the bio-fluid dinamyc session two interesting problems are faced, i.e., a fluid-structure approach for the study of a pulsatile pump and a numerical investigation of transport and absorption phenomena of blood solutes.

Finally, the Conference was attended by more than 100 people, included about 20 foreigners. For the number of contributed papers and partecipants, this edition resulted particulary successful.

Prof. Alfonso Niro
Dipartimento di Energetica - POLITECNICO DI MILANO
Piazza Leonardo da Vinci 32 - I-20133 MILANO
phone: (+39) 02.2399.3905 / fax (+39) 02.2399.3940
e-mail: Alfonso.Niro@polimi.it

Report on 4th Minsk International Seminar "Heat Pipes, Heat Pumps, Refrigerators" 4-7 September, 2000, Minsk, Belarus

by Leonard L. Vasiliev

4-7 September, 2000 in Minsk , Belarus was held the 4th Minsk International Seminar and Exhibition "Heat Pipes, Heat Pumps, Refigerators".

This is a Fourth biennial Minsk International Seminar and exhibition "HEAT PIPES, HEAT PUMPS, REFRIGERATORS" since 1993 under the auspices of NIS Association "Heat Pipes", Luikov Heat and Mass Transfer Institute, National Academy of Sciences of Belarus, International Institute of Refrigeration and some other Ministries and Institutions.

The main goal of these meetings is still the same – to provide an opportunity for scientists and engineers particularly from the Former Soviet Union and its neighboring countries to meet the researchers and specialists from western countries and the world leading countries in the field of heat pipes, sorption heat pumps and refrigerators. There are well known meetings all over the world in the field of heat pipes and sorption machines. Today International Heat Pipe Conferences have a very good reputation since 1973, the date of the First Heat pipe Conference in Stuttgart (Groll, 1973). The next Conferences were in Bologna (Busse, 1976), London (Reay, 1081), Tsukuba (Oshima, 1984),Grenoble (Curtilla, 1987), Minsk (Vasiliev, 1990), Beijing (Tongze Ma, 1992), Albuquerque (Merrigan, 1995), Stuttgart (Groll, 1997), Tokyo (Maezawa, 1999).

Heat pumps and refrigerators Conferences such, as Stockholm (Wettermark, 1980), Paris (CEC, 1985), Tokyo (Watanabe, 1991), Paris (Meunier,1992), New Orleans (Redermacher, 1994), Montreal (Nikanpour, Hosatte, 1996), Munich (Ziegler, 1999).

Minsk International Seminars (1993, 1995, 1997, 2000) are a middle size designed scientific meetings oriented on beneficial application of heat pipes in sorption machines. The main goal of Minsk Seminar is to combine efforts of heat pipe specialists and sorption machines specialists to solve the problem of heat and mass transfer enhancement in nature friendly heat pumps, refrigerators, heat exchangers and to improve the ecology of our planet and reduce the energy consumption. The second important problem to solve is the electronic equipment thermal control (computers, Telecom systems, space environmental two-phase thermal control technology, et.).

The first reason to this activity with Minsk Seminar foundation was a USSR patent pending No. 174411 "Heat Pipe" (B. I. 24, 30.06.1992). This device combines the enhanced heat and mass transfer in conventional heat pipes with sorption phenomena of sorbent bed inside it. It means, that this device could be used as a sorption machine element and be cooled and heated as a heat pipe.

The 4th Minsk Seminar Proceedings incorporate 50 papers, including 8 invited lectures. Approximately 60 participants attended this Seminar , representing 17 countries, such as:
Russia, Belarus, Ukraine, USA, France, Germany, Holland, Canada, South Africa, China, Korea, Japan, India, Czech Republic, Poland, Lithuania.

The contributions were presented as oral lectures, or as posters. If you compare the discussions from the meeting in 1993 (First Minsk Seminar) with today program you may be amazed how modest the progress is: solid sorption machines still are said to be at the edge of breakthrough and need to be competitive to mechanical vapor compression heat pumps and refrigerators. But heat pipe technology progress for today is evident - miniature heat pipes are used in 80% of Notebook Pcs produced in millions in the world.

Heat pipe technology in the near future will be a good opportunity to change the sorption chillers technology and improve its performance. The most

important change in this field is sorption machines efficiency, compactness and reliability. Unfortunately till now sorption heat pumps and refrigerators are considered as a niche technology not so well known for the engineers. Therefore not only the industry, but academia also is responsible of future progress in this area. We believe that such a way of dealing with scientific matters will promote personal contacts, extremely needed for scientists and engineers from East and West European countries and the world leading countries.

Leonard L. Vasiliev,
Seminar Chairman,
September 2000,
Minsk, Belarus
E-mail : lvasil@ns1.hmti.ac.by

Report on CHISA 2000 Congress, Symposium on Computational Fluid Dynamics (CFD) 14th International Congress of Chemical and Process Engineering,

by Juraj Kosek, Dalimil Šnita

The CHISA 2000 congress was organized by the Czech Society of Chemical Engineering. The congress was composed of 9 general topics and 10 specialized symposia. One of these was Symposium on Computational Fluid Dynamics whose aim was to review the latest developments and to provide a stimulating atmosphere for critical and research initiatives.

The title of the plenary lecture presented by Prof. H. Van den Akker from Delft University of Technology, Netherlands was "Computational fluid dynamics: more than promise to chemical engineering". By virtue of recent dazzling growth in computer power, the description of chemical engineering problems in local terms by means of Computational Fluid Dynamics has become quite feasible. In the plenary lecture, the state of the art of CFD was presented and illustrated with sample flow fields obtained via various types of CFD. The relevance of such simulations for the chemical engineer was demonstrated for a number of cases (e.g., chemical reactors, cyclones, crystallizers). The CFD is thus becoming the essential tool of chemical engineering.

More than 20 oral and a number of poster presentations at the Symposium on CFD compromised the following main topics:

· General papers
· Mixing processes
· Multiphase reactors
· Heat and mass transport
· Applications to reaction engineering
· Microfluidics
· Turbulence applications
· Viscous flows

The lectures at the Symposium on CFD raised a stimulating discussion on interesting problems, for example:

·Large eddy simulations for industrial flows,
·Dynamic simulations of multiphase flows in bubble column reactors,
·Influence of dispersed solid phase on flow field in jet loop reactors,
·CFD calculations of two-phase flow on elements of structured packing,
·Application of the Euler/Lagrange approach to liquid-solid flows in stirred vessels,
·CFD simulations of particle distribution in an unbafled high-aspect ratio stirred vessel,
·Verification of CFD predictions by tracer experiments,
·Estimation of oxygen mass transfer in activated sludge aeration tanks by CFD modeling,
·Simulation of turbulent mixing in precipitation reactors,
·CFD predictions of gas explosions in a baffled, vented enclosure,
·Prediction of flow profiles in rotating basket reactor, etc.

More than 1100 participants and more than 1200 papers have been registered at CHISA 2000. The full texts of all lectures and posters submitted to the CHISA 2000 congress were distributed to all participants on the CD-ROM. The next international CHISA congress will be held in 2002 in Prague.

Juraj Kosek, Dalimil Šnita
Scientific secretaries, Symposium on CFD
Department of Chem. Engineering,
Prague Institute of Chem. Technology,
Technicka 5, 166 28 Prague 6,
Czech Republic

Report on the 1st JSMF Annual Meeting July 13-14, 2000, Sendai, Japan

by Toshiaki Ikohagi

The first JSMF Annual Meeting was held by the Japanese Society for Multiphase Flow, in Sendai, Japan, July 13-14, 2000. This national meeting was first organized jointly with the 19th Multiphase Flow Symposium 2000 which has took place every year under the sponsorship of Science Council of Japan. The meeting gave multiphase flow scientists, engineers and students an opportunity to get together for discussing the wide range of multiphase flow problems and for promoting the interchange of recent information and new ideas.

The meeting was attended by 228 participants. Total 122 oral presentations were made in 6 organized sessions, 1 symposium session and 8 general sessions. The 2nd JSMF Annual Meeting will be held in July 12-13, 2001 and Prof. S. Yuu, Kyushu Institute of Technology, will organize it.

