

The Information Center for Multiphase Flow

NEWS LETTER

No.1
October 1993

ICeM The Japan Society of Multiphase Flow

What is ICeM (The Information Center for Multiphase Flow)?

Why was ICeM Started?:

The Information Center was established as a subordinate organization of the Japan Society of Multiphase Flow on 1993, and has begun responding to strong interest for information on multiphase flow research/researchers worldwide.

What is ICeM's Goal?:

To stimulate interaction among multiphase flow scientists and engineers worldwide and enlarge the circle of research and researchers.

What are ICeM's Activities?:

- *To collect up-to-date information on multiphase flow research papers and reports, conferences, symposia, workshops etc. and provide it to the people registered with the Center.
- *To publish a 'NEWSLETTER' which is sent to registered people.
- *To create a data bank on multiphase flow research/researchers.
- *To enable the smooth operation of activities by appointing volunteers to report on relevant activities such as meetings and so on.

To Join ICeM:

Please see the page 13 of the Newsletter.

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All correspondence concerning: news items of interest to members, notice of meetings and conferences, personal news items, etc. should be addressed to the editor or to a regional corresponding member.

Chairman(Editor):

Professor Goichi Matsui
Inst. of Engineering Mechanics
University of Tsukuba
Tsukuba 305, Japan
Tel: +81-298-53-5129
Fax: +81-298-53-5207
Telex: 3652580 UNTUKU J
E-mail: matsui@kz.tsukuba.ac.jp

Vice Chairman:

Professor Yutaka Tsuji
Faculty of Engineering
Osaka University
Suita, Osaka 565, Japan
Tel: +81-6-877-5111(ext.5126)
Fax: +81-6-876-4975
Telex: 5286-227 FEOUJ
E-mail: tsuji@mupf.meim.osaka-u.ac.jp

BETTER COMMUNICATION FOR GROWTH AND COLLABORATION

M.C. Roco*

Multiphase flow has grown as an interdisciplinary area in science, engineering and technology in the second part of this century. Its methods of investigation have been proposed by various research groups from physics, engineering, medicine, agriculture, mathematics, astronomy and other disciplines. Specific technologies have been developed in processing industries, materials synthesis, bioengineering, mining, nuclear power, propulsion, coal conversion and other areas. Most of these activities are still fragmented, with noticeable differences, from nomenclature to the generic research goals. Multiphase flow usually includes dynamics of systems of particles, bubbles and droplets in fluids. However, numerous other topics such as melting and solidification, filtration, boiling, and geotechnical phenomena, use the methods and technology of multiphase flow. A focused activity to channel the pertinent information and improve interactions between various disciplinary groups has become necessary. For this purpose, the Information Center for Multiphase Flow (ICMF) has been established under the auspices of the Japan Society of Multiphase Flow (JSMF), with international participation. The Center aims to streamline and enhance the information obtained from various sources in academia, industry and government, from different disciplines and countries, to the participating subscribers. This would support the growth of the field as a whole, help develop interdisciplinary research and international collaboration. By considering the current variety of topics, separation on disciplines and subgroups, and the need for collaboration in the field, the Center should be welcomed by all researchers and practitioners. It may play a synergistic role in promoting the science and technology of multiphase flow.

The idea of this Center has germinated for some time. Interdisciplinary activities of various professional societies in the U.S., Europe and Japan, and particularly the First International Conference on Multiphase Flow in Tsukuba in 1991, have increased the awareness in this regard. The offer of the JSMF committee to administer the Center, in collaboration with correspondents from other countries, has been essential and generous.

(*) M.C. Roco is Director of "Fluid, Particulate and Hydraulic Systems" program at the National Science Foundation (U.S.A.), Professor of Mechanical Engineering at the University of Kentucky, and serves as Chairman of the Multiphase Flow Technical Committee of ASME. This note does not necessarily represents the position of either NSF or ASME.

The Challenge

The importance of interdisciplinary and international collaboration has increased in recent years. A larger proportion of the new discoveries takes place at the interface between disciplines. International interactions has become an integral part of the research activity because of the globalization of science and engineering, higher cost of research (see nuclear magnetic resonance or neutron scattering facilities for multiphase flow visualization), improved communication (including fax and electronic mail), and convergence of the scientific and technical capabilities of the industrialized nations. Several needs for improved communication in multiphase flow research, education and engineering are listed below:

- o Channeling selected information from a variety of dispersed sources such as universities, national laboratories, industry, professional societies, governments, from different countries, to the potential users.
- o Initiation of interdisciplinary activities focused on either experimental, analytical or numerical methods specific for multiphase flow.
- o Providing convenient educational means to the people entering the field of multiphase flow. This may be regarded as a human resources strategy for advancing the science and technology of this field.

The Response

By considering the needs and potential rewards, the creation of the Center is timely. It is expected that the most rewarding activities will be selected by the Center after receiving input from all interested participants. Here are suggestions for several activities, besides the current Newsletter, which are achievable in short term:

- o An important mean of communication should be the existing e-mail system (INTERNET), including specialized "Bulletin boards".
- o The Center should organize specialized technical groups on focused topics in research, education, or state-of-the-art industrial applications.
- o Development of data bases useful in multiphase flow research, such as materials properties, on experimental and numerical methods.

o Establishing periodical contacts with other professional societies in order to facilitate the flow of information.

In long term, the creation of an Institute of Multiphase Flow could be a good investment. The institute would network researchers and users, sponsor workshops and short-courses, stimulate exploratory research in new areas, and fund several in-house survey projects.

Samples of activities in the U.S.

Without attempting to present a comprehensive view, I will briefly describe three professional activities in the U.S. with which I am currently involved.

o The **Multiphase Flow Technical Committee (MFTC)** of the of the American Society of Mechanical Engineering (FED/ASME) has three subcommittees on "Gas-Solid Flow", "Liquid-Solid Flow" and "Gas-Liquid Flow". It organizes two main conferences per year at the ASME Winter Annual Meeting (the following meeting is in New Orleans, Nov. 28-Dec. 3, 1993, and the conference chairman is M.L. Billet, 814-238-0136) and FED/ASME Summer Meeting (the following one is in Lake Tahoe, June 19-23, 1994; same conference chairman). MFTC has currently in preparation a balanced conference program, including a series of international symposia (Liquid-solid flow, June 1994; Gas-solid flow, June 1995; Gas-liquid flow, June 1995; Cavitation, April 1994), other recurring symposia (Multiphase transport in porous media, Nov. 1993; Multiphase in manufacturing, Nov. 1994; Multiphase flow in wells and pipes, Nov. 1994, others), and current interest symposia (Numerical methods in multiphase flow, June 1994; Parallel computing in multiphase flow, Nov. 1994; Flow visualization in multiphase flow, June 1995; others). The well established Cavitation and Multiphase Forum will be organized in June 1994 by Oki Furuya and Joseph Katz. An "Open Forum on Multiphase Flow" will be initiated in June 1994 at the meeting in Lake Tahoe, where the speakers will have the opportunity to present research in progress. Only abstracts will be required six months in advance. The main goal of the committee is to broaden the participation in the ASME activities of engineers and scientists from different fields of multiphase flow and particle technology, particularly young professionals, and to increase the interaction

with other professional societies from the U.S. and abroad. Another important objective is to maintain the high quality of the papers presented and published in the ASME proceedings and the Journal of Fluids Engineering. A special emphasis is given to symposia on emerging areas of research.

