

Background and Topics of the Symposium

At present, three national research institutes are carrying out a study on Smart Control of Turbulence ("Smart Control of Turbulence: A Millennium Challenge for Innovative Thermal and Fluids Systems", Project for Organized Research Combination System by the Ministry of Education, Culture, Sports, Science and Technology, Executive Manager: Hideo Ohashi, President, Kogakuin University, Steering Committee Chair: Nobuhide Kasagi, Professor, The University of Tokyo). The purpose of this study is to realize the smart turbulence control, which should lead to tremendous technological impacts such as drag reduction and enhancement in combustion and heat transfer, by developing highly intelligent fluid-dynamic devices with new functions. This interdisciplinary research target can be fulfilled by the unique collaboration between three national laboratories, namely, NAL (National Aerospace Laboratory of Japan), AIST (National Institute of Advanced Industrial Science and Technology), and NMRI (National Maritime Research Institute). Leading scientists at several top universities will also join and help with this project.

In this Symposium, invited speakers will give overviews on the recent study of smart control of turbulence and the speakers of the each research institutes will present following research targets: (1) conceptual design of micro devices for active feedback control of turbulence, (2) study on control of turbulent combustion, (3) turbulence control with mechano-chemical functionalization of fluids (surfactants, micro bubbles, ... etc.), and (4) large-scale numerical simulation of shear flow turbulence, turbulence combustion, and turbulence control mechanisms.

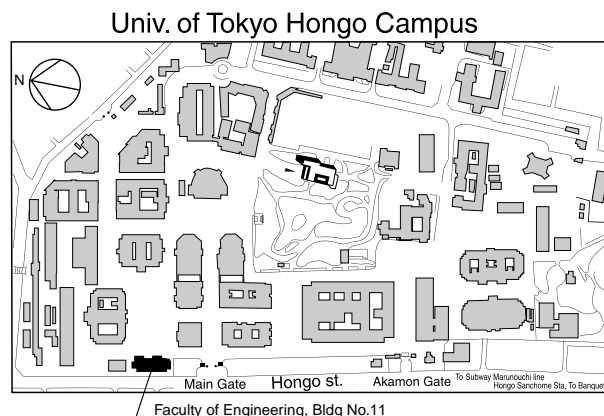
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[Symposium Site]

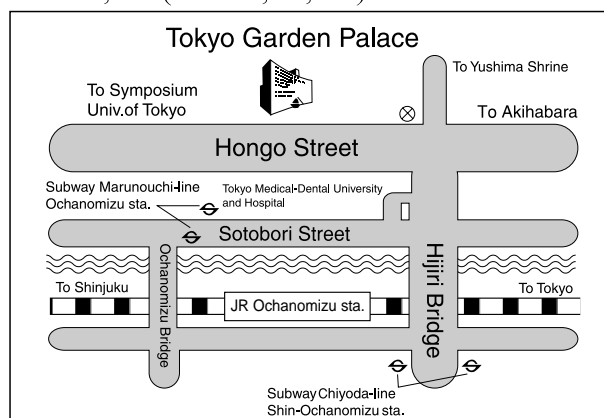


[Banquet]

Date: March 4th 18:30 - 20:30

Place: Tokyo Garden Palace Hotel, room "Nishiki"

Fee: ¥5,000 (Student, ¥2,000)



Secretariat of

3rd Symposium on Smart Control of Turbulence

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4th Symposium on Smart Control of Turbulence

Faculty of Engineering, Bldg No.11
The University of Tokyo
Tokyo, Japan

March 2-4, 2003

Sponsors

National Aerospace Laboratory of Japan (NAL)
National Institute of Advanced Industrial Science
and Technology (AIST)
National Maritime Research Institute (NMRI)

Supporting Organization

Ministry of Education, Culture, Sports,
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The Japan Society of Mechanical Engineers (JSME)
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Space Sciences (JSASS)
The Society of Naval Architects of Japan (SNAJ)

Center for Smart Control of Turbulence

http://www.turbulence-control.gr.jp/sympo_e/FY2001/

Time Table

March 2 (Sun)

17:30-19:30 Registration & Reception Party

March 3 (Mon)

09:30-09:50 Opening and Welcome Address

S. Ogaki, Dean Graduate School of Engineering,
Univ. of Tokyo
H. Ohashi (Executive Manager of the Project),
President, Kogakuin Univ.