The followings are the contents of the 1st JSMF Annual Meeting and the 19th Multiphase Flow Symposium.

Prof. Toshiaki Ikohagi
Tohoku University
Inst. of Fluid Science
E-mail : ikohagi@ifs.tohoku.ac.jp

Report on the 4th Int. Conf. on Supercomputing in Nucl. Applications. September 4-7, 2000, Tokyo, Japan

by Tadashi Watanabe

The fourth international conference on supercomputing in nuclear applications (SNA2000) was held in Tokyo, Japan, on September 4-7. The objective of the conference was to present the newest research results using numerical simulations in a wide variety of scientific and engineering fields, and to promote and encourage the introduction of computing technologies to research and development fields. Twelve oral sessions and two poster sessions were included in the conferece: High Performance Computing Infrastructre I,II,III, High Performance Computing Hardware, Reactor Engineering I,II, Material Science and Bioscience I,II, Fluid and Structural Engineering I,II, Environmental Science, and Radiation and Photon Science and Basic Research Fields. There were 16 invited talks, 30 oral presentations, and nearly 40 poster presentations. Among them, 15 presentations were related to fluid engineering: 4 for the plant analyses, 3 for turbulent flows, 2 for CFD-code analyses, 2 for fluid-structure interactions, 2 for basic two-phase flow analyses, 1 for sodium combustion, and 1 for reactive flows. There were 5 oral presentations for fluid engineering as follows.

In the invited talk entitled "Overview of the Simulation System 'IMPACT' for Analysis of Nuclear Power Plant Thermal Hydraulics and Severe Accidents," the development of the code system for analysing thermal-hydraulic phenomena during accidents of reactors was presented by Dr. Naitoh of NUPEC. In two presentations, the Star-CD code was used for detailed calculations in the core: one was for sub-channel analyses of PWR entitled "High Fidelity Thermal-Hydraulic Analysis Using CFD and Massively Paralle Computers" by the ANL group in US, and the other for design calculations of the accelerator driven system entitled "Large scale numerical simulations for the design of the Energy Amplifier Demonstration Facility" by CRS4 group in Italy. The development of the code system for analyses of sodiumcombustion entitled "Numerical Methodology for Sodium Combustion Evaluation of Fast Reactor" was presented by Dr. Yamaguchi of JNCRI. The development of the thermal-hydraulic code was reported in two presentations: one was for industrial large eddy simulations entitled "PRICELES: A Development Platform for Industrial Large Eddy Simulations" by the CEA group in France, and the other for reactive flow solver codes entitled "Reactive Flow Simulations in Complex Geometries with High-Performance Supercomputing" by the FZJ group in Germany.

In nuclear related fluid engineering fields, large scale numerical simulations using supercomputers or clusters are widely performed including parallel computations and graphics. The research area is ranging from detailed flow structures in two-phase and turbulent flows to complicated phenomena and plant dynamics during sever accidents. Numerical simulations are already one of the important technologies and will be more and more important for flow analyses in nuclear applications.

Dr. Tadashi Watanabe
R&D Group for Numerical Experiments
Japan Atomic Energy Research Institute
watanabe@sugar.tokai.jaeri.go.jp

Report on the 3rd International Symposium on Turbulence, Heat and Mass Transfer April 3 - 6, 2000, Nagoya, Japan.

by Y. Nagano

Symposium Co-Chairs:Prof. Y. Nagano, Nagoya Institute of Technology, Japan, and Prof. K. Hanjalic, Delft University of Technology, The Netherlands

The 3rd International Symposium on Turbulence, Heat and Mass Transfer was held from April 3 to 6, 2000, at the Nagoya Trade and Industry Center (Fukiage Hall), Nagoya, Japan. This triennial Symposium sought to continue the tradition established earlier in Lisbon, Portugal (1994) and Delft, The Netherlands (1997), in providing a forum for scientists and engineers from academia and industry who are active in the research of turbulence phenomena related to heat and mass transfer. The Symposium aimed to gather specialists in the field to present the state-of-the-art and recent progress, to exchange ideas and to discuss current problems, future needs and prospects. Major topics and new trends were introduced through the keynote lectures given by internationally recognized authorities.

We have published the monograph which covers different facets of the broad field: (1) Experiments and theories which elucidate the role of turbulence and its structure in the mechanisms of heat and mass transfer; (2) New experimental techniques for turbulent flow and heat/mass transport measurements; (3) Turbulence, heat and mass transfer in stagnation and recirculating regions, around separation and reattachment, and in rotating flows; (4) Unsteadiness and transients in turbulent heat and mass transfer; (5) Heat transfer augmentation by turbulence control; (6) Turbulence in two-phase flows: effects of turbulence in particulate, droplet and film heat and mass transfer; (7) Turbulence, heat and mass transfer in combustion and other reacting flows; (8) Direct numerical simulation, and large eddies and subgrid-scale modelling of turbulence, heat and mass transfer; (9) Turbulence modelling for forced and natural turbulent convection; (10) Environmental turbulence; and (11) Turbulence, heat and mass transfer in special applications such as automobile and aircraft.

We received more than 150 abstracts. In view of the scheduled time allowed for presentation of papers in the Symposium, we reluctantly limit the number of papers to 117, including five keynote lectures. All the submitted papers were reviewed by members of the Scientific Advisory Committee and Organizing Committee, as well as by some other experts in the field, to whom we would like to express our thanks and appreciation. The selection of the papers was made on the basis of quality and scientific impact, as well as the relevance of the topic to the Symposium themes. As in the previous Symposia, some interesting papers had to be declined to meet the latter criterion.

This series of Symposia has been organized in cooperation with the International Centre for Heat and Mass Transfer (ICHMT). The organization of the Symposium and publishing of this monograph were supported by the Nagoya Institute of Technology, Nagoya City and the Ministry of Education, Science, Sports and Culture of Japan. The support of the following companies is also acknowledged: Chubu Electric Power Co. Inc., Denso Corporation, Kobe Steel Ltd., Mitsubishi Heavy Industries Ltd. (Air-Conditioning & Refrigeration Machinery Works), Software Cradle Co. Ltd., Toenec Corporation, Toho Gas Co. Ltd., Toyota Central R&D Labs. Inc., and Toyota Motor Corporation. Finally, Ms. Yuko Suzuki and Mr. Hirofumi Hattori deserve special thanks for looking after numerous organizational and communication tasks.

Prof. Y. Nagano
Nagoya Institute of Technology
Graduate School of Engineering
Environmental Technology & Urban Planning
E-mail : nagano@heat.mech.nitech.ac.jp

A Note from the Editor

- Members, who have paid the membership fee but did not send their Biographical Question-naire, please send the Questionnaire to the Editor as soon as possible.
- Members, who have sent the Biographical Questionnaire but did not pay the membership fee, should pay the fee to ICeM.
- The annual membership fee is \3,500 (Japanese yen) (\1,500 for members of the Japan Society of Multiphase Flow (JSMF)); the fee for 3 years (2000-2002) is \10,000 (\4,500 for members of JSMF).
- ICeM will send the membership card and the receipt of membership fee for those who pay the fee.
- The ICeM Newsletter is published twice a year and the next issue will be published in October 2000.
- Space may be bought in the Newsletter for advertisements. Please contact the Editor for details.

Report on the ASME-ZSITS International Thermal Science Seminar 11 – 14 June, 2000, Bled, Slovenia

by Arthur E. Bergles

The ASME-ZSITS International Thermal Science Seminar (ITSS), co-sponsored by the American Society of Mechanical Engineers (ASME) and by the Association of Mechanical Engineers and Technicians of Slovenia (ZSITS), was held in Bled, Slovenia, 11 – 14 June, 2000. The seminar was also co-sponsored by the International Institute for Refrigeration, Commission B1 (IIR/B1), and by the International Centre for Heat and Mass Transfer (ICHMT).

The ITSS offered an international exchange of recent advances in experimental work, theory, design, applications and technology of thermal sciences. About 80 scientists from 30 countries presented their work in two parallel sessions, performed on the following topics: Fundamentals; Numerical; Energy Systems; Phase Change; Measurement; Enhanced Heat Transfer; Equipment; Heating, Refrigerating & Air Conditioning; and Environmental. 10 keynote lectures were contributed by acknowledged experts in the field (C. Amon, A. Bejan, D. Didion, D. Gorenflo, D.B.R. Kenning, J. Meyer, R. A. Nelson, P. Novak, M. Ohadi and I. Zun). During the seminar a Round Table was organized on the Thermal sciences aspects of renovation and development of the south eastern European region (moderated by E. Ganic).