o The **Particle Technology Forum (PTF)** has been established by the American Institute of Chemical Engineers (AIChE) in 1993 in order to promote the science and education of particulate systems. The forum conduct an international biennial conference, the first one being in August 17-19, 1994, in Denver. For further information about PTF, one may contact John Bloomer at AIChE headquarters, 345 East 47th Street, New York, N.Y. 10017, Tel. 212-705-7652.

o In the last years, several **new university courses in the area of multiphase flow** have been offered in the U.S. A group of universities, including the University of Houston, University of Pittsburgh and University of Florida, have jointly planned a four-course sequence in this area. Other universities offer only a specialized course in this field. Illustrations of courses scheduled in 1993 are: "Fine Particle Synthesis and Transport" at the Yale University (D.E. Rosner), "Fundamentals of Gas-Droplet/Gas-Particle Flows" at the Washington State University (C.T. Crowe), "Multiphase Flow and Heat Transfer" at the University of California in Santa Barbara (short course by S. Banerjee and G. Hetsroni), "Particle-Fluid Mechanics" at the Johns Hopkins University (M.C. Roco), and "Theory of Flotation" at the Columbia University in New York (C.C. Harris).

I would like to convey the warmest thanks to the JSMF committee chaired by Professor G. Matsui for organizing the Information Center. It opens an opportunity for researchers and engineers working in multiphase flow to expand their technical information, find what is exciting around the world, and develop collaborations. I am confident that the results will be seen soon through our active participation.

Corresponding Members

Corresponding members might be changed depending on their circumstances or added if necessary.

CANADA

Prof.M.Kawaji
University of Toronto
Dept. of Chemical Engineering & Applied Chemistry
200 College Street, Toronto,
Ontario M5S 1A4, Canada
TEL: +1-416-978-3064
FAX: +1-416-978-8605

Prof.S.B.Savage
McGill University
Dept. of Civil Engineering & Applied Mechanics
817 Sherbrooke Street West Montreal,
Quebec H3A 2K6, Canada
TEL: +1-514-398-6864
FAX: +1-514-398-7361

FRANCE

Prof.J.M.Delhaye
Centre d'Etudes Nucleaires de Grenoble
Laboratoire d'Etudes Fondamentales
DTP/STI-LEF CENG-85X,38041
Grenoble Cedex, France
TEL: +33-76-88-30-54
FAX: +33-76-88-51-77
TLX: 320 323

Prof.G.Gouesbet
INSA de Rouen
Laboratoire d'Energetique des Systemes et Procèdes
U.R.A. C.N.R.S. 230, B.P.08
76131 Mont-Saint-Aignan, Cedex, France
TEL: +33-35-52-83-91
FAX: +33-35-52-83-90

F.R.G.

Dr.I.Domnick
University Erlangen-Nurnberg
Institute of Fluid Mechanics
Cauerstrasse 4, D-91058, Erlangen, F.R.G.
TEL: +49-9131-859472
FAX: +49-9131-859503
TLX: 629755
E-MAIL: jdomnick@lstml.lstm.uni-erlangen.de

Prof.U.Müller
Kernforschungszentrum Karlsruhe
Institut für Angewandte Thermo und Fluidodynamik
Postfach 36 40 D-7500 Karlsruhe, F.R.G.

ITALY

Dr.G.P.Celata
C.R.E. Casaccia-ENEA
Thermal Process Engineering
Division Head
ENE-IMPE-IPROT Via Anguillare
301 00060 Rome, Italy
TEL: +39-6-3048-3905
FAX: +39-6-3048-4203/3026
TLX: 613296 ENEACAI

ISRAEL

Prof.G.Hetsroni
Israel Institute of Technology
Dept. of Mechanical Engineering
Haifa, Israel
FAX: 972-432-4533
E-MAIL: MERHGO1@TECHNION.BITNET

JAPAN

Prof.T.Fukano
Kyushu University
6-10-1 Hakozaki, Higasi-ku
Fukuoka 812, Japan
TEL: +81-092-641-9744 Ext.5440
FAX: +81-092-641-9744

Prof.M.Maeda
Keio University
3-14-1 Hiyoshi, Kohoku-ku, Yokohama 223, Japan
TEL: +81-045-563-1141 Ext.3120
FAX: +81-045-562-7625

Prof. T.Masuyama
Tohoku University
Aramaki, Aoba-ku, Sendai 980, Japan
TEL: +81-022-222-1800 Ext.4544
FAX: +81-022-222-2114

Prof. Y.Matsumoto
University of Tokyo
Dept. of Mechanical Engineering
Hongo, Bunkyo-ku, Tokyo 113, Japan
TEL: +81-03-3812-2111 Ext.6286
FAX: +81-03-3818-0385
E-MAIL: ymats@mech.t.u-tokyo.ac.jp

Prof. K.Ohba
Kansai University
Dept. of Mechanical Engineering
3-3-35 Yamate, Suita, Osaka 564, Japan
TEL: +81-06-388-1121 Ext.5793
FAX: +81-06-330-3370

Prof. T.Sakaguchi
Kobe University
Faculty of Engineering
Dept. of Mechanical Engineering
Rokkodai-cho, Nada-ku, Kobe 657, Japan
TEL: +81-078-881-1212 Ext.5152
FAX: +81-078-881-0036
E-MAIL: sakaguci@mech.kobe-u.ac.jp

Dr.A.Serizawa
Kyoto University
Dept. of Nuclear Engineering
Yoshida, Sakyo-ku, Kyoto 606, Japan
TEL: +81-075-753-5829
FAX: +81-075-753-5845

KOREA

Dr.M.K.Chung
Korea Advanced Institute of Science and Technology
Dept. of Mechanical Engineering
373-1 Kusong-dong Yusung-gu
Taejeon, 305-701, Korea
TEL: +82-42-869-3002
FAX: +82-42-861-1694

Prof.S.D.Kim
Korea Advanced Institute of Science and Technology
Dept. of Chemical Engineering
373-1 Kusong-dong Yusung-gu
Taejon, 305-701, Korea
TEL: +82-42-829-3902/3903
FAX: +82-42-829-3910
TLX: KAISROK K45528

NORWAY

Prof.K.H.Bendiksen (tentative)
Institutt for Energiteknikk
P.O.Box 40, N-2007 Kjeller, Norway
TEL: +47-63-80-60-00
+47-63-80-62-01 (Direct Line)
FAX: +47-63-81-11-68

