

## CURRICULUM VITAE

Yoichiro MATSUMOTO

### Personal Information

Name: Yoichiro Matsumoto

Date of Birth: April 25, 1949

Nationality: Japanese

Sex: Male

City of Birth: Kakogawa, Japan

Marital Status: Married

Affiliation: The University of Tokyo

Position: Executive Vice President, Professor of Mechanical Engineering

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### Education

1972: Department of Mechanical Engineering, The University of Tokyo

1974: Department of Mechanical Engineering, Graduate School, The University of Tokyo  
(Master of Engineering)

1977: Department of Mechanical Engineering, Graduate School, The University of Tokyo  
(Doctor of Engineering)

### Professional Experience

1977: Lecturer of Mechanical Engineering, The University of Tokyo

1978: Associate Professor of Mechanical Engineering, The University of Tokyo

1992: Professor of Mechanical Engineering, The University of Tokyo

2004-2006: Vice-Dean, School of Engineering, The University of Tokyo

2006-2008: Dean, School of Engineering, The University of Tokyo

2008-2009: Special Adviser to the President, Vice President, The University of Tokyo

2009-present: Executive Vice President, The University of Tokyo

### Major Scientific Interest:

Fluids Engineering, Molecular Dynamics, Rarefied Gas Dynamics, Bubble Dynamics, Multi-phase Flows, Medical Application of Fluids Engineering, Development of Living Matter Simulator, Knowledge Structuring

### **Membership of Societies / Professional Institutions**

Fellow of the Japan Society of Mechanical Engineers  
Member of Science Council of Japan  
Member of the Engineering Academy of Japan  
Honorary member of the Visualization Society of Japan  
Member of the Japanese Society for Multiphase Flow  
Fellow of the Japan Society of Fluid Mechanics  
Member of Heat Transfer Society of Japan  
Member of Turbomachinery Society of Japan  
Member of Combustion Society of Japan  
Member of the Japan Society for Computational Engineering and Science  
Member of Japanese Society for Engineering Education  
Fellow of the American Society of Mechanical Engineers  
Member of America Physical Society  
Member of International Association of Hydraulic Engineering and Research

### **Honors**

JSME Young Engineering Award, “*Propagation of Pool Burning*”, 1983  
JSME Medal for Outstanding Paper, “*Thin-Film Formation on a Rotating Disk*”, 1992  
JSME Medal for Outstanding Paper, “*Numerical Simulation of Bubble Plume in a Tank with Free Surface*”, 1998  
Paper Award, JSME, “*Forces acting on a Rising Bubble in a Quiescent Liquid*”, 1998  
Computational Mechanics Award, JSME, 1998  
Fluids Engineering Frontier Award, JSME, 1999  
Fellow of the Japan Society of Mechanical Engineers, 2000  
Paper Award, Turbomachinery Society of Japan, “*Prediction of Suction Specific Speed of Axial Flow Pump by Using Numerical Simulation with Bubble Flow Model*”, 2004  
Fellow of the Japan Society of Fluid Mechanics, 2005  
Fellow of the American Society of Mechanical Engineers, 2005  
Calvin W. Rice Lecture Award, “*Medical Application in Fluids Engineering*”, ASME, 2005  
Lifetime Member of the American Society of Mechanical Engineers, 2005  
JSME Medal for Outstanding Paper, “*Renal Stone Comminution Utilizing Cloud Cavitation Erosion*”, 2007  
Fluids Engineering Award, JSME, 2007  
JACM Award for Computational Mechanics, 2007  
APACM Award for Computational Mechanics, 2010  
Ted Belytschko Applied Mechanics Award, ASME, 2010  
JSME Medal for Outstanding Paper, “*Prediction of Cavitation Intensity and Erosion Area in Centrifugal*”

*Pump by Using Cavitating Flow Simulation with Bubble Flow Model*”, 2011

### **Other Professional Activities**

#### Journal Editorial Boards

- Editor of *JSME International Journal Series B*, 1996-1998
- Editorial Advisory Board Member of *Computational Fluid Dynamics Journal*, 1998-2001
- Editorial Advisory Board Member of *Experiments in Fluids*, 1998-2004
- Associate Editor of *ASME Journal of Fluids Engineering*, 2000-2002
- Editorial Board Member of *Shock Waves*, 2000-2007
- Editorial Board Member of *Fluid Dynamics Research*, 2002-2006
- Editorial Advisory Board Member of International Journal of Multiphase Flow, 2004-present
- Editorial Advisory Board Member of Computational Mechanics, 2006-present