The ITSS was set up to confirm that thermal science is still of vital importance in this complex world. In some circles, thermal science, particularly heat transfer, is considered “mature”. The presented papers indicated that, if anything, thermal science is still on the upswing of the classical S-shaped curve. New knowledge is constantly being generated and applied to problems ranging from absorption refrigeration systems to zeotropic mixture phase change.

The ITSS came at a time when electronic proceedings and virtual meetings are becoming the norm. The whole technical publishing situation is very fluid. The co-chairs had elected to have an actual meeting with paper proceedings – prepared before the meeting. To defer to the new situation a disk containing all the material in the volume was also available. The success of this undertaking is tested by approximately 80 papers. Further, the Standard Nomenclature was specified, recently adopted by the major worldwide thermal science journals.

Many papers were concerned with experimental resolution of thermal science problems. Hence it is appropriate and in keeping with our view that the craft of experimentation must be maintained and selected papers on experimental studies will be published in a special issue of the Experimental Thermal and Fluid Science journal.

Editors:
Arthur E. Bergles
Rensselaer Polytechnic Institute
Troy, New York

University of Maryland
College Park, Maryland

Massachusetts Institute of Technology
Cambridge, Massachusetts
e-mail: abergles@aol.com

Iztok Golobic
University of Ljubljana
Ljubljana, Slovenia
e-mail: Iztok.Golobic@uni-lj.si

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.

All Correspondence Concerning

News items of general interest to ICeM members, notice of future meetings and conferences, personal news items, new books, etc. should be addressed to the editor or to regional corresponding members. It will be very helpful if any manuscripts proposed for publication are sent by E-mail.

Report on the Euro Conference New And Renewable Technologies For Sustainable Development
26-29 JUNE 2000, Madeira Island, Portugal
Organised by IST - Technical University of Lisbon

by Maria da Graça Carvalho

This International Conference aimed at bringing together experts in various fields of scientific and economic development which should merge efforts in the understanding of the sustainable development concept and technological implications. Presentations featured issueas such as energy systems, renewable resource exploitation, and the engineering design and optimization for minimum resource consumption.

The Euro Conference was sponsored by the European Comission (DG RTD, Human Potential Programme, High-Level Scientific Conferences, Contract No. HPCF-CT-1999-00177), Instituto Superior Técnico (Technical University Of Lisbon), Fundação para a Ciência e a Tecnologia, Governo Regional da Madeira and EEM - Electricity Company of Madeira.

The Conference was held at the Savoy Hotel, in Funchal, Madeira Island.
The invited lectures were:

- "Sustainability Assessment of Renewable Energy Systems", N. Afgan, M. G. Carvalho, Instituto Superior Técnico (Technical University of Lisbon), Portugal, and N. Hovanov, St. Petersburg State University, Russia
- "Design and Optimisation of Forced Convection Heat Sinks for Sustainable Development", A. Bar-Cohen, S. Prstic, K. Yazawa and M. Iyengar, University of Minnesota, USA
- "Constructal Optimisation of Tree-Shaped Paths for the Collection and Distribution of Fluid, Electricity, Goods and People", A. Bejan, Duke University, USA
- "Advantage of the Renewable Energies at Madeira Island - Electrical Power Production", M. J. Fernandes, A. Figueira and J. Cotrim, EEM - Empresa de Electricidade da Madeira, S.A., Portugal
- "Photovoltaics R & D: A Tour through the 21st Century", L. Kazmerski, National Renewable Energy Laboratories, USA
- "The EC's Human Potential Programme - Funding Possibilities and Background Information", H. Morsi, European Commission
- "An Overview of Gas Turbine Technologies for Power Generation in Europe", P. A. Pilavachi European Commission
- "Energy Research within the Fifth Framework Programme of the European Union", P. A. Pilavachi, European Commission
- "Suitability of Metallic Materials for Inter-connections in Solid Oxide Fuel Cells", W. Quadakkers, IWV Jülich, Germany

After the Opening Ceremony with the presence of the President of the Regional Government of Madeira, Dr. Alberto Joao Jardim, opening lectures followed in the next days. Technical sessions were as follows:

- Sustainable Assessment of Energy Systems I
- Sustainable Assessment of Energy Systems II
- Economic Assessment of Energy Systems I
- Economic Assessment of Energy Systems II
- Economic Assessment of Energy Systems III
- Solar Energy I
- Fuel Cells
- Biomass and Waste Energy I
- Solar Energy II
- Combustion I
- Biomass and Waste Energy II
- Geothermal and Ocean Energy I
- Combustion II
- Geothermal and Ocean Energy II

The Euro Conference had about 80 participants and due to its success, another edition is expected to take place in 2002. The web site will keep you informed:

http://navier.ist.utl.pt/renewables2000.

Professor Maria da Graça Carvalho
Instituto Superior Técnico
Technical University of Lisbon
Mechanical Engineering Dept.
Pav. Mecanica 1, 2nd floor
Av. Rovisco Pais
1049-001 Lisboa
Portugal

Report on 5th Workshop on Transport Phenomena in Two-phase Flow
Sept. 6-11, 2000, Pamporovo, Bulgaria

by DSc Christo Boyadjiev

The 5th Workshop on Transport Phenomena in Two-phase Flow held on Sept. 6-11 2000 in the Pamporovo resort, Bulgaria (Chairman Prof. Chr. Boyadjiev, Bulgaria).

The conference program included more than 25 (authors from 10 counties) presentations covering a broad of problems of two-phase flows:

- ·Non-linear mass transfer
- ·Marangoni effect Liquid-liquid two-phase flow
- ·Gas-liquid flow in micro channels
- ·Wave phenomena and coherent structures Combustion and heat transfer phenomena Rheology of fine suspensions and sedimentation
- ·Gas-solid fluidized beds

The discussions allowed a fruitful exchange of information among leading specialists in different areas of two-phase flow transport phenomena.

Two jubilee sessions dedicated to the anniversaries of leading scientists supporting the event during the last 4 years (Prof. Markatos, Greece; Prof. S. Alekseenko, Russia) were performed.

➢The new book " Non-linear mass transfer and hydrodynamic stability", Chr. Boyadjiev and V. Babak , Elsevier, Amsterdam, 2000 was presented at a special session.

➢The following list presents the contents of the proceedings.