P.R.CHINA

Prof.W.Wang
Southeast University
Department of Power Engineering
Nanjing, Jiang-Su, 210018, P.R.China
TEL: +86-25-631700 Ext.2726
FAX: +86-25-712719/714212
TLX: 34137 SEVLB CN

Prof.H.Chen
The Ministry of Communications P.R.C
Water Borne Transportation Institute
President of China Committee of Freight Pipeline
48 Bei San Huan Zhong Road
Beijing 100088, P.R.China
TEL: +86-1-2018898
FAX: +86-1-2011659

Prof.L.Zhou
Tsinghua University
Dept. of Engineering Mechanics
Beijing 100084, P.R.China
TEL: +86-1-282451-2982/285451
FAX: +86-1-259-4876
TLX: 22617 QHTSC CN

RUSSIA

Prof.R.I.Nigmatulin
(Tyumen)
Russian Academy of Sciences Siberian Branch,
TIMMS
Taymirskaaya 74, Tyumen, GSP, 625000, Russia
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
Laboratory for Fluid Dynamics and Thermodynamics
Murnikova 2 61000 Ljubljana, Slovenia
TEL: +38-61-154-217
FAX: +38-61-218-567
TLX: 32240 FAKSTR 51
E-MAIL: iztok.zun@ijs.si

U.K.

Prof.G.F.Hewitt
Imperial College of Science,
Technology and Medicine
Dept. of Chemical Engineering
& Chemical Technology
Prince Consort Road London, SW7 2BX, U.K.
TEL: +44-71-589-5111 Ext.4307
FAX: +44-71-584-1170
TLX: 929 484

U.S.A.

Prof.C.T.Crowe
Washington State University
Department of Mechanical
and Materials Engineering
Pullman, WA 99164-2920, U.S.A.
TEL: +1-509-335-8654
FAX: +1-509-335-4662
E-MAIL: CROWE@WSUVM1

Prof.M.Ishii
Purdue University
School of Nuclear Engineering
1290 Nuclear Engineering Building,
West-Lafayette, IN 47907-1290, U.S.A.
TEL: +1-317-494-4587
FAX: +1-317-494-9570

Prof.R.T.Lahey, Jr. (tentative)
Rensselaer Polytechnic Institute
Troy, New York 12180-3590, U.S.A.
TEL: +1-518-276-8579
FAX: +1-518-276-8788

Prof.R.M.Nerem (tentative)
Georgia Institute of Technology
School of Mechanical Eng.
Atlanta, Ga 30332-0405, U.S.A.
TEL: +1-404-894-2768

Prof.M.C.Roco
National Science Foundation
Room 1115 1800 G Street N.W.
Washington, D.C. 20550, U.S.A.
TEL: +1-202-357-9606
FAX: +1-202-357-7636
E-MAIL: mroco@note.nsf.gov

To Readers:

For future data bank on Multiphase Flow Research/Researchers, ICeM want to get your personal data. Please write your name, address, research field and a list of papers etc. to the Editor.

ICeM would also be very grateful to receive recent reprints, along with up to five keywords per paper.

ICeM welcomes articles for inclusion in this Newsletter written by Multiphase Flow Researchers. It will be very helpful if the diskette is also attached to the manuscripts.

The 12th Multiphase Flow Symposium '93
July, 15-16, 1993 - Fukuoka, Japan

The 12th Multiphase Flow Symposium '93 was held at Kyushu University, Fukuoka JAPAN on July 15 ~ 16, 1993. Usually it is very hot in this season in Fukuoka, fortunately, however, it was cool due to the unusual weather in this whole summer in the west of Japan. Some participants enjoyed to see the very lively " Yamagasa Festival ", one of the three big Yamagasa Festival in Japan.

The 27 contributed papers out of 64 papers were presented in the nine morning sessions of the first day, which were roughly divided into 3 papers related to fluidized beds, 6 papers to the behavior of particles, 6 papers to liquid films or annular flows, 3 paper to the flow characteristics of a gas-liquid and a three phase flows, 3 papers to large scale multiphase flows and 6 papers to the behaviors or the generation of gas bubbles or droplets.

In the 9 morning sessions in the second day 30 papers were presented. They are divided into, 7 papers related to solid-liquid two phase flows, 3 papers to swirling two phase flows, 4 papers to flow characteristics of gas-liquid two phase flows, 4 papers to two-phase flows with heat transfer, 6 papers to measurement techniques in two-phase flow, and 6 papers to the modeling of two-phase flow, which were followed by more 4 papers to the modeling and 4 papers to two-phase flow problems in multiphase flow in the afternoon two sessions.

Invited lectures were given on " Science of Multiphase Interface-Nanosopic Viewpoints " on the first day and on " Debris Flow and Pyroclastic Flow at Unzen Volcano " on the second day, both of which stimulated our interest toward new fields of multiphase flows.

In the afternoon of the first day a new type forum was held, in which 7 practical problems, i.e., Tunnel ventilation system during construction to control the density of dust, Prediction of diffusion of fine dust with water, Water jet and its application, Behavior of fine bubbles in a bath tub, A multiphase pump, Two-phase flow problems in a small scale boiler, and Two-phase flow in a nuclear reactor, were presented and discussed in a very relaxed atmosphere with drinking beer.

Although interest in this symposium seems to become increasingly strong, the presentations from industries are desirable to drastically increased.

Tohru Fukano
Chairman of the organizing
Committee of the Symposium '93
Professor
6-10-1, Hakozaki, Higashi-ku,
Fukuoka, 812 Japan
TEL : 092-641-1101
FAX: 092-641-9744

UIT (Italian Union of Thermo-fluid-dynamics)

11th National Heat Transfer Conference June 24-25, 1993 - Milan, Italy

UIT (Italian Union of Thermo-fluid-dynamics) organizes every year a national heat transfer conference with the participation of researchers presenting experimental or theoretical contributions in the fields of Fluid Mechanics, Heat Transfer and Thermodynamics. The aim of the conference is to promote a national forum to compare and exchange results obtained at University and at industry research centres. The 1993 edition was held in Milan from 24 to 25 June, 1993, and was organized by the Energy Department of the Polytechnic of Milan.

The conference consisted of 4 sessions, respectively on: a) Thermo-fluid-dynamics of single-phase systems; b) Thermo-fluid-dynamics of multiphase systems; c) Computational thermo-fluid-dynamics; and d) Nuclear and conventional energy systems.

A total of 46 papers was presented, including 10 papers from abroad, and about 70 people attended the conference.

Two invited lectures were delivered by Prof. B. Azzopardi (The effect of pipe fittings on the structure of two-phase flow) and by Prof. L.S. Fletcher (Thermal enhancement techniques for microelectronic systems), providing an updated state-of-the-art review.