#### Academic Societies(selected)

- Chair, Computational Mechanics Division, Japan Society of Mechanical Engineers, 1997
- Vice-President, the Japanese Society for Multiphase Flow, 2000
- Chair, Fluids Engineering Division, Japan Society of Mechanical Engineers, 2001
- President, the Japan Society of Fluid Mechanics, 2004
- President, the Visualization Society of Japan, 2007
- Vice President, Japan Society of Mechanical Engineers, 2008
- President-elect, Japan Society of Mechanical Engineers, 2009
- President, Japan Society of Mechanical Engineers, 2010
- President of Japanese Society for Engineering Education, 2012-

#### Conference Committees (selected)

- Co-chair, *ISAC '97 High Performance Computing on Multiphase Flows*, 1997
- Co-chair, *3<sup>rd</sup> ASME-JSME Joint Fluids Engineering Conference*, 1999
- Co-chair, *NSF-JSPS Joint Seminar on Two-Phase Flow Dynamics*, 2000
- Co-chair, *Fifth International Symposium on Cavitation (CAV2003)*, 2003
- Chair, *Fifth International Conference on Multiphase Flow (ICMF2004)*, 2004
- Chair, *10<sup>th</sup> International Symposium on Therapeutic Ultrasound 2010 (ISTU2010)*, 2010
- Chair, *1<sup>st</sup> ASME-JSME-KSME Joint Fluids Engineering Conference (AJK2011-FED)*, 2011

### **Lectures:**

Fluid Mechanics, Molecular thermo-fluid engineering, Mechano-bioengineering, Nano-micro medical system

### **Ph. D. Committees Chaired:**

1. Tomoyasu Nonoshita, “Transient Behavior of Swirling Flow with Water Column Separation”, 1990

2. Youngho Lee, "Study on Three Dimensional Behavior of Cavity Flow by PIV", 1992
3. Jun Matsui, "Molecular Dynamics of Monatomic Gas Colliding on Solid Surface", 1993
4. Fumio Takemura, "Internal Phenomena on Bubble Motion", 1993
5. Masaharu Kameda, "Shockwave Propagation in Liquid Containing Bubbles", 1994
6. Takeshi Miyamoto, "Numerical Study on Transient Behavior of Mist Flow Generated by Air-assist Injector", 1995
7. Shu Takagi, "A Rising Bubble Behavior in Liquid", 1995
8. Yuichi Murai, "Three Dimensional Structure of Bubbly Flow", 1996
9. Masahiko Shibahara, "Quantum Molecular Dynamics Study on Photothermal Conversion", 1997
10. Takashi Tokumasu, "Construction of Collision Model of Diatomic Molecules", 1998
11. Nobuhiro Yamanishi, "Dynamics of Gas-Surface Interaction", 1998
12. Nobuyuki Tsuboi, "Structure of Non-equilibrium Interaction between Shock Waves and Boundary Layer in Hypersonic Rarefied Flow", 2000
13. Kazuyasu Sugiyama, "Fine Structure of Bubbly Turbulent Flow", 2000
14. Junho Choi, "Dynamic properties of liquid thin films in submerged system", 2001
15. Mayeed Mohammed Sajjad, "Characterization of Ultrathin Liquid Perfluoropolyether Films on Solid Carbon Surfaces by Monte Carlo Simulation", 2002
16. Kentaro Tanaka, "The effect of lubricant molecule on the stability of frictional vibration", 2002
17. Yukinori Sakiyama, "Multi-scale Analysis for Reactive Rarefied Gas Flow", 2002
18. Lertnuwat Boonchai, "Numerical Simulation of Cavitating Flows", 2003
19. Soo-Hyun So, "Characteristics of Flow Structure in Bubbly Channel Flow", 2003
20. Hiroki Yamaguchi, "Vibrational Relaxation / Excitation Collision Model of Diatomic Molecules for Rarefied Gas Flows", 2004
21. Shin Yoshizawa, "Behavior of a Bubble and a Bubble Cloud in an Ultrasound Field", 2006
22. Gota Kikugawa, "Effect of Impurities on Microscopic Structure of Liquid-Vapor Interface", 2006
23. Teiichiro Ikeda, "Use of Focused Ultrasound-induced Cavitation Collapse for Lithotripsy", 2006
24. Ikuya Kinefuchi, "Molecular Beam Study on Oxidation of Silicon Surface", 2006
25. Taisuke Sugii, "Multi-scale simulation of lipid bilayers", 2007
26. Yukio Kaneko, "Non-invasive Treatment of Tumor Using Focused Ultrasound with Microbubbles", 2007
27. Mitsuaki Kato, "Numerical Analysis of nonlinear effect in focused ultrasound", 2008
28. Yunqiao Liu, "The Behavior of an Encapsulated Microbubble in the Ultrasound Field", 2011
29. Toki Uda, "Experimental Analysis for Flow Field and Aeroacoustic Sound Using Time-resolved PIV", 2011
30. Norio Shimamoto, "Mathematical modeling based on fractional calculus for diffusive transport in fractal structure", 2011
31. Touru Kawaguchi, "Influential Factors of Self-Assembled Monolayer on Solid-Liquid Interfacial

