

## Report

# Summary of FLUCOME '97 Hayama

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**Abstract:** This article is a summary of the fifth Triennial International Symposium on Fluid Control, Measurement and Visualization, FLUCOME '97 Hayama, which was held from September 1 to September 4 in 1997 at Hayama, Japan. The FLUCOME symposium was held at first in Tokyo in 1985, the 2nd in 1988 in Sheffield, UK, the 3rd in 1991 in San Francisco, USA, the 4th in 1994 in Toulouse, France, and came back again to Japan in 1997. FLUCOME '97 Hayama was sponsored by the Society of Instrument and Control Engineers of Japan and Japan Science Foundation, and co-sponsored by the Japan Society of Mechanical Engineers, the Japan Hydraulics and Pneumatics Society and the Visualization Society of Japan. The participants exchanged new information and deepened their friendship among them. A lot of new ideas and important research results were reported and the new directions in fluid control, measurement and visualization were discussed freely. The sixth symposium chaired by Prof. A. Laneville will be held in Sherbrooke (Québec) Canada in 2000, and the seventh will be held in Italy in 2003.

**Keywords:** fluid control, fluid dynamics, fluid control system, fluid measurement, flow visualization.

## 1. Introduction

There may exist common important and interesting problems on fluid control, measurement and visualization in various engineering and scientific fields. In order to report and discuss such problems, the FLUCOME symposium, which was originated in Tokyo in 1985 with Prof. Y. Nakayama in the chair, was held every three years at various places in the world as Sheffield UK by Prof. R. Boucher in 1988, San Francisco USA by Prof. R. Woods in 1991, and Toulouse France by Dr. P. Hébrard in 1994. Under these circumstances, the symposium had gone around the world and came back again to Japan in 1997. This symposium was sponsored by the Society of Instrument and Control Engineers of Japan (SICE) and Japan Science Foundation, and was co-sponsored by the Japan Society of Mechanical Engineers, the Japan Hydraulics and Pneumatics Society, and the Visualization Society of Japan. The other supporting academic societies were the Society of Chemical Engineers, Japan; Information Processing Society of Japan; the Japan Petroleum Institute; Japan Society of Civil Engineers; Japan Society of Medical Electronics and Biological Engineering; Japanese Society for Artificial Organs; the Japan Society of Aeronautical and Space Sciences; the Pharmaceutical Society of Japan; the Japan Society of Fluid Mechanics.

Abridged name "FLUCOME" comes from International Symposium on FLUID CONTROL, MEASUREMENT and visualization, which suggest the research fields to discuss and promote widely in FLUCOME.

## 2. FLUCOME '97 Hayama

At the International Steering Committee of FLUCOME '91 San Francisco, 4th FLUCOME '94 was decided to be held in Toulouse and 5th FLUCOME '97 temporarily to be held in Japan. At the Committee of FLUCOME '94 Toulouse, 5th FLUCOME '97 chaired by Prof. K. Tsuchiya was officially decided to be held in Japan. Similarly

with the first symposium FLUCOME'85, the topics of all areas concerning fluid dynamics and modeling, fluid control and systems, hydraulics and pneumatics, fluid measurement, and physical and numerical flow visualization were covered and still more new applications to such fields as aerospace, bio-medical engineering, environmental engineering and micro-machine were included. The conference consisted of plenary sessions (keynote papers), invited tutorial lecture, parallel technical sessions, technical visits, luncheon meetings and banquet, and enjoyable social programs. The conference site unified with accommodation is situated in the central part of the Miura Peninsula, and the area is known as the holiday resort closest to Tokyo such as Sagami Bay dotted with famous bathing places and marinas in Japan.

1st Circular and Call for Papers was distributed at the address of the mail list supplied by the former chairman. 204 abstracts were reviewed and all of them were accepted as the first review. After the notification, the authors were asked to submit their full papers for the second review. 178 full papers were submitted. Each full paper was reviewed by two reviewers. Finally, 165 papers, some of which were revised, were published in the Proceedings of FLUCOME'97 Hayama. Five papers were written as keynote papers to present new research aspects and a paper as a tutorial lecture.

The registration was started in the afternoon of the first day, August 31, 1997. The welcome party was held at 7 p.m. at Foyer in the Symposium site, Shonan Village Center, and about 70 people gathered and deepened their friendship with taking snack.