Recent results obtained in the Italian academia, national industry and government labs have been presented, stimulating a fruitful discussion among participants. Main topics treated and discussed are reported herewith.

Experimental investigation of the heat transfer and temperature distribution in a fluid, confined between rigid, parallel plates, and heated from below (Rayleigh-Bénard convection), showing for Rayleigh number between 10^4 and $2.3 \cdot 10^6$ an oscillatory behaviour of the fluid temperature, starting from $Ra=3.2 \cdot 10^4$ and whose frequency of oscillation increases as RA increases.

Pressure drop measurements in a sudden area contraction for big diameters in air-water two-phase flow, showed a good agreement with the Chisholm model slightly modified in the expression of the void fraction.

An assessment of correlations and models for the prediction of the critical heat flux (CHF) in water subcooled flow boiling over about 1900 data points, allowed to conclude that in the very high heat fluxes region modified Tong-68 correlation and Katto model are the best predictive tools available in the literature.

Studies of the CHF in refrigerants binary mixtures in flow boiling demonstrated how the behaviour of the mixture in terms of the CHF depends on the CHF mechanisms, i.e. ideal behaviour (linear interpolation between the pure fluids CHF values) is observed for DNB-type mechanism, while deviations from the ideality are observed for dryout-type mechanism of the CHF.

The effect of acoustic vibration on boiling incipience in pool boiling has been studied, showing that at very selective and repeatable frequencies between 180 and 200 Hz the stable convective heat transfer mode instantaneously jumps into full nucleate boiling, evidencing a strong interaction between the acoustic vibration and the boiling nucleation.

Further information on the 11th UIT National Heat Transfer Conference can be obtained by:

Prof. G. SOTGIA
Politecnico di Milano
P.zza L. Da Vinci, 32
20133 Milano, ITALY
Tel: ++39 2 2399-3850
Fax: ++39 2 2399-3838

Future Meetings

Listings include Conference Name, Place, Date and Contact.

- * *VII International Conference on Finite Elements in Fluids – New Trends and Applications*
Barcelona, SPAIN, September 20 – 24, 1993
FEMIF'93 Secretariat, Internat. Center for Numerical Methods in Engineering,
Edificio C-1, Campus Norte UPC, Gran Capitàn, s/n – E-08034 Barcelona, Spain
- * *12th International Conference on Slurry Handling and Pipeline Transport HYDROTRANSPORT 12*
Brugge, BELGIUM, September 28 – 30, 1993
BHR Group Limited, Cranfield, Bedford MK43 0AJ, United Kingdom
Tel +44-234-750422, Fax +44-234-750074, F.A.O. Miss T. Peters, Conference Organiser
- * *European Conference on Applications of Meteorology "Weather Forecasting and its Uses"*
Oxford, U.K., September 28 – October 1, 1993
Mrs. Suzanne Brand, Conference Administration office, IBC Technical Services Ltd,
Gilmora House 57-61 Mortimer Street, GB-London W1N7TD – UK
- * *Fifth International Conference on Numerical Combustion*
Garmisch-Partenkirchen, GERMANY, September 29 – October 1, 1993
Dr. Jürgen Warnatz, Universität Stuttgart – Inst. für Technische Verbrennung,
Pfaffenwaldring 12 – W – 7000 Stuttgart 80, Germany
- * *6th International Topical Meeting on Nuclear Reactors Thermal Hydraulics–NURETH 6*
Grenoble, FRANCE, October 5 – 8, 1993
Prof. J. M. Delhaye, ATOMIC ENERGY COMMISSION, Thermohydraulic Service
CENG/SETh/LEF, 85 X-38041 GRENOBLE CEDEX, France, Fax +33 76 88 51 77
- * *2nd IMACS Conference on Computational Physics*
St. Louis, Missouri, USA, October 6 – 9, 1993
IMACS93, Department of Science and Mathematics Parks College of Saint Louis University,
Cahokia, IL 62206, USA, Tel +1-618-337-7500 EXT 420 or 424, Fax +1-618-332-6802,
Internet imacs93@newton.slu.edu
- * *International Conference on Fractals in Hydroscience*
Ischia, ITALY, October 14 – 15, 1993
Hydrofractals '93 Secretariat, Cuen Congressi, Via Coroglio, 156, 80124, Napoli, Italy
- * *Euromech: Blood-wall interaction*
Berlin, GERMANY, October 18 – 21, 1993
Prof. K. Affeld, Universitätsklinikum Rudolf Virchow, Spandauer Damm 130,
D-1000 Berlin 19, Germany
- * *4th Chinese National Conference on Multiphase Flows. Non-Newtonian Flows and Physicochemical Fluid Flows*
Xi'an, P. R. CHINA, October 26 – 29, 1993
Prof. G.J.Zhou (Beijing University)
and Prof. L.X.Zhou (Department of Engineering Mechanics, Beijing 100084, P. R. China)
- * *3rd World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics*
Honolulu, Hawaii, USA, October 31 – November 5, 1993
Prof. R. K. Shah, Harrison Division, General Motors Corporation
Lockport, N. Y. 14094 – 1896, USA, Fax +1-716-439-3648
- * *Double – Diffusive Convection*
Scottsdale, AZ, USA, November 3 – 6, 1993
H.J.S.Fernando, Mech. & Aero. Engng, Arizona State Univ. Tempe, AZ 85287, USA
- * *International Symposium on Highly Advanced Computing*
Sendai, JAPAN, November 9, 1993
JSME
- * *International Symposium on Aerospace and Fluid Science*
Sendai, JAPAN, November 14 – 16, 1993
Prof. H. Hashimoto, Tohoku University, Aramaki Aoba-ku Sendai 980, Japan