Heat Transfer”, 2012

32. Toshiyuki Oyama, “Numerical Analysis of single bubble bouncing on a free surface / wall”, 2012
33. Nobuya Miyoshi, “Scattering Behavior of Water Molecules on a Solid Surface”, 2013

## **Publications**

### Journal Papers

1. Yoichiro Matsumoto, Takamoto Saito, “Surface Tension Driven Flow Caused by Surface Heating” (in Japanese), *Trans. JSME Series B* 46-402, pp282-290, 1980
2. Yoichiro Matsumoto, Takamoto Saito, “Propagation of Pool Burning” (in Japanese), *Trans. JSME Series B* 46-405, pp998-1006, 1980
3. Matsumoto, Y. and Saito, T., “Flame Propagation over Liquid Fuel at Sub-flash Temperature”, *Bulletin of JSME, Vol.24 No.187*, pp160-167, 1981
4. Yoichiro Matsumoto, Makoto Aoki, “Growth and Collapse of Cavitation Bubbles: Change of Nuclei Population due to Collapse of Bubbles” (in Japanese), *Trans. JSME Series B* 49-447, pp2265-2272, 1983
5. Yoichiro Matsumoto, “Response of Small Gas Bubble for the Ambient Pressure Reduction (Contribution of Condensation inside the Bubble by Homogeneous Nucleation)” (in Japanese), *Trans. JSME Series B, 50-455*, pp1649-1657, 1984
6. Matsumoto, Y. and Aoki, M., “Growth and Collapse of Cavitation Bubbles (Distribution Change of Cavitation Nuclei due to the Collapse of Cavitation Bubbles)”, *Bulletin of JSME, Vol.27 No.229*, pp1352-1357, 1984
7. Matsumoto, Y. and Beylich, A. E., “Influence of Homogeneous Condensation inside a Small Gas Bubble on its Pressure Response”, *Journal of Fluids Engineering Vol.107*, pp281-286, 1985
8. Yoichiro Matsumoto, “Influence of Homogeneous Condensation inside a Bubble on Cavitation Inception” (in Japanese), *Trans. JSME Series B, 51-467*, pp2036-2042, 1985
9. Yoichiro Matsumoto, Toshiaki Okudaira, Masayoshi Wada, Hisao Enomoto, Yasumasa Ichikawa, “Influence of Cavitation on the Nuclei Distribution” (in Japanese), *Trans. JSME Series B, 51-472*, pp3844-3851, 1985
10. Yoichiro Matsumoto, “Influence of Noncondensable Gas on Bubble Motion (Effect of the Diffusion Between Vapor and Noncondensable Gas on the Evaporation and Condensation on the Bubble Wall)” (in Japanese), *Trans. JSME Series B, 52-475*, pp1168-1174, 1986
11. Hisao Enomoto, Tatsuo Kawada, Hideo Ohashi, Yoichiro Matsumoto, Kazuhiro Tanaka, “Performance Study of a Mixed-Flow Impeller by Means of Partial Impellers” (in Japanese), *Trans. JSME Series B, 52-477*, pp2117-2120, 1986
12. Matsumoto, Y., “Contribution of Homogeneous Condensation inside Cavitation Nuclei to Cavitation Inception”, *Journal of Fluids Engineering, ASME, Vol.108*, pp433-437, 1986