On the second day, September 1, after the chairman, Prof. K. Tsuchiya, President of SICE, Prof. N. Suda, and the former chairman, Dr. P. Hébrard, made their opening addresses from 9 a.m. the symposium was started with plenary session, where three keynote papers were presented in the Auditorium; "Finite analytic modeling of complex flows" by Prof. Ching Jen Chen (Florida A&M University and Florida State University, USA), "Stability and nonlinear behavior of poppet valve circuits" by Prof. Satoru Hayashi (Tohoku University, Japan), "Different wake flow regimes in vortex-induced vibrations" by Prof. Andre Laneville (University of Sherbrooke, Canada). In the afternoon, 10 technical sessions about the research fields, which were Measurements, Fluid Power Control, Fluidics, Mechanics and Visualization, were made in the five rooms in parallel with a coffee break between the sessions.

On the third day, September 2, the tutorial lecture "Introduction to bondgraphs" was given by Prof. J. U. Thoma (The University of Waterloo, Canada) in the morning in parallel with 8 technical sessions, and also 8 technical sessions were made in the afternoon.

On the fourth day, September 3, at the plenary session in the morning, two keynote papers were presented in the Auditorium; "Process tomography — a new trend industrial flow measurement —" by Prof. Franz Mesch (Universität Karlsruhe, Germany) and "Full scale measurement and wind tunnel modeling on the effects of wind on the efficiency of dry cooking towers" by Prof. Qing-Ding Wei (Peking University, China). 4 technical sessions were organized in the morning. The Exhibition was held for 4 days during the Symposium (9/1-9/4) at Foyer at the Conference Site and a core time of it was provided in the afternoon of September 3. This was a kind of poster presentation at which individual researchers and 28 companies presented their development in current and new technologies. Two technical tours were organized in the afternoon. One was Course A which included Mitsubishi Electric Co., Ltd. and Mitsubishi Co., Ltd. and the other was Course B Japan Marine Science & Technology Center and MEGA-FLOAT Oppama Branch.

Numbers of sessions and papers in each research field were as follows:

<b>General Sessions</b> (41 sessions in total, 5 rooms in parallel) included		
<b>Measurements</b>	8 sessions	32 papers
<b>Fluid Power Control</b>	11 sessions	49 papers
<b>Fluidics</b>	3 sessions	11 papers
<b>Mechanics</b>	9 sessions	30 papers
<b>Visualization</b>	10 sessions	38 paperse

The welcome banquet for participants and guests of the support group was held at Kamakura Prince Hotel in the evening on September 3. The chairman of FLUCOME'97, Prof. K. Tsuchiya, gave a warm speech, hoping to build up friendship among the participants and to exchange new information through the Symposium for the development of fluid control, measurement and visualization. Then, on behalf of participants, two presidents of the cosponsor societies, Prof. A. Yamaguchi and Prof. H. Kato and two former chairmen, Prof. Y. Nakayama, Prof. R. F. Boucher, and next chairman, Prof. A. Laneville, gave the address thanking to all of the authors, sponsors, committee members and the other participants and congratulating the success of the conference.

The steering committee was opened in the evening of the second day and decided next sixth FLUCOME to be held in Sherbrooke (Québec), Canada, chaired by Prof. A. Laneville in 2000 and the seventh FLUCOME temporarily to be held in Italy in 2003.

***Authors' Profiles***



Kiichi Tsuchiya: He started as an instrument and control engineer after graduation from the graduate school of Waseda University in 1954. He joined the faculty of Mechanical Engineering Department of Waseda University in 1963 and has been a professor since 1969. His current scientific interests include the fluid control, bio-control, biomedical engineering and visualization. He serves as President of the Society of Life Support Technology of Japan, President of the Visualization Society of Japan, President of the Japan Society of Mechanical Engineers and Director of the Society of Instrument and Control Engineers of Japan.



Kenji Araki: He received his Dr. of Engineering in Precision Mechanical Engineering Department at the University of Tokyo in 1970 and has worked at Saitama University as a professor. His research interest are fluid power control, human support engineering and control of sputterless spot welding. He served as Director of the Japan Hydraulics and Pneumatics Society (JHPS), Chairman of Symposium Committee of FLUCOME'97 and Vice Chairman of Organizing Committee of 3rd JHPS International Symposium on Fluid Power Control.