- * *CFD in Turbomachinery and Experimental Validation*
Val d'Isere, FRANCE, December 9 – 10, 1993
J.L.Kueny, CREMHyG, BP 95, F-38402, St. Martin d'Heres, France
- * *1st ISHMT – ASME and 12th National Heat and Mass Transfer Conference*
Bombay, INDIA, January 5 – 7, 1994
Dr. V. Venkat Raj, Government of India, Bhabha Atomic Research Centre
Reactor Safety Division, Trombay, Bombay – 400 085, India, Fax +91 22 556-0750
- * *International Absorption Heat Pump Conference*
New Orleans, Louisiana, USA, January 18 – 21, 1994
- * *4th International Topical Meeting on Nuclear Thermal Hydraulics, Operations & Safety*
Taipei, TAIWAN, April 5 – 8, 1994
Prof. C.Shih, Department of Nuclear Engineering, National Tsing – Hua University,
Hsin – Chu, Taiwan, Tel 886-35-727991, Fax 886-35-720724, E-mail ckshih@ne.nthu.edu.tw
- * *7th Workshop on Two-Phase Flow Predictions*
Erlangen, GERMANY, April 11 – 14, 1994
Dr. –Ing. M. Sommerfeld, Lehrstuhl für Strömungsmechanik, Universität Erlangen-Nürnberg
Cauerstr. 4, 91058 Erlangen, Germany
Tel +49-9131-859507, Fax +49-9131-859503, E-mail msommer@lstm.uni-erlangen.de
- * *MECH '94 – International Mechanical Engineering Congress and Exhibition*
Perth, AUSTRALIA, May 15 – 19, 1994
Martin Ooms,
- * *International Conference on New Trends in Nuclear Systems Thermohydraulics*
Pisa, ITALY, May 30 – June 2, 1994
Prof. F. Oriolo, Dip. Costruzioni Meccaniche e Nucleari, Università di Pisa
Via Diotisalvi, 2 56100, Pisa, Italy, Fax +39 50 585265
- * *ACHEMA, International Meeting on Chemical Engineering*
Frankfurt am Main, GERMANY, June 5 – 11, 1994
Kinki Chemical Society, Attn.: Mr. Yoshio Shibahara, 1-8-4, Utsubo-Honmachi,
Nisi-ku, J-Osaka, 550, Japan
- * *1994 ASME Fluids Engineering Division Summer Meeting*
Lake Tahoe, NV, USA, June 19 – 23, 1994
ASME
- * *International Symposium Numerical Methods for Multiphase Flows, ASME*
Lake Tahoe, NV, USA, June 19 – 23, 1994
Prof. C. T. Crowe, Dept, Mech, Matis Engr, Wasington State University, Pullman WA 99164-2920,
Tel 509-335-3214, Fax 509-335-4662, E-mail crowe@wsuvm1, csc, wsu, edu
- * *25th Fluid Dynamics, Plasma-Dynamics and Laser Conference*
Colorado Springs, Colorado, USA, June 20– 23, 1994
AIAA
- * *Symposium on Dispersed Phase Turbulence Interactions*
Seattle, USA, June 26 – July 1, 1994
Prof. John Eaton, Department of Mechanical Engineering, Stanford University,
Stanford, CA 943005 – 3030, USA
- * *30th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exh.*
Indianapolis, Indiana, USA, June 27 – 29, 1994
AIAA
- * *2nd International Conference on Experimental Fluid Mechanics*
Torino, ITALY, July 4 – 8, 1994
Prof. M. Onorato, DIAS – Politecnico di Torino, C.so Duca degli Abruzzi, 24
10129 Torino, Italy, Fax +39 11 5646899

- * *14th International Conference on Numerical Methods in Fluid Dynamics*
Bangalore, INDIA, July 11 – 15, 1994
Dr. S. S. Desai, Computational & Theoretical Fluid Dynamics Division,
National Aerospace Laboratories, Post Bag No. 1779 – Bangalore 560 017, India
- * *13th Multiphase Flow Symposium '94*
Tsukuba, JAPAN, July 13 – 15, 1994
Prof. G. Matsui, Institute of Engineering Mechanics, University of Tsukuba,
Tsukuba 305, Japan, Fax +81-298-53-5207
- * *Iclass 94 – Sixth International conference on Liquid Atomization and Spray Systems*
Rouen, FRANCE, July 18 – 22, 1994
Dr. Christophe Dumouchel, Université de Rouen, URA 230 / CORIA,
BP 118, 76134 Moint-Saint-Agnan Cedex, France
- * *1st International Particle Technology Forum*
Denver, Colorado, USA, August 17 – 19, 1994
Dr. B.J. Ennis, Secretariat, 1st International Particle Technology Forum
E.I. du Pont de Nemours & Co., Inc. Experimental Station, E304/A204,
Wilmington, DE 19880, USA, Tel +1-302-695-3835, Fax +1-302-695-2504
- * *3rd JSME – KSME Fluids Engineering Conference*
Sendai, JAPAN, July 25 – 27, 1994
(from Korea) Prof. J.H. Boo, Dept. Mechanical Engineering, Hankuk Aviation Univ.
200-1, Hwajon-dong, Koyang-shi, Kyongki-do, 411-791, Korea
(from Japan and other countries) Prof. T. Ikohagi, Inst. Fluid Science, Tohoku Univ.
2-1-1, Katahira, Aoba-ku, Sendai 980, Japan
- * *WCCM III – 3rd World Congress on Computational Mechanics*
Chiba, JAPAN, August 1 – 5, 1994
Prof. T. Kawai, WCCM III Office, c/o International Communications Specialists, Inc.
Kasho Bldg., 2-14-9, Nihombashi, Chuo-ku, Tokyo 103, Japan
Tel +81-3-3272-7981, Fax +81-3-3273-2445, Telex +72-0222-3585 ICS J
- * *10th International Heat Transfer Conference*
Brighton, UK, August 14 – 18, 1994
Prof. G. F. Hewitt, Dept of Chemical Engng and Chemical Technology,
Imperial College of Science, Technology and Medicine – Prince Consort Road,
London SW7 2BY, U.K., Fax +44 71 5841170
- * *1st Intl conf. on Flow Interaction*
HONG KONG, September 5 – 9, 1994
N. W. M. Ko, Dept. of Mech. Engng, University of Hong Kong, Hong Kong
- * *1994 International Symposium on Heat and Mass Transfer in Chemical Process Industry Accidents*
Rome, ITALY, September 15 – 16, 1994
Prof. Antonio Naviglio, ICHMT 1994 Symposium, University of Rome "La Sapienza",
Corso Vittorio Emanuele II°, 244 – 00186 Rome, Italy
- * *3rd International Symposium on Multiphase Flow and Heat Transfer*
Xi'an, P.R. CHINA, September 19 – 21, 1994
Prof. X.J. Chen, Engng. Thermophysics Research Institute, Xi'an Jiaotong University
Xi'an, Shaanxi Province, 710049, P.R. China, Fax +86 29 334716
- * *Hydrosoft 94*
Portocarras, GREECE, September 21 – 23, 1994
Jane Evans, Wessex Institute of Technology, Ashurst Lodge,
Ashurst, Southampton, SO4 2AA, UK
- * *The 2nd International Conference on Fluid Dynamic Measurement and Its Applications*
Beijing, P.R. CHINA, October 19 – 22, 1994
Prof. Sun Xijiu, Department of Thermal Engineering, Tsinghua University
Beijing 100084, P.R. China