13. Yoichiro Matsumoto, Hideji Nishikawa, Hideo Ohashi, "Performance of Cascade of Blades in Two-Phase Flow (1st Report, Modeling and Numerical Calculation)" (in Japanese), *Trans. JSME Series B*, 53-495, pp3210-3219, 1987
14. Matsumoto, Y., Nishikawa, H. and Ohashi, H., "Performance of Cascade of Blades in Two Phase Flow (Modeling and Numerical Calculation)", *JSME International Journal, Ser. II, Vol. 31, No. 4*, pp652-659, 1988
15. Yoichiro Matsumoto, Taku Ohara, Isao Teruya, Hideo Ohashi, "Liquid Film Formation on a Rotating Disk (1st Report, Numerical Analysis at the Initial Stage)" (in Japanese), *Trans. JSME Series B*, 54-499, pp569-574, 1988
16. Yoichiro Matsumoto, Masao Watanabe, "Nonlinear Oscillation of Gas Bubble with Internal Phenomena" (in Japanese), *Trans. JSME Series B*, 54-501, pp1051-1057, 1988
17. Kazuhiro Tanaka, Michiharu Arai, Shigeru Ikeo, Yoichiro Matsumoto, "Radial thrust of screw centrifugal impeller" (in Japanese), *Turbomachinery Vol.17, No.4*, pp215-221, 1989
18. Ohara, T., Matsumoto, Y. and Ohashi, H., "The film formation dynamics in spin coating", *Physics of Fluids A 1(12)*, pp1949-1959, 1989
19. Matsumoto, Y., Ohara, T., Teruya, I. and Ohashi, H., "Liquid Film Formation on a Rotating Disk (Numerical Analysis at the Initial Stage)", *JSME International Journal, Series II, 32-1*, pp52-56, 1989
20. Matsumoto, Y. and Watanabe, M., "Nonlinear Oscillation of Gas Bubble with Internal Phenomena", *JSME International Journal, Series II, 32-2*, pp157-162, 1989
21. Taku Ohara, Yoichiro Matsumoto, Norio Shimamoto, Hideo Ohashi, "Liquid Film Formation on a Rotating Disk (2nd Report, Numerical Analysis of the Film Thinning Process with Heat and Mass Transfer)" (in Japanese), *Trans. JSME Series B*, 55-514, pp1640-1648, 1989
22. Yoichiro Matsumoto, Masao Watanabe, "Numerical Simulation on a Bubble Motion with Full N-S Equations" (in Japanese), *Trans. JSME Series B*, 55-519, pp3282-3287, 1989
23. Hideo Ohashi, Yoichiro Matsumoto, Yasumasa Ichikawa, Takashi Tsukiyama, Takashi Seshimo, "Characteristics of circulating two phase flow tunnel" (in Japanese), *Trans. JSME Series B*, 56-522, pp16-21, 1990
24. Ohashi, H., Matsumoto, Y., Ichikawa, Y. and Tsukiyama, T., "Air/water two-phase flow test tunnel for airfoil studies", *Experiments in Fluids* 8, pp249-256, 1990
25. Yoichiro Matsumoto, Hideji Nishikawa, Hideo Ohashi, "Pressure Wave Propagation in Bubbly Liquid" (in Japanese), *Trans. JSME Series B*, 56-525, pp1237-1243, 1990
26. Nishikawa, H., Matsumoto, Y. and Ohashi, H., "Numerical Calculation of The Bubbly Two-Phase Flow around an Airfoil", *Computers & Fluids*, 19-3/4, pp453-460, 1991
27. Taku Ohara, Yoichiro Matsumoto, Hideo Ohashi, Norio Shimamoto, "Liquid Film Formation on a Rotating Disk", *Heat Transfer Japanese Research Vol.20 No.1*, pp36-55, 1991
28. Taku Ohara, Hideo Ohashi, Yoichiro Matsumoto, "Thin-Film Formation on a Rotating Disk" (in Japanese), *Trans. JSME Series B*, 57-543, pp3807-3814, 1991