09:00-10:00 Overview of Turbulence Control Project

N. Kasagi (Univ. of Tokyo)

10:00-12:00 Technical Session 1

(Active Control of Turbulence)

10:10-11:00 **Active Controls of Flows over Bluff Bodies
for Drag Reduction**

H. Choi (Invited Talk), Seoul National Univ.

11:00-11:30 **Toward Smart Control of Separation
around a Wing**

**-Development of an Active Separation Control
System-**

*A. Nishizawa, S. Takagi (NAL),
H. Abe, R. Maeda, H. Yoshida (AIST)

11:30-12:00 **Toward Smart Control of Separation
around a Wing**

**-An Evaluation System of Flow Drags and
Control Devices-**

*T. Segawa, H. Abe, Y. Kikushima, H. Yoshida
(AIST), A. Nishizawa, S. Takagi (NAL)

[Lunchtime]

13:20-15:20 Technical Session 2

**(Turbulence Control by Using of Functionality
of Fluid Property)**

13:20-14:10 **Simulations of Turbulent Drag Reduction
Using Micro-Bubbles**

M. R. Maxey (Invited Talk), J. Xu, S. Dong,
G. E. Karniadakis, Brown Univ.

14:20-14:50 **Microbubbles as a Skin Friction Reduction
Devic**

-A Midterm Review on the Research-

*H. Kato (Toyo Univ.), Y. Kodama (NMRI)

14:50-15:20 **Numerical Simulation of Transient Microbubble
Flow**

*K. Sugiyama (NMRI), T. Kawamura, S. Takagi,
Y. Matsumoto (Univ. of Tokyo)

[Break]

15:40-17:40 Technical Session 3

(Control of Turbulent Combustion)

15:40-16:30 **Model Based Active Control of Combustion,
Recent Developments and Implementations**

A. F. Ghoniem (Invited Talk), A. Annaswamy, M.I.T.

16:40-17:10 **Local Flame Structure of Turbulent Premixed
Flame**

-DNS and CH/OH PLIF-

*M. Tanahashi, Y. Nada, S. Tsukinari,
T. Saitoh, T. Miyauchi (Tokyo Inst. of Tech.),
G.-M. Choi (NAL)

17:10-17:40 **Evaluation of Chemiluminescence as Sensor
for Controlling Lean Premixed Combustion**

*L. Zimmer, S. Tachibana, T. Yamamoto,
Y. Kurosawa, K. Suzuki (NAL)

**18:30-20:30 Banquet(at Tokyo Garden Palace Hotel,
room "Nishiki")**

March 4 (Tue)

09:30-11:30 Technical Session 4

(Active Control of Turbulence)

09:30-10:20 **Sensors for Flow Measurements based on
MEMS Technology**

G. Stemme (Invited Talk), Royal Institute of
Technology

10:30-11:00 **Evaluation of a GA-based Feedback Control
System with Arrayed Micro Sensors and
Actuators in a Turbulent Channel Flow**

*Y. Suzuki, T. Yoshino, N. Kasagi (Univ. of Tokyo)

11:00-11:30 **Suboptimal Turbulence Control Algorithm
for the Modification of Reynolds Stress in
the Near-wall Layer**

*K. Fukagata (AIST, Univ. of Tokyo),
N. Kasagi (Univ. of Tokyo)

[Lunchtime]

13:00-14:15 Technical Session 5

**(Turbulence Control by Using of Functionality
of Fluid Property)**

13:00-13:45 **Turbulence Structures of Microbubble Flow
Measured by PIV/PTV and LIF Techniques**

*A. Kitagawa (NMRI), A. Fujiwara (Univ. of Tokyo),
*K. Hishida (Keio Univ.), Y. Kodama (NMRI)

13:45-14:15 **Experimental Study on the Mechanism of
Turbulent Heat Transfer in Drag Reducing
Flow by Surfactant Additives**

*F.-Ch. Li, Y. Kawaguchi (AIST),
K. Hishida (Keio Univ.)

[Break]

14:35-16:35 Technical Session 6

(Control of Turbulent Combustion)

14:35-15:25 **Modelling of Premixed Turbulent Combustion
for Smart Control**

R. Borghi (Invited Talk), Universites Aix-Marseille

15:35-16:05 **Numerical Analysis of Flame Behavior in
Gas Turbine Combustors Using LES**

*J. Shinjo, Y. Mizobuchi, S. Ogawa (NAL)

16:05-16:35 **Analysis of Unstable Phenomena in Premixed
Flame Burners and their Active Control**

*A. K. Hayashi, H. Sato, T. Endo, Y. Yasunami,
S. Yoshimi (Aoyama Gakuin Univ.),
S. Ogawa (NAL),
M. Ikame, T. Kishi, K. Hiraoka, K. Harumi,
H. Oka (NMRI)

16:35-16:45 **Conclusions and Future Plans**

Y. Kodama (NMRI)