- * *International Conference on Advanced Technology and Equipment of Materials Handling ATEMH'94*
Shanghai, P.R.CHINA, October 25 – 27, 1994
Mr. Hu Chuanying, Chinese Mechanical Engineering Society, Sanlihe Road, Beijing, 100832, P.R.China
Tel 01-8595318, Fax 01-8033613, 01-8513867
 - * *2nd International Conference on Multiphase Flow '95 – Kyoto*
Kyoto, JAPAN, April 3 – 7, 1995
Prof. T. Fukano, Department of Mechanical Engineering, Kyushu University,
Hakozaki 6-10-1, Higashi-ku, Fukuoka 812, Japan
 - * *International Symposium on Gas-Solid Flows and Coal Combustion*
Beijing, P.R.CHINA, September, 1995
Prof. L.X.Zhou and Prof. X.C.Xu. (Prof. L.X.Zhou: Department of
Engineering Mechanics Tsinghua University, Beijing 100084. P.R.China).
 - * *International Symposium on Two-Phase Flow Modelling and Experimentation*
Rome, ITALY, October 9 – 11, 1995
Dr. G.P. Celata, ENEA Casaccia, Energy Department, Via Anguillarese, 301
I-00060 Rome, Italy, Fax +39 6 3048 3026
 - * *2nd European Thermal – Science and 14th UIT National Heat Transfer Conference*
Rome, ITALY, May 27 – 31, 1996
Dr. G.P. Celata, ENEA Casaccia, Energy Department, Via Anguillarese, 301
I-00060 Rome, Italy, Fax +39 6 3048 3026
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A Note from the Editor

If you want to register with ICeM, please complete the enclosed Biographical Questionnaire and return it to the Editor.

Annual membership fee is ¥3,500(Japanese yen); the fee for 3 years(1994–1996) is ¥10,000. However, the annual fee is ¥1,000 for members of the Japan Society of Multiphase Flow(JSMF). Please send the above money to the following Postal Giro account;

Account Number Utsunomiya 7-17483
Name of the Account ICeM

or to the Editor's address from your post office using the International Postal Remittance Service. The deadline for founding members of ICeM is December 31, 1993, but registration is welcome anytime.

This Newsletter is being sent free of charge to members of JSMF and to those who are contemplating joining or who have expressed interest in ICeM. The membership fee goes to sustaining ICeM. After this issue of the Newsletter, only paid-up members will receive it.

Two issues of the Newsletter will be published in 1994. The second issue of the Newsletter will be published in April, 1994.

Space may be bought in the Newsletter for advertisements. Please contact the Editor for details and rates.

Any questions/comments will be welcomed.

Welcome to ICeM

Shin-ichi Kamiyama
President of JSMF

Dear Sirs/Madames,

The Japan Society of Multiphase Flow(JSMF) was established in 1987 to promote further progress in the interdisciplinary fields of multiphase flow, by facilitating more intimate cooperation and exchange of new information among people working in different areas of science and technology related to multiphase flow.

As a comprehensive compilation of its activities, JSMF hold the first ICMF on 1991 in Tsukuba, Japan, which brought a great success.

Furthermore, in order to promote an exchange of up-to-date information of international scope related to multiphase flow, JSMF established the Information Center for Multiphase Flow(ICeM) in 1993.

I would appreciate it if you are interested in supporting us in this venture and also encourage your colleagues to join the Center.

I look forward to your participation.

Sincerely yours,



Professor S. Kamiyama
President of JSMF(1993-94)

Executive Committee Members of The Japan Society of Multiphase Flow(1993-94)

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Announcement and Call for Papers

Second International Conference on Multiphase Flow '95 – Kyoto

The Japan Society of Multiphase Flow

April 3–7, 1995

Kyoto International Conference Hall, Kyoto, Japan

SCOPE: The Japan Society of Multiphase Flow is sponsoring the Second International Conference on Multiphase Flow '95 – Kyoto (ICMF '95–Kyoto) which is a follow up to the First Conference held in Tsukuba in 1991, focusing on the most acute and promising directions by bridging between different interdisciplinary fields of multiphase flow researches and industrial applications. The Second Conference aims to promote further studies and technological development in various aspects of multiphase flows, and to stimulate the professional communities and work in these directions. The Conference brings together international experts in field of multiphase flow with the idea to address an important and interesting area in a novel way. Participants are invited to attend the Conference and take an active part in presentation and discussions.

TECHNICAL PROGRAM AND FORUM: The technical program will consist of an opening plenary session with invited papers followed by several parallel programs consisting of technical oral sessions and poster sessions. The Conference will also give a forum on international cooperation in modern science and technologies including multiphase flows. A particular focus is addressed on critical technologies in energy, environmental and biomedical areas. Lectures and papers will be given by invited leading international experts, management administrators and top government representatives from several countries. Contributed technical papers for oral and poster sessions are welcome in the following areas, but are not limited to:

Fundamentals

- Hydrodynamic modeling (flow regimes, interactions between particles/bubbles, interface–fluid interactions, wall effects, etc.)
- Dynamics of interface (coalescence, deformation, disintegration)
- Turbulence and transport phenomena at phase interfaces
- Phase distribution and separation
- Interfacial and film flow phenomena
- Instabilities
- Wave phenomena and critical flow
- Chaos
- Fluidization and aeration
- Plasma flows
- Heat and mass transfer

- Chemically reacting flow

- Fundamental equations and closure laws

Applications

- Industrial applications and problems in multiphase flows
- Component technologies in multiphase flows
- System design and scaling of multiphase flows
- Controls and functionalization of multiphase flows
- Code development (physics oriented)

Experimentation

- Instrumentation and measurement techniques
- Visualization
- Computer simulation and graphics

SCHEDULE: The schedule for abstracts and papers is:

- Four copies of extended abstract due July 1, 1994
- Notification of abstract acceptance September 15, 1994
- Author–prepared camera–ready mats due December 15, 1994

ORGANIZING COMMITTEE MEMBERS (provisional):

A. Serizawa (Chairman, Japan), Y. Tsuji (Vice chairman, Japan), K. Ayukawa (Japan), M. Bohnet (FRG), H. Branover (Israel), G.P. Celata (Italy), C.T. Crowe (USA), J.M. Delhaye (France), F. Durst (FRG), S. Einav (Israel), G.F. Hewitt (UK), M. Ishii (USA), S. Kamiyama (Japan), R.T. Lahey (USA), C.M. Lee (Korea), U. Muller (FRG), R.M. Norem (USA), R.I. Nigmatulin (Russia), M.C. Roco (USA), S.B. Savage (Canada), J.H. Whitelaw (UK), L. Zhou (P.R. China)

SCIENTIFIC COMMITTEE:

J. Bataille (Co–chairman, France), T. Fukano (Co–chairman, Japan)

FOR FURTHER INFORMATION: Please contact Prof. A. Serizawa, the Conference Chairman, at the following address:

Prof. A. Serizawa

Department of Nuclear Engineering, Kyoto University

Yoshida, Sakyo, Kyoto 606–01, Japan

Tel: +81–75–753–5829 Fax: +81–75–753–5829, 5845



The American Society of
Mechanical Engineers

CALL FOR PAPERS



The American Society of
Mechanical Engineers

INTERNATIONAL SYMPOSIUM

NUMERICAL METHODS FOR MULTIPHASE FLOWS

1994 ASME FLUIDS ENGINEERING DIVISION
SUMMER MEETING
LAKE TAHOE, NV
USA
JUNE 19-23, 1994

The Multiphase Flow Committee and the Coordinating Group on Computational Fluid Dynamics are organizing a symposium on numerical methods for multiphase flows. The purpose of the symposium is to provide a forum for the presentation of current activities and new ideas in the development of computational methods for multiphase flows and mathematical models.

Scope: The submitted papers should address the new applications of conventional techniques or new, more efficient, numerical methods which provide more accurate solutions to gas-liquid, gas-particle and solid-liquid flows as well as three phase flows. Papers on the development of numerical models are also welcomed. Typical topics may include:

- direct numerical simulations
- finite element techniques
- improved finite difference methods
- vortex simulations
- large eddy simulations
- two-fluid models
- lagrangian models

Prospective authors should submit three copies of a 300 word abstract to an organizer by July 16, 1993. Notification of accepted abstracts will be completed by Aug. 13, 1993. Full length papers will be due Oct. 15. These papers will be reviewed and notification of acceptance will be made on Dec. 15, 1993. ASME mats of the complete paper will be due on March 1, 1994.

Abstracts may be send to:

Clayton T. Crowe
Dept. Mech. Mats Engr.
Washington State University
Pullman, WA 99164-2920
Tel: 509-335-3214
Fax: 509-335-4662
E-mail: crowe@wsuvm1.csc.wsu.edu

Martin Sommerfeld
Lehrstuhl f. Strömungsmechanik
Freid.-Alex. Universität
D-8520 Erlangen
Germany
Tel: 09131-859501
Fax: 09131-859503
E-Mail: martin.sommerfeld@cnve.uni-erlangen.de

Yutaka Tsuji
Dept. Mech. Engr.
Osaka University
Yamada-oka 2-1, Suita
Osaka
Japan
Tel: 06-877-5111
Tel: 06-876-4975
E-Mail: tsuji@mupf.meim.osaka-u.Ac.Jp

Rich Johnson
INEL
P.O. Box 1625
Idaho Falls, ID 83415
Tel: 208-526-0955
Fax: 208-526-6970
E-Mail: rwj@inel.gov

Andrea Prosperetti
Dept. Mech. Engr.
The Johns Hopkins Univ.
Baltimore, MD 21218
Tel: 410-516-8534
Fax: 410-516-7254
E-Mail: prosper@polaris.me.jhu. eu

SAMPLE CALL FOR PAPERS

SYMPOSIUM ON DISPERSED PHASE - TURBULENCE INTERACTIONS

12TH U.S. NATIONAL CONGRESS OF THEORETICAL AND APPLIED MECHANICS

June 26 - July 1, 1994

University of Washington, Seattle

There will be fourteen symposia at the Congress, of which seven will be in Fluid Mechanics. The Symposium on Dispersed Phase - Turbulence Interactions, chaired by Sanjoy Banerjee of the University of California, Santa Barbara, is one of these. There will be six invited lectures at the Symposium, and the invited lecturers will also serve as session chairs and organizers. The session chairs/invited lectures are John Eaton, Stanford University; Julian Hunt, University of Cambridge; Juan Lasheras, UC San Diego, Martin Maxey, Brown University, Y. Tsuji, Osaka University and Pierre-Louis Violette, Electricite de France. A broad range of subjects will be covered at the symposium, including the effect of dispersed phases (bubbles, drops, particles) on continuous-phase turbulence, as well as the motion of the dispersed phase due to interactions between particles and with the continuous phase.

This call for papers is being circulated to stimulate contributed papers from researchers all over the world. Please submit 300-500 word summaries to either of the session co-chairs indicated below by September 1, 1993. Following receipt of the summaries, the preliminary selection will be made by the session organizers and the recommendations forwarded by October 1, 1993 to the Congress Scientific Program Committee, who will make the final decision. Upon acceptance, publication format requirements will be sent to the authors. Abstracts of all accepted papers will be collected in a volume and will be distributed to the attendees of the Congress. All invited lectures will be published in the conference proceedings.

Session Co-Chairs:

Professor John Eaton
Department of Mechanical Engineering
Stanford University
Stanford, CA 94305-3030, USA
Tel. (415) 723-4023; Fax (415) 725-4862
E-mail: eaton@sierra.stanford.edu

Professor Y. Tsuji
Faculty of Engineering
Osaka University
Suita, Osaka 565, JAPAN
Tel. (06) 877-5111; Fax (06) 876-4975;
E-mail: tsuji@mupf.meim.osaka-u.ac.jp

**ANNOUNCEMENT
AND CALL FOR CONTRIBUTIONS**

SEVENTH WORKSHOP ON TWO-PHASE FLOW PREDICTIONS

Erlangen, April 11 - 14, 1994

Lehrstuhl für Strömungsmechanik
Universität Erlangen-Nürnberg
Cauerstr. 4, 91058 Erlangen, Germany

The series of Workshops on Two-Phase Flow Predictions aims to be an international meeting where recent advances in the development of numerical methods and models for dispersed two-phase flows are presented and discussed. A further objective is to enhance the communication between experimentalists and those developing numerical tools and to demonstrate the future needs for experiments and experimental techniques. Therefore, contributions also related to detailed experimental studies and to the development of new experimental techniques are welcome. Papers on the following main topics are most welcome:

- 1) Numerical method and modelling of dispersed turbulent two-phase flows (turbulence models, heat and mass transfer, particle-wall interaction, particle-particle interactions,...)
- 2) Direct and large eddy simulations
- 3) Application of numerical methods for problems in chemical and biochemical industries
- 4) Application of numerical methods for two-phase combustion problems and chemical reaction
- 5) Experimental studies on dispersed two-phase flows including new measuring techniques.



CALL FOR PAPERS



**1st INTERNATIONAL PARTICLE TECHNOLOGY FORUM
August 17-19, 1994
Denver Marriott Hotel - City Center, Denver, Colorado, U.S.A.**

Held in conjunction with the
AIChE 1994 Summer National Meeting
August 14-17, 1994

Sponsored by: American Institute of Chemical Engineers (HOST)
American Association for Aerosol Research
American Ceramic Society
American Society of Mechanical Engineers
GVC-VDI-Gesellschaft Verfahrenstechnik und
Chemieingenieurwesen, Germany

Institute of Electrical and Electronics Engineers
(Instrumentation and Measurement Society)
Institution of Chemical Engineers
International Fine Particle Research Institute, Inc.
Society for Mining, Metallurgy and Exploration, Inc.
Society of Powder Technology, Japan

Announcement and Call For Papers

**INTERNATIONAL SYMPOSIUM
ON
TWO-PHASE FLOW MODELLING AND EXPERIMENTATION**

October 9-11, 1995 • Rome, Italy

The objectives of the Symposium are to bring together researchers, designers, experimentalists, modellers, and numerical analysts from industry, laboratories and academia active in the area of two-phase flow to present the state-of-the-art, to exchange their expertise and experiences and to further stimulate their research activities. The Symposium is organized by the Assembly of World Conferences on Experimental Heat Transfer Fluid Mechanics and Thermodynamics.

At the Symposium, keynote lectures will be presented during each morning and afternoon session on the state-of-the-art review on experimentation and modelling of two-phase flows.

Contributed papers are solicited dealing with experimental work, theory, analysis, design, numerical studies, modelling on fundamentals and applications of two-phase flow, including heat and mass transfer, fluid mechanics and thermodynamics aspects. Papers are also solicited reporting measurement techniques, visualization techniques, instrumentation, and analysis of experimental data as well as theory or numerical results.

The Conference Scientific Committee is responsible for the approval and acceptance of papers and for the final Symposium program.

DEADLINES

- | | |
|-------------------|--|
| September 5, 1994 | Three copies of abstracts due to the Lead Scientists of the Conference closest to your region. |
| October 3, 1994 | Authors to be notified of abstract acceptance. |
| December 5, 1994 | Full length manuscript due to the Lead Scientist. |
| February 15, 1995 | Authors to be notified of paper acceptance. |
| April 5, 1995 | Author-prepared mats due. |

For further information and abstract, contact

Dr. Gian Piero Celata, Symposium Chairman, ENEA Casaccia, Energy Department, Via Anguillarese, 301, I-00060 S.M. Galeria, Rome, Italy. Tel.: ++39 6 3048-3905; Fax: ++39 6 3048-3026 or 3048-4203

Dr. Ramesh K. Shah, Symposium Co-Chairman, Harrison Division, General Motors Corporation, Lockport, NY 14094-1896, USA. Tel.: ++1 716 439-3020; Fax: ++1 716 439-3648 or 439-3168.

Take a look at the new books for the Chemical Engineering professional!

Principles and Practice of Slurry Flow

C A Shook
University of Saskatchewan, Canada
M C Roco
National Science Foundation, USA

This book describes the basic concepts and methods for understanding and designing slurry flow systems, for in-plant installations and long distance transportation systems. The book provides a summary of recent developments, with explanations of the principles involved, for engineers involved in designing slurry pipelines.

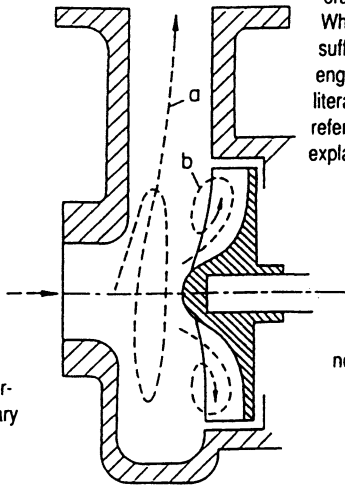


Fig. 9.4 Schematic for the vortex pump:
a. Through flow, b. Vortex flow

Mechanistic models, pump performance, wear considerations and instrument selection are also described. Where relevant recent research results are included, sufficient background material is given to allow an engineer of limited experience to read the appropriate literature. The book is intended to be a self-contained reference where terms are defined and concepts are explained. The book is based on direct experience of both authors in research, short courses and consulting in slurry transport technology.

CONTENTS: Basic Concepts for Fluids and Particles • Fluid - Particle Mixtures • Homogeneous Slurries • Calculations for Homogeneous Flows • Correlations for Non-homogeneous Slurries • Two Layer Model • Microscopic Modelling of Slurry Flows • Wear in Slurry Equipment • Pumps and Feeders • Instrumentation • Design and Operation Considerations • Bibliography • References • Appendices • Notation • Subject Index

August 1991

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From some of the most prominent researchers in fluid and particulate phenomena

PARTICULATE TWO-PHASE FLOW

M.C. Roco, National Science Foundation
and the University of Kentucky

Representing the work of 50 distinguished contributors, *Particulate Two-phase Flow* presents new measurement methods, experimental results and advanced numerical methods for particulate two-phase flow. This book covers basic concepts of flow phenomena as well as recent experimental and theoretical findings, focusing on qualitative aspects relevant to applications in chemical processing, metallurgy, plastics, materials synthesis, pharmaceutical and food processing.

Particulate Two-phase Flow brings the observations and findings of several of the world's most prominent researchers in flow phenomena together in a single unique volume, and includes material on micromechanical and probabilistic modeling, numerical simulations, and production of ultrafine particles via aerosols and colloids for materials with controlled microstructure. Important for researchers as well as students, this book contains valuable information on a variety of flows.

- A collection of 28 contributions on basic phenomena and advanced methods of investigation for particulate two-phase flow
- Contains review sections plus original research results on new measurement methods, theories and simulation techniques
- A unique source of data previously available only in specialized journals

Contents

PART I. EXPERIMENTS ON TWO-PHASE FLOW MICROSTRUCTURE

• Techniques for Analyzing the Behavior of Concentrated Suspensions • Simultaneous Imaging of the Velocity Fields of Two Phases • Quantitative Multipoint Measurements and Visualization of Dense Liquid-Solid Flows Using Laser Induced Photochemical Anemometry (LIPA) • Magnetic Resonance Imaging of Multiphase Systems • The Rheology of Concentrated Suspensions of Non-Colloidal Particles • Measurement of the Shear-Induced Microstructure of Concentrated Suspensions of Non-Colloidal Spheres • Channel Flows of Granular Materials and their Rheological Implications • The Effect of Particles on the Turbulence in a Boundary Layer • Unsteady Motion of Dense Suspensions and Rheological Behavior • Finite Size Effects in Fluidized Suspension Experiments • Dispersion Stability: A Thin Film Model for Concentrated Colloidal Dispersions • Structure and Mechanisms of Electro-Rheological (ER) Fluids • Periodic Liquid-Solid Flow Microstructure in a Centrifugal Pump • Aerosol Dynamics • Formation of Uniform Precipitates: Advances and Unresolved Questions

PART II. MODELING AND NUMERICAL SIMULATIONS

• Analytical Modeling of Multiphase Flow • Dynamics of Concentrated Colloidal Dispersions: Statistical Mechanical Approaches • Particle Dispersion by Organized Turbulent Structures • Use of Lagrangian Statistics to Describe Turbulent Dispersed Flows • Gas-Solid Flow in Pipes • Expert Systems in Solids Handling • Hydrodynamic Modeling of Circulating and Bubbling Fluidized Beds • Bubble Flow in Liquid-Solid Suspensions • Liquefaction and Solidification • Frictional, Inelastic Contact Models and Collision Operators for Molecular-Dynamics-Like Simulations of Dry Granular Solids • Stokesian Dynamics Simulation of Particulate Flows • Numerical Simulation of Suspension Flow on High Performance Computers • Numerical Simulation of the Motion of Particles at Large Reynolds Numbers

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