29. Yoichiro Matsumoto, Fumio Takemura, "Effect of Internal Phenomena on Bubble Motion (1st, Report, Effects of thermal diffusion, phase change on the gas-liquid interface and mass diffusion between vapor and noncondensable gas at the collapsing phase)" (in Japanese), *Trans. JSME Series B*, 58-547, pp645-652, 1992
30. Yoichiro Matsumoto, Jun Matsui, Hideo Ohashi, "Numerical Analysis on Gas-Surface Interaction by Molecular Dynamics Method (1st Report, Simulation with Lennard-Jones Molecules)" (in Japanese), *Trans. JSME Series B*, 58-551, pp2046-2051, 1992
31. Fumio Takemura, Yoichiro Matsumoto, "Effect of Internal Phenomena on Bubble Motion (2nd Report, Effects of Transport Phenomena and Mist Formation Inside Bubble at the Expanding Phase)" (in Japanese), *Trans. JSME Series B*, 58-551, pp2060-2067, 1992
32. Matsui, J. and Matsumoto, Y., "Study of Scattering Process in Gas-Surface Interactions", *Rarefied Gas Dynamics: Experimental Techniques and Physical Systems*, AIAA, pp515-524, 1992
33. Jun Matsui, Yoichiro Matsumoto, Hideo Ohashi, "Numerical Analysis of Gas-Surface Interaction by Molecular Dynamics Method [2nd Report, Scattering Dynamics of Xenon on Pt(111)]" (in Japanese), *Trans. JSME Series B*, 58-553, pp2744-2749, 1992
34. Matsumoto, Y. and Kameda, M., "Pressure wave phenomena in bubbly liquid", *Nuclear Engineering and Design*, 141, pp123-134, 1993
35. Yoichiro Matsumoto, Masaharu Kameda, "Propagation of Shock Waves in Dilute Bubbly Liquids (1st Report, Governing Equations, Hugoniot Relations, and Effect of Slippage between Two Phases)" (in Japanese), *Trans. JSME Series B*, 59-564, pp2386-2394, 1993
36. Masaharu Kameda, Yoichiro Matsumoto, "Propagation of Shock Waves in Dilute Bubbly Liquids (2nd Report, Effect of Internal Phenomena of the Bubble)" (in Japanese), *Trans. JSME Series B*, 59-564, pp2395-2402, 1993
37. Matsui, J. and Matsumoto, Y., "Numerical Analysis of an Atomic Molecule Interaction on Surface", *Thermal Science and Engineering*, 2-1, pp28-34, 1994
38. Matsumoto, Y. and Tokumasu, T., "Cluster Formation of Diatomic Molecules", *Thermal Science and Engineering*, 2-1, pp138-144, 1994
39. Matsumoto, Y. and Takemura, F., "Influence of Internal Phenomena on Gas Bubble Motion (Effects of Thermal Diffusion, Phase Change on the Gas-Liquid Interface and Mass Diffusion between Vapor and Noncondensable Gas at the Collapsing Phase)", *JSME International Journal, Ser. B*, 37-2, pp288-296, 1994
40. Takagi, S., Prosperetti, A. and Matsumoto, Y., "Drag Coefficient of a Gas Bubble in an Axisymmetric Shear Flow", *Physics of Fluids*, Vol.6, pp3186-3188, 1994
41. Takemura, F. and Matsumoto, Y., "Influence of Internal Phenomena on Gas Bubble Motion (Effects of transport phenomena and mist formation inside bubble in the expanding phase)", *JSME International Journal, Series B*, 37-4, pp736-745, 1994
42. Masaharu Kameda, Yoichiro Matsumoto, "Propagation of Shock Waves in Dilute Bubbly Liquids (3rd