- ·A.ULLMANN, M. ZAMIR, Z. LUDMER AND N. BRAUNER, Effects of tube inclination on the flow pattern and the performance of phase transition extraction columns
- ·CHR. BOYADJIEV, On the mechanism and kinetics of the transport processes in systems with intensive interphase mass transfer. 3. Comparative analysis of the absorption and desorption rates
- ·B. BOYADJIEV, CHR. BOYADJIEV, on the mechanism and kinetics of the transport processes in system with intensive interphase mass transfer4. Effect of The Interface Concentration
- ·O.YU. TSVELODUB, A.A BOCHAROV, Spatial Wave Regimes on a Liquid Film Flowing Over a Vertical Cylinder
- ·R. I. NIGMATULIN, The Resonant Supercompression and Sonoluminescence of a Gas Bubble in a Liquid Filled Flask
- ·SERIZAWA, Z. FENG, Two-Phase Flow Patterns in Ultra-Small-Channels
- ·K.G.ANISIMOV, D.A. BOROZDENKO, V.V.KONOVALOV, A.V.MOTORIN, V.I.VOLKOV , The Research of Spectrum Characteristics of Flow and Ressure Distribution in Bounded Packed Bed
- ·ANISIMOVA., V.I VOLKOV. S. ISTOMINA,, V.V. KONOVALOV, A.V MOTORIN., N.?. ROGOZNIKOVA., I.A. ZAGORODSKIH A Study on Liquid Filtration in Capillaries
- ·G. SIMEONOV, S. SLAVTCHEV, Liquid film falling down a non-uniformly heated wall. Integral method approach
- ·E. P. KERAMIDA, N. C. MARKATOS , Numerical modeling of radiant heat attenuation through water mist
- ·N.C.MARKATOS, Two-Phase Flow in Thermosyphon Reboilers
- ·Y. SHTEMLER, M. LEVITSKY, Hydraulic Theory for Double-Nozzle Vortex Chambers
- ·Y. SHTEMLER, I. SHREIBER, M. HERSKOWITZ, E. GELMAN , Bubbly Liquids Filtration Through Fixed Beds
- ·YA. IVANOV, V. KAVARDJIKOV, D. PASHKOULEVA, Influences on the Velocity Profile of Disperse Systems' Flow
- ·E. TOSHEV , B.HRISTOV, Monte-Carlo Numerical Simulation of Sedimentation
- ·S. ALEKSEENKO, D. MARKOVICH , Coherent Structures in Thermophysics and Hydroaerodynamics
- ·M. DOICHINOVA, CHR. BOYADJIEV, Mass transfer in opposite-current flow 1. Linear theory
- ·M.DOICHINOVA,CHR. BOYADJIEV,Mass Transfer in Opposite-Current Flow. 2.Non-linear theory
- ·CH. KARAGIOZOV, M. LOZANOVA, Hydrodynamics in Two Liquid Films - Effect of The Properties
- ·A. BOCHKAREV, V. I. VOLKOV , Stokes Flow In A Boundary Layer
- ·V. GIRENKO, J. HRISTOV , Magnetic Stabilization of Admixtures
- ·S. OKA, How to Implement Scientific Results in Practice?
- ·V.N. BABAK , Non-steady two-phase chemosorption with irreversible chemical reaction of the first order in the liquid phase

➢Copies of the proceedings are available upon request to Prof. Chr. Boyadjiev (chboyadj@bas.bg)

Report on 8th International Conference on Nuclear Engineering (ICONE-8) April 2-6, 2000, Baltimore, Maryland, U.S.A

by Michitugu Mori

The 8th International Conference on Nuclear Engineering (ICONE-8) co-sponsored by the American Society of Mechanical Engineers (ASME), the Japan Society of Mechanical Engineers (JSME) and the Societe Francaise Energie Nuclear (SFEN) was held on April 2-6, 2000, at Hyatt Regency Hotel in Baltimore, Maryland, U.S.A. The number of the registered participants in this big conference totaled about 650 as shown in TABLE 1, almost the same as the figure registered in the previous conference, ICONE-7, held in Tokyo (656). Of this total, ~340 came from the U.S.A., ~132 from Japan, ~55 from France, and others from 27 countries. The conference was composed of 152 technical sessions, 16 plenary sessions and invited speakers' sessions, and five student program sessions, as shown in TABLE 2. Of about 70 plenary lectures and invited speakers' lectures, 12 lectures were given by Japanese participants.

The opening session was held with theme of "Nuclear Energy in the New Millennium," which was also the keynote theme of the conference.

During the opening session, the chairperson C. H. Poindexter, Chairman, President & CEO, Constellation Energy Group, U.S.A., gave the opening address, in which he stated that the Calvert Cliffs nuclear power station is expected to be given a renewed operation license for the first time in the U.S.A., and such cases are expected increase from now on, and that the electric utility industry in the U.S.A. is trying to maintain and increase its competitiveness by the advantage of economies of scale through consolidation and alliance, and selling and buying of power plants. From Japan, the honorary chairperson Tomono, Senior Fellow of Tokyo Electric Power Co., Inc., stated that nuclear power plays a significant role in Japan as it now accounts for one-third of the total electricity generated in the country. Commenting on the JCO criticality accident, chairperson Tomono also said that it is necessary for engineers engaging in the nuclear world not only to promote advance in technology but also to keep their responsibility and contribution to the society in mind for their challenges in the New Millennium, and that it is necessary to learn and make good use of the lessons learned from the accident.

The speakers of France, H.Machenaud, the Construction Manager, EdF, stated that the energy self-sufficiency of France is now recovering largely because of nuclear power generation and nuclear power generation continues to be an important energy source in the future, that it is necessary to always continue to trace the fields of research and development, construction and operation in order to promote nuclear power generation in a sound manner, and that the EPR now being jointly developed by Siemens and FRAMATOME plays an important role in making up for the fields of inadequate research and development, and construction in recent years. During other plenary and invited panel sessions, speakers talked about cost reduction efforts related to operation, maintenance and construction of power plants, deregulation, MOX utilization, low-level radiation, PA, etc.

During the technical sessions in ten tracks, about 700 presentation were given, including 35 student programs, and there were active discussions about operation and maintenance, equipment reliability, materials, structures, quake-proof engineering, authorization and licensing renewals, decommissioning and decontamination of reactors, safety assessment, next-generation reactors, thermal-hydraulics, fundamental technology, fuel cycles, technical standards and criteria, regulations, etc. The next conference, ICONE-9, is scheduled to be held on April 8-12, 2001 in Nice, France.

Dr. Michitugu Mori
Nuclear Power R&D Center
Tokyo Electric Power Company
E-mail : mori-mcy@rd.tepco.co.jp

TABLE 1. Number of the registered participants

Country	Number of Registration
Argentina	1
Austria	2
Belgium	6
Brazil	2
Canada	13
Finland	6
France	55
Germany	24
Hungary	3
India	1
Israel	1
Italy	7
Japan	132
Kazakhstan	1
Korea	15
Lithuania	1
Netherlands	3
Republic of China	1
Russia	6
Slovenia	2
Spain	8
Sweden	9
Switzerland	7
Taiwan	2
Turkey	1
UK	5
USA	340
TOTAL	654

TABLE 2. Number of the Presentation

Opening Session Plenary Session Invited Panel Session Concluding Plenary Session	71
TRACK1: Plant O&M	76
TRACK2: Major Component Reliability & Materials Issue	66
TRACK3: Structural Integrity, Dynamic Behavior & Seismic Design	42
TRACK4: License renewal, life Extension, Decommissioning & Decontamination	26
TRACK5: Safety, Reliability & Plant Evaluations	82
TRACK6: Next Generation Systems	52
TRACK7: Thermal Hydraulics	164
TRACK8: Basic Nuclear Engineering Advances	77
TRACK9: Nuclear Fuel Cycle, Spent Fuel & Radwaste Management	46
TRACK10: Codes, Standards, & Regulatory Issues	48
Student Program	35
TOTAL	785

Report on IV Minsk International Heat And Mass Transfer Forum May 22-26, 2000, Minsk, Belarus

by Iosif Gurevich

Organizers of the Forum: National Academy of Sciences of Belarus, State Committee on Science and Technology of the Republic of Belarus, Ministry of Education of the Republic of Belarus, Belarusian State Power Engineering Concern "Belenergo", A.V.Luikov Heat & Mass Transfer Institute of the National Academy of Sciences of Belarus, Department of the Physical and Technical Problems of Power Engineering of the Russian Academy of Sciences, National Committee for Heat and Mass Transfer of the Russian Academy of Sciences, Ministry of General and Professional Education of the Russian Federation, Institute of Engineering Thermophysics of the National Academy of Sciences of the Ukraine, International Center for Heat and Mass Transfer.

On the threshold of the new century the Forum has been aimed at discussion and critical evaluation of the advances in the field of heat and mass transfer and determination of tasks for the future.

The Forum included the Opening and Closing Plenary Sessions, the work of 11 sections with oral and poster papers, and round tables.

Of ten plenary reports of the highest interest were "Problems of Heat and Mass Transfer in Atomic Power Engineering in the 21st Century", Self-Organization and Dynamic Chaos. Problems and Tasks", "Heat and Mass Transfer in Capillary-Porous Bodies (Results and Problems)".

The Program of the Forum covered 557 section reports and communications, including: 87 pertaining to the Section "Convective Heat and Mass Transfer", 36 to "Radiative and Combined Heat Transfer", 78 to "Heat Conduction and Problems of Heat Exchange Optimization", 48 to "Heat and Mass Transfer in Chemically Reactive Systems", 73 to " Heat and Mass Transfer in Two-Phase Systems (including phase changes)", 40 to " Heat and Mass Transfer in Disperse Systems", 34 to " Heat and Mass Transfer in Rheological Systems", 31 to " Heat and Mass Transfer in Capillary-Porous Bodies", 30 to " Heat and Mass Transfer in Drying Processes", 69 to " Heat and Mass Transfer in Power Plants", 31 to " Heat and Mass Transfer in Chemical-Technological Apparatuses".

In the course of the Forum four round tables took place, namely: "Combustion and Chemical Technologies in the 21st Century", "Heat Pumps", "Heat and Mass Transfer in Biological Systems", "Heat/ Mass Exchange and Ecology".

Prior to the Forum, the Proceedings of the Forum in 11 volumes in the original language and the Book of Abstracts in the English language have been published. The latter can be found in Internet: www.itmo.by/forum/forum7/annotati.html

The plenary and invited keynote papers and round-tables discussions will be published in the special issue of the "Journal of Engineering Physics and Thermophysics" ("Inzhenerno-Fizicheskii Zhurnal"), Vol. 74, No 4, 2001.

Dr. Iztok Golobic
University of Ljubljana
E-mail : iztok.golobic@Uni-Lj.si

Report on DROP-SURFACE INTERACTIONS, Advanced School and Workshop Coordinated by M. Rein, DLR, Germany

by Martin Rein

Drop-Surface Interactions was the topic of an Advanced School and a Workshop held at the International Center for Mechanical Sciences (CISM) in Udine, Italy, from July 17-21, 2000. The lectures of the course were given by well-known experts, namely, M. Lesser (Royal Institute of Technology, Sweden), H.N. Oguz (The Johns Hopkins University, USA), D. Poulikakos (ETH Zürich, Switzerland), A. Prosperetti (The Johns Hopkins University, USA and University of Twente, The Netherlands), M. Rein (DLR, Germany) and M. Vignes-Adler (LPMDI, University of Marne-la-Vallée, France). The participants were postgraduates, postdocs, mechanical and chemical engineers, and material scientists of universities, research institutions and industrial development departments. The Advanced School on Drop-Surface Interactions was combined with a Workshop which was held in the late afternoons. The workshop provided a platform for presenting and discussing recent results of the participants in a lively environment. In this manner an excellent exchange of ideas was attained.

Practically all aspects of drop-surface interactions were addressed within both the course and the workshop. Initially, a thorough overview of both fluid mechanical and thermodynamic phenomena of drops interacting with liquid and solid surfaces was provided. Emphasis was laid on distinguishing between different impact scenarios and on the conditions under which certain phenomena such as splashing and spreading occur. The importance of scaling was stressed and characteristic non-dimensional numbers were introduced. In addition to the inertia of the approaching drop and to the surface tension of the liquid, also the compressibility, the viscosity and interfacial phenomena were shown to be of great importance. Fur-

thermore, heat transfer and phase change phenomena were extensively discussed. The physical background of these aspects were introduced and methods for modelling drop-surface interactions both theoretically and numerically, were presented. In particular, the formation of shock waves both in liquids and solids, cavitation, vorticity generation, sound emission and air entrainment by impinging drops were covered. Furthermore, physicochemical aspects such as the role of surfactants for the wetting behavior of drops and the hysteresis of contact angles have been treated in detail. On the thermodynamic side the dynamic Leidenfrost phenomenon, non-equilibrium conditions during the solidification of drops and the heat flux singularity at molten contact lines were considered. Finally, an overview of numerical algorithms for free-surface flows was presented with a particular emphasis on boundary integral formulations and front tracking methods.

CISM´s Palazzo del Torso served as an ideal environment for both, the Advanced School and the Workshop. Within the breaks lively discussions among the participants and the lecturers took place.The material presented in the course provides a comprehensive picture of the present understanding of drop-surface interactions. It will be published by CISM and distributed as a text book by Springer-Verlag Wien New York.

Dr. Martin Rein
Univ.Doz.
DLR-Institute of Fluid Mechanics
Tel: +49 - (0)551 7092671
Fax: +49 - (0)551 7092806
E-mail: martin.rein@dlr.de

Report on The 3rd Israeli Conference for Conveying and Handling of Particulate Solids May 29-June 1, 2000, Dead Sea, Israel

by Gabriel Tardos

The conference took place at the Grand Nirvana Hotel at the Dead Sea in Israel during May 29-June 1, 2000 and was jointly organized with the 10th International Freight Pipeline Society Symposium. The conference was chaired by Dr Haim Kalman and Co-chaired by Dr Avi Levy, both from the Department of Mechanical Engineering at the Ben-Gurion University of the Negev. They were assisted by an Israeli based Organizing Committee representing Israeli industry and academia and by an International Advisory Board with seventeen members from ten countries. An exhibition featuring Powder Technology instrumentation and equipment accompanied the conference. The main sponsors included the three major technical universities in Israel, Ben-Gurion University of the Negev, Technion-Israel Institute of Technology and Tel-Aviv University, the US National Science Foundation, five Powder Technology societies including the Powder Technology Forum (PTF) of the AIChE and nine private corporations.

The conference had more than 210 participants from 21 countries. Most participants from abroad were from Germany (19), USA (17), UK (14) and Japan (12). A total of 19 invited Plenary and Keynote lectures, 84 technical oral presentations and 38 technical posters were presented during the three days of the conference. In addition, four workshops, on several topics in the field of Powder Science and Technology, were held during the forth day followed by an industrial tour to the Dead Sea Works, Ltd.

The proceedings of the conference were edited by Drs H. Kalman, A. Levy and M. Hubert and contain two volumes with about 1010 pages with 146 full papers and eleven extended abstracts. Interested persons can obtain a copy of the proceedings or only individual papers by requesting them directly from the editor at E-mail Kalman@menix.bgu.ac.il or by Fax: (972)-7-647-2813. Selected papers from the proceedings will be published by Elsevier in a special volume.

The conference was opened by a plenary session in which Dr. Mike C. Roco, Program Director of Particulate and Multiphase Systems at the National Science Foundation in the USA, presented a thought provoking lecture on “Trends in Particle Science and Technology@. This was followed by industrial perspective presented by Dr. Karl V. Jacob from the Dow Chemical Company, President of the Powder Technology Forum of the AIChE. He spoke about “Particle Technology Past, Present and Future: The industrial perspective”. Individual Sessions were dedicated to all the important topics in Powder Science and Technology such as Powder Processing, Particle Characterization, Particle Breakage and Comminution, Mechanical and Pneumatic Conveying, Mixing and Segregation, Powder Storage, Size Enlargement and Agglomeration, Slurry Transport, Classification, Separation and Dust Control, and Drying. Each topic was then covered by an invited plenary or keynote speaker and several review and research papers. These topics are also reflected in the chapters of the proceedings. There were four parallel running sessions of 100 minutes each during all three days of the conference with poster sessions organized during all three days.

A typical response from a participant before the conference: “I have just received the Program for the 3rd Israeli Conference for Conveying and Handling of Particulate Solids. I must congratulate you for doing an absolutely marvelous job. You have been able to attract a very large number of papers, including both fundamental and applied industrial research topics, and involved people from academia,

industry, consulting and government from all over the world. The conference is becoming one of the, if not the, major events in particle technology. A very impressive job you have done!"

These are some excerpts of comments by several participants that largely represent the overall impression: "I just want to express my sincere appreciation to everybody concerned for all your efforts in organizing such an excellent conference. You went to enormous trouble to ensure that everything was arranged superbly on both the technical and social sides. Although it was a huge amount of work for you, I hope that you will keep on organizing this series of conferences. It was one of the best-organized that I have ever attended". And "I wish to say how very much we enjoyed the conference at the Dead Sea. It was an excellent conference and the hospitality was wonderful. We wish to congratulate you on the organisation of this important event and thank you very much for all your efforts in making the conference such an enjoyable and happy occasion".

Gabriel I. Tardos, Professor
Department of Chemical Engineering
The City College of the City University of New York
New York, NY,10031, U.S.A.

Report on the Engineering Foundation Conference Boiling 2000: Phenomena & Emerging Applications Anchorage, Alaska, 30 April 2000 - 5 May 2000

by Gian Piero Celata

The United Engineering Foundation has organized in the wonderful frame of Girdwood, Anchorage, Alaska, the fourth International Conference on Boiling, titled "Boiling 2000: Phenomena & Emerging Applications".

This Conference follows the first one held at Santa Barbara, USA, in March 1992 (Pool and External Flow Boiling), the second held at Banff, Canada, in May 1995 (Convective Flow Boiling) and the last one held at Irsee, Germany, in May 1997 (Pool and Flow Boiling).

A total of 33 papers have been presented out of the scheduled 44, plus 7 keynote lectures, with a final participation of about 60 people.

Although the participation has been less numerous than previous editions, both in papers presented and in attendees (maybe the very long trip to this very far but beautiful location in Alaska has prevented a higher participation), the 'Boiling 2000' Conference has matched any expectations which are typical of United Engineering Foundation Conferences: very specific topics, international leading experts attending, time available for discussion; high quality of the papers presented.

During the Conference participants had the possibility to:

•examine the scientific and technological state-of-the-art on pool and forced convective boiling;
•discuss the recent advances in boiling phenomena (new models, recent experimental data, new correlations, mechanistic models, binary mixtures, etc.);
•discuss the emerging applications in boiling (cooling of electronic components, microscale heat transfer, geothermal energy conversion, microgravity, fluoroinerts, etc.)
•identify the phenomenological techniques to extrapolate the knowledge on boiling and on two-phase flow towards new emerging applications.

Of special interest the keynote lectures, which are briefly summarized hereunder.

Geoff Hewitt has presented, with the usual skillness, some research themes which still represent challenges in boiling: he talked about entrainment and deposition rate in annular flow and multicomponent mixture boiling.

James Klausner gave a very complete state-of-the-art on the modeling of bubble detachment from the heated wall and on the analysis on the forces which play a relevant role in the bubble growth and detachment under various geometric and thermodynamic conditions.

Paolo Di Marco has presented an excellent survey on pool boiling research in microgravity, showing also the activity of the research group (coordinated by Prof. Walter Grassi) at the University of Pisa, Department of Energetics; which is a fore-running team in this advanced research topic.

Wataru Nakayama provided a survey of the cooling of electronic systems using boiling of fluids.

John Thome reported a very detailed updating of two-phase heat transfer modelling based on flow pattern. The talk has been based on an original and effective theoretical-experimental approach developed at the Federal Polytechnic Institute of Lausanne.

Satish Kandlikar presented an updating of he research on subcooled boiling CHF, also on the basis of what reported in the very recent Handbook of Phase-Change: Boiling & Condensation, edited by the speaker.

David Kenning talked on experimental methods to get local information on bubble nucleation (temperature fluctuation analysis and thermal excursions during bubble growth and detachment, etc.)

Contributing papers presented at the Conference have dealt with typical problems associated with the whole boiling process, from the onset on boiling up to the boiling crisis, and have been grouped in the following sessions: evaporative heat transfer, bubble characteristics in nucleate boiling, pool boiling heat

transfer, new applications, emerging areas, forced convective heat transfer, critical heat flux, boiling of binary mixtures.

The fifth edition of this Conference will be held in 2003 (date and place to be defined), the Conference Chair being Professor James Klausner, University of Florida.

The complete program of the Conference is still available in internet at the web site of the United Engineering Foundation: http://www.engfnd.org/pastconf/0aqpre.html

Gian Piero Celata
National Institute of Thermal-Fluid Dynamics
ENEA
Fax: +39-06-3048-3026
E-mail: celata@casaccia.enea.it

Report on the 38th European Two-Phase Flow Group Meeting Karlsruhe, 29-31 May 2000

by Gian Piero Celata

The 38th edition of the European Two-Phase Flow Group Meeting has been organized at Karlsruhe from May 29 to 31 by Prof. Ulrich Müller and Dr. Greet Jansenss-Maenhout, Institute für Kern-und Energietechnik, Karlsruhe.

A total of 53 people attended the Meeting, with some 30 papers presented. This is the standard size of this Meeting, which is characterized by the following features:

•informality: papers are brought in a sufficient number of copies by participants at the registration, thus representing the very last minute results of the research;

•discussion: this is a very important aspect of the Meeting which is held in plenary session for all presentations;

•possibility to learn and redirect research: presenting last minute results, it is possible from discussion with leading experts and other colleagues to get back with new information to possibly re-orient the research program; this is usually not possible at formal Conferences where, because of the publication of Proceedings, it is necessary to submit the paper almost a year in advance.

Participation at the Meeting is by invitation through the National delegates. Information about he European Two-Phase Flow Group Meetings is posted in Internet at :

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

The Meeting in Karlsruhe presented a very well balanced presence of people, in terms of young scientists and leading experts, and proved to be a very good 'round table discussion' of works in progress, with an interesting mixing of basic background and new enthusiasm.

The topics which papers presented have been grouped in are: boiling, condensation, numerical simulation, flow pattern transition, unsteady phase change, bubbly flow.

The complete list of papers presented is available in Internet at:

http://termserv.casaccia.enea.it/eurotherm/2000.html

where abstracts can be downloaded.

The Meeting has been closed with a plenary discussion chaired by Dr. Gian Piero Celata, where the general themes of the two-phase flow community have been debated. In particular, problems associated with funding of research from the European Union have been discussed, together with the interaction between experimental and theoretical research. This latter, being characterized by the availability of more and more powerful computers and low costs of investment, is tending to deal with more and more complex schematizations and calculations which require a more detailed and deepened experimentation for comparison and assessment. This, obviously, requires more funding and represents a technical challenge.

The 39th Meeting of the European Two-Phase Flow Group will be held at Aveiro, Portugal, from 17 to 20 June, 2001.

During the Karlsruhe Meeting, a group of people (Besnard, Celata, Delhaye, Giot, Hewitt, Schulenberg and Sehgal) founded a new European Scientific Institute, named EMSI (European Multiphase Systems Institute), which aims and objectives are:

promotion and fostering, through research, discussion and knowledge transfer, of multiphase systems understanding for various applications;

to encourage the creation of co-operative projects throughout European Countries, with strong connection with the European Union.

EMSI will be in Europe something similar to what IMuST is in the United States (http://crss.crss.ucsb.edu/imust/). Further detailed information will be given in the ICeM Newsletter as soon as EMSI will be operating.

Gian Piero Celata
National Institute of Thermal-Fluid Dynamics
ENEA
Fax: +39-06-3048-3026
E-mail: celata@casaccia.enea.it

Report on 5TH International Symposium on Heat Transfer (ISHT)' BEIJING August 12-16, 2000, Beijing, China

by Ru-Ji Wang

The 1st and 2nd International Symposiums on Heat Transfer' Beijing were held in 1985 and 1988. The International Scientific Committee then decided to hold the symposiums termly once every four years. The 3rd, 4th and 5th symposiums were also organized by Institute for Thermal Science and Engineering, Tsinghua University, and presided by Professor B.X. Wang in 1992, 1996 and 2000. The proceedings of the 1st and 2nd symposiums were published as Heat Transfer Science and Technology series by Hemisphere Publishing Corporation and the following ones published by Higher Education Press, Beijing. The series of ISHT' Beijing provided a valuable forum for the international exchange of information on new ideas, new methods and new developments in the field of heat transfer.

As we begin the new millenium, the rapid advances in processing techniques, the rapid accumulation of new knowledge, the impressive improvements in research capabilities and the importance of environmental factors have provided many opportunities for the research community as they face the challenges of the 21st century. It would be much valuable to have a new forum for exchanging information.

The 5th symposium, with the permission of Ministry of Education (MOE) and the financial supporting of NSF of China, was held as scheduled during August 12-16, 2000, at Xijiao Hotel in Beijing, where many universities and institutes such as Tsinghua University, Peking University and Chinese Academy of Sciences are located nearby. The proceedings included 8 invited keynotes and 125 general papers carefully selected from 152 submitted abstracts. The attendants came from 13 countries, namely Australia, Belgium, France, Germany, Japan, Korea, Portugal, Russia, Singapore, Sweden, UK and USA as well as China, mostly from other than the mainland of China. Most papers are involved in the fundamentals on two-phase flow, flow boiling and condensation, fluid flow and heat transfer in porous media, and associated application developments. Measuring and analyzing methods for heat transfer in microscale are also presented in this symposium.

Further information in details may contact with

Prof., Dr. David M. Christopher,
Thermal Engineering Department,
Tsinghua University, Beijing 100084,China
Email: Dmc@tsinghua.edu.cn,
Fax: +86-10-6277.0209

Report on 8th International Conference on PRESSURE SURGES Safe Design and Operation of Industrial Pipe Systems The Hague, The Netherlands: 12-14 April, 2000

by Catherine Cox

The 8th Conference in the Pressure Surges series, Safe Design and Operation of Industrial Pipe Systems , was held in The Hague, The Netherlands. In spite of a very full programme, with over 40 international presentations, 3 new sessions were successfully introduced to the programme.

The first was a panel session in which several authors were given just 5 minutes in which to present their findings, all in a related field, followed by a question and answer session. Congratulations were in order to the speakers who not only managed to put across their message succinctly but kept to time.

The second new feature allowed delegates the opportunity to present 'Work in Progress'. This introduced up to the minute data from on-going work which normally would not be included in the programme. Several delegates took the opportunity to present their findings.

The third innovation was an Open Discussion Forum where three controversial questions were posed to the audience prior to the conference. Bryan Karney from the University of Toronto led this lively session in a very able and entertaining manner.

A number of keynote speeches were given during the 2½ day conference. Fred Locher of Bechtel Corporation in the USA began the proceedings with his speech entitled 'Caution: Pressure Surges in Process and Industrial Systems May be Fatal'. This proved to be a very interesting and thought provoking presentation to open the Conference. Other keynote speeches given were: 'Rapid Expulsion of Entrapped Air Through an Orifice' by Sam Martin of Georgia Institute of Technology; 'Celebrations and Challenges – Waterhammer at the Start of the 20th and 21st Centuries' by Sandy Anderson, University of Newcastle upon Tyne; 'The Simulation of Time Dependent Flows Within Building Utility Services Systems' by John Swaffield, Heriot-Watt University, 'Advances in Unsteady Friction Modelling in Transient Pipe Flow' by Angus Simpson, University of Adelaide and 'FSI Research in The Netherlands' by Arris Tijsseling of Eindhoven University of Technology.

On a sad note, Hans Horlacher of the Technical

University of Dresden gave a moving speech in celebration of the life of Dr Harald Graze, formerly of the University of Melbourne. Dr Graze was well known and respected in the field of Surge Control and in particular by regular attendees of this Confererence and will be sorely missed.

To complement the Technical sessions, the delegates were able to enjoy some relaxation time, an opportunity to renew friendships and make new ones at the drinks reception (sponsored by Goodwins International Limited) and at the conference dinner. The highlight of the latter was the presentation of light-hearted conference 'awards' after the meal.

The planning of the 9th Conference will soon be underway and potential delegates and presenters should contact BHR Group to ensure they receive information in due course.

Dr. Catherine Cox
BHR Group, The Fluid Engineering Centre
E-mail : ccox@bhrgroup.co.uk

Report on the 2nd Japanese-European Two-Phase Flow Group Meeting
September 25-29, 2000, Tsukuba, Japan

by Goichi Matsui, Iztok Zun and Gian

The Second Japanese-European Two-Phase Flow Group Meeting was held in Tsukuba, Japan, two years after the first meeting in Portoroz, Slovenia. The meeting attracted over 70 participants from 13 different countries. The main aim of the meeting was to promote the information exchange and/or collaboration between European Two-Phase Flow Group and Japanese two-phase flow scientists and engineers. The total number of invited contributions was 51, 17 from Europe. Among those, there were 5 joint European-Japanese or Japanese European papers. The following countries formally participated at the Tsukuba Meeting: Austria, Czech Republic, France, Germany, Italy, Japan, Portugal, Slovenia, Sweden, Switzerland and UK. The scientific content of the meeting was divided in the following topics: Boiling and Heat Transfer (10 papers), Measurement (10), Bubble and Turbulent Diffusion (3), Numerical Simulation (9), Flow Pattern (3), Dispersed Flow (8), Stratified Flow (2), Control and Environment (3) and Applications (3). The titles of papers suggest that two-phase flow research grows in new directions. The trends are remarkable in the fields of measurement, simulation and application. The abstract volume was distributed in the meeting but the proceedings of the meeting are printed on CD-ROM after the meeting. The total number of participants and contributions increased and the meeting was active and fruitful. Moreover, the useful interchange in various senses was promoted during the meeting.

The organizers are fully indebted to the following sponsors (in alphabetical order): CASIO Science Promotion Foundation, Central Research Institute of Electric Power Industry, The Japanese Society for Multiphase Flow, The Tsukuba EXPO'85 Memorial Foundation, and to The University of Tsukuba.

It was decided to continue the series of joint meetings every three years under the umbrella of The European Multiphase Systems Institute (EMSI) and The Japanese Society for Multiphase Flow (JSMF). The third meeting is scheduled for 2003 in Certosa di Pontignano, Siena, Italy. The contact persons are Dr. G. P. Celata, Prof. A. Tomiyama and Prof. I. Zun (http://termserv.casaccia.enea.it/eurotherm/etpfgm.html).

Prof. G. Matsui
Institute of Engineering Mechanics and Systems
University of Tsukuba
Fax: +81-298-53-5207
E-mail: matsui@kz.tsukuba.ac.jp

Prof. I. Zun
Laboratory for Fluid Dynamics and Thermodynamics
Faculty of Mechanical Engineering
University of Ljubljana
Tel & Fax: +386-1-4254-217
E-mail: iztok.zun@fs.uni-lj.si

Dr. G. P. Celata
National Institute of Thermal-Fluid Dynamics
ENEA
Fax: +39-06-3048-3026
E-mail: celata@casaccia.enea.it

Report on ISTP-12, 12th International Symposium on Transport Phenomena Istanbul, TURKEY, July 16-20, 2000

by Ibrahim Dincer

As the Chairman of ISTP-12, I am delighted to write this Conference report.

13 keynote papers and nearly 200 technical papers (including open forum presentations) from over 35 countries contributed to this Symposium. Personally, I feel that this Symposium was a great success, as it brought together researchers from different backgrounds and different countries, all of whom have a common interest in transport phenomena.

I am confident that all keynote speakers and participants found this Symposium a very rewarding experience from a technical and a social standpoint, and benefited from the exchange of ideas, information, problems and solutions with technical experts. The luncheons, banquet, receptions and other exciting social events provided an ample opportunity to interact with the many diverse international attendees. I am also extremely happy that I had an opportunity to show you cordial Turkish hospitality and the stunning natural beauty in Istanbul.

As we are all aware, the efforts required in organizing and holding such a Symposium are extensive. We put a tremendous amount of efforts to realize such a great Symposium. Therefore, I like to highlight the following:

First, I would like to take this opportunity to express my sincere appreciation to Professor We-Jei Yang, President of the Pacific Center of Thermal Fluids-Engineering, and its executive board members for giving me this chance to organize the ISTP-12 first time in Europe, in Istanbul. Second, I greatly appreciate our Organizing Committee Chairman Dr. Ferhat Yardim's excellent job in making local preparations and arrangements under the technical guidance of our Technical Chairmen, Professors Ekrem Ekinci and Hasancan Okutan whose their efforts are higly appreciated. Third, I am very much grateful to Profesor Paul Marto for organizing such a successfull Open Forum with a fruitful and friendly atmosphere. Fourth, my sincere thanks go to our Organizing Committee Members for their help and assistance. Fifth, I would like to register my sincere appreciation to the organizing bodies, the Pacific Center of Thermal Fluids-Engineering, American Society of Mechanical Engineers, King Fahd University of Petroleum and Minerals, and Istanbul Technical University for their encouragement and support. Last, but not least, I acknowledge my gratitude to the ISTP-12 keynote speakers, authors, session chairpersons and attendees whose their contributions and efforts have made this great success possible.

In the meantime, I hope it was a fruitful experience and a pleasant trip for you and everyone arrived back to his/her Country safely. Thank you all once again and I look forward to meeting you, your colleagues and your friends in Victoria for ISTP-13 in July 2002.

Dr. Ibrahim Dincer
ISTP-12 Symposium Chairman
Associate Professor
Department of Mechanical Engineering
King Fahd University of Petroleum and Minerals (KFUPM)
Box 127, Dhahran 31261, Saudi Arabia
Tel: 966-3-860-4497
Fax: 966-3-860-2949
E-mail: idincer@kfupm.edu.sa
Http: www.geocities.com/ibrahimdincer

Future Meetings

Listings include Conference Name, Place, Date and Contact.

First Asian Particle Technology Symposium (APT 2000)
Bangkok, Thailand, December 13-15, 2000
Prof. Yoshinobu Fukumori
E-mail: fukumori@pharm.kobegakuin.ac.jp
Dr. Tawatchai Charinpantitkul
E-mail: ctawat@pioneer.chula.ac.th
Fax: +662-218-6480

The 26th International Technical Conference on Coal Utilization & Fuel Systems
Sheration Sand Key Clearwater, Florida, USA March 5-8, 2001
http: www.coaltechnologies.com

Turbulent Heat Transfer III
Anchorage, Alaska, March 18-23, 2001.
http:www.engfnd.org

6th International Congress on Optical Particle Characterization
Brighton, UK April 2-5, 2001
Prof. A.R.Jones
Imperial College, London
E-mail: conference@iop.org
Fax: +44 20-7470-4900
http://www.iop.org

Internal Combustion Engine Division of the ASME 2001 SPRING TECHNICAL CONFERENCE
Philadelphia, Pennsylvania, USA, April 29 - May 2, 2001
Dr. Ismail B. Celik
Mechanical and Aerospace Engineering Department
West Virginia University
Fax: (304) 293 6689
E-mail: celik@cemr.wvu.edu

4th International Symposium on Mixing in Industrial Processes
Toulouse, France, May14-16, 2001
E-mail:progep-ismip4@ensigct.fr
http://www.univ-inpt.fr/~ISMIP4

2nd ICHMT International Symposium on Advances in Computational Heat
Palm Cove, Queensland, Australia, May 20-25, 2001.
Prof. Graham de Vahl Davis
The University of New South Wales
Fax: (+61 2) 9663 1222
Email: g.devahldavis@unsw.edu.au
http:www.cht01.mech.unsw.edu.au

The 10th International Conference on Fluidization
Bijing, China, May 20-25, 2001
Prof. Mooson Kwauk
Fax: +86-10-6255-8065
E-mail: moodon@lcc.icm.ac.cn.

ICMF 2001-New Orleans 4th International Conference on Multiphase Flow
New Orleans, Louisiana, USA, May 27-June 1, 2001
Prof. E. Michaelides
School of Engineering, Tulane University
Fax: +1-504-862-8747
E-mail: emichael@mailhost.tcs.tulane.edu
http://mail.eng.lsu.edu/icmf2001/

Tenth International Conference on Computational Methods and Experimental Measurements 2001
Alicante, Spain, June 4 – 6, 2001.
http://www.wessex.ac.uk/conferences/2001/CMEM01/

Radiation-2001, Third International Symposium on Radiative Transfer
Antalya, TURKEY, June 10-15, 2001
Prof. Faruk Arinc
Middle East Technical University
Fax: +90 312 210 1331
http://ichmt.me.metu.edu.tr/upcoming-meetings/Rad-01/announce.html

Third International Conference on Compact Heat Exchangers and Enhancement Technology for the Process Industries
Davos, Switzerland, June 10-15, 2001.
http://www.engfnd.org

39th European Two-Phase Flow Group Meeting
Aveiro, Portugal, June 17-20, 2001
Prof. A.C. M. Sousa and Prof. J.J.A.Grácio
University of Aveiro
E-mail: 39etpfgm@mec.ua.pt

CAV 2001 Fourth International Symposium on Cavitation
Pasedena, California, USA, JUNE 20-23, 2001
Prof. R. E. A. Arndt
University of Minnesota
E-mail: arndt001@tc.umn.edu
Fax: 612 627-4609
Prof. C. E. Brennen
California Institute of Technology
E-mail:brennen@caltech.edu
Fax: 626 568-2719
Prof. S. L. Ceccio
University of Michigan
E-mail: ceccio@umich.edu
Fax: 734 647-3170

Chemical Reactor Engineering 2000: Novel Reactor Engineering for the New Millennium
Barga, ITALY, June 24-29, 2001
Prof. Franco Berruti
University of Saskatchewan
Fax: +1-306-966-5205
E-mail: F. Berruti@engr.usask.ca

Second International Symposium on Turbulence and Shear Flow Phenomena
Stockfolm, SWEDEN, June 27-29, 2001
Prof. M. A. Leschziner (QMW,U. London) and Prof. N. Kasagi (Univ. Tokyo)
http://www.mech.kth.se/tsfp2

Third International Conference on Compact Heat Exchangers and Enhancement Technology for the Process Industries
Davos, Switzrland, July 1-6, 2001
Dr. Ramesh K. Shan
Harrison Thermal Systems
Fax: 716-439-3186
E-mail: rkshah@attglobal.net.

Third International Symposium on Computational Technologies for Fluid/Thermal/Chemical Systems with Industrial Applications in conjunction with the ASME PVP Division Conference
Atlanta, Georgia, USA, July 22-26, 2001
Dr. Vladimir Kudriavtsev
CFD Canada
Fax : +1-416-441-0803
E-mail: vkudr@sympatico.ca
Prof. Satoyuki Kawano
Tohoku University
Fax : +81-22-217-6979
E-mail: kawano@ad.mech.tohoku.ac.jp
Prof. Chris R. Kleijn
Delft University of Technology
Fax : +31-15-278-2838
E-mail: crkleijn@klft.tn.tudelft.nl
http://www.asme.org/divisions/pvp/index1.htm/pvp_home.hmtl.

EPMESC'VIII (EPMESC: Enhancement and Promotion of Computing Methods for Engineering and Science)
Shanghai, China, July 25-28, 2001
http://www2.sjtu.edu.cn/epmesc

5th International Conference on GAS-LIQUID and GAS-LIQUID-SOLID Reactor Engineering
Melbourne, September 23-27, 2001
(As part of the 6th World Congress of Chemical Engineering)
http://www.eng.newcastle.edu.au/cg/GLS5/index.htm

6th World Congress of Chemical Engineering
Melbourne Australia, September 23-27, 2001
E-mail: chemeng@meetingplanners.com.au
http://www.chemengcongress.com

5th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics
Thessaloniki, GREECE, September 24-28, 2001
Dr. G.P. Celata
ENEA Casaccia
Fax: + 39 06 3048 3026
E-mail: celata@casaccia.enea.it
Dr. P. Di Marco
University of Pisa Fax: +39 050 569 666
E-mail: p.dimarco@ing.unipi.it

VIM-01, International Symposium on Visualization and Imaging in Transport Phenomena
Antalya, TURKEY, October 14-19, 2001
Prof. S. Sideman
Technion
Fax: +972 4 822 4131
E-mail: sam@biomed.technion.ac.il
http://ichmt.me.metu.edu.tr/upcoming-meetings/Vim-01/announce.html

2nd International Conference on Computational Heat and Mass Transfer
Rio de Janeiro, BRAZIL, October 22-26, 2001
Prof. R. Cotta
Fax: +55 21 290 6626
E-mail: cotta@serv.com.ufrj.br
http://www.lttc.com.ufrj.br/ICHMT/

The 7th International Conference on Circulating Fluidized Beds (CFB7)
Niagara Falls, Canada May 5-8, 2002.
http://publish.uwo.ca/~jzhu/cfb7

11th International Symposium on Applications of Laser Technique to Fluid Mechanics
Lisbon Portugal 8-11 July 2002
Abstract by 15 December 2001
http://in3.dem.ist.utl.pt/lisboa-laser/

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.
Dr. J.Domnick
Fraunhofer-Institut fuer
TEL: +49-711-970-1762, FAX: +49-711-970-1004
E-MAIL: jhd@IPA.FhG.de
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

THE NETHERLANDS
Prof. B. Scarlett (tentative)
Department of Chemical Process
TEL: +31-15-783577, FAX: +31-15-784452

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: +1-518-276-8579, 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. Efstathios 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