- Report, Effect of Spatial Distribution of Bubbles)” (in Japanese), *Trans. JSME Series B* 61-584, pp1238-1245, 1995
43. Nobuhiro Yamanishi, Yoichiro Matsumoto, “Molecular Dynamics Study of a Diatomic Gas Molecule Scattering from a Solid Surface” (in Japanese), *Thermal Science and Engineering*, 3-2, pp25-29, 1995
  44. Shu Takagi, Yoichiro Matsumoto, Huaxiong Huang, “Numerical Analysis of a Single Rising Bubble Using Boundary-Fitted Coordinate System” (in Japanese), *Trans. JSME Series B* 61-586, pp1976-1983, 1995
  45. Nobuhiro Yamanishi and Yoichiro Matsumoto, “Molecular Dynamics Simulation of a Diatomic Gas Molecule Scattering from a Solid Surface”, *Thermal Science and Engineering*, 3-3, pp33-36, 1995
  46. Yoichiro Matsumoto, Yuichi Murai, “Numerical Simulation of Bubble Plume in a Tank with Free Surface” (in Japanese), *Trans. JSME Series B*, 61-588, pp2818-2825, 1995
  47. Hideo Ohashi, Akira Sakurai, Jiro Nishihama, Katsuya Nagayama, Yoichiro Matsumoto, Tomoyasu Nonoshita, “Experimental Study of Fluid Forces on Whirling Centrifugal Impeller (2nd Report, Impeller in Vaned Diffuser)” (in Japanese), *Trans. JSME Series B* 61-591, pp3862-3868, 1995
  48. Takeshi Miyamoto, Takashi Kobayashi, Yoichiro Matsumoto, “Modeling and Numerical Simulation of Transient Sprays from an Air-Assist Injector” (in Japanese), *Trans. JSME Series B* 61-591, pp4163-4170, 1995
  49. Yuichi Murai, Yoichiro Matsumoto, “Numerical Method for Bubbly Flows Using the Pressure Equation” (in Japanese), *Trans. JSME Series B* 62-593, pp85-92, 1996
  50. Takeshi Miyamoto, Takashi Kobayashi, Yoichiro Matsumoto, “Prediction of Mean Diameter and Velocity of Droplets in Air-Assisted Hollow-Cone Injection” (in Japanese), *Trans. JSME Series B* 62-593, pp319-324, 1996
  51. Kameda, M. and Matsumoto, Y., “Shock Waves in a Liquid Containing Small Gas Bubbles”, *Physics of Fluids*, Vol.8 No.2, pp322-335, 1996
  52. Yoichiro Matsumoto, Takashi Tokumasu, “Construction of Collision Model of Diatomic Molecules (1st Report, the MD Simulation of Molecular Collision)” (in Japanese), *Trans. JSME Series B* 62-595, pp864-871, 1996
  53. Takashi Tokumasu, Yoichiro Matsumoto, “Construction of Collision Model of Diatomic Molecules (2nd Report, Construction of the model and its verification)” (in Japanese), *Trans. JSME Series B* 62-595, pp872-879, 1996
  54. Yoichiro Matsumoto, Nobuhiro Yamanishi, “Molecular Dynamics Study of Gas-Surface Interaction (1st Report, Numerical Simulation of O<sub>2</sub>/Graphite)” (in Japanese), *Trans. JSME Series B* 62-595, pp880-887, 1996
  55. Matsumoto, Y. and Kameda, M., “Propagation of Shock Waves in Dilute Bubbly Liquids.(Governing Equations, Hugoniot Relations, and Effect of Slippage Between two Phases)”, *JSME International Journal Series B* 39(2), pp264-272, 1996
  56. Jun Matsui, Yoichiro Matsumoto, “Numerical Analysis of Gas-Surface Interaction by Molecular



- Dynamics Method (3rd Report, Analysis on transferred energy and velocity distribution after collision)” (in Japanese), *Trans. JSME Series B* 62-598, pp2156-2162, 1996
57. Shu Takagi, Yoichiro Matsumoto, “Force Acting on a Spherical Bubble Rising through a Quiescent Liquid” (in Japanese), *Japanese Journal of Multiphase Flow Vol.10, No.3*, pp264-273, 1996
  58. Shu Takagi, Yoichiro Matsumoto and Huaxiong Huang, “Numerical Analysis of a Single Rising Bubble Using Boundary-Fitted Coordinate System”, *JSME International Journal Series B* 40(1), pp42-50, 1997
  59. Yuichi Murai, Yoichiro Matsumoto, “Numerical Analysis of Detailed Flow Structures of Bubble Plume (1st Report, Calculation of Bubbly Flows using Lagrange Method)” (in Japanese), *Trans. JSME Series B* 63-611, pp2277-2282, 1997
  60. Miyamoto, T., Kobayashi, T. and Matsumoto, Y., “Structure of Sprays from an Air-Assist Hollow-Cone Injector”, *SAE 1996 Transactions, Journal of Engines, Section 3-Volume 105*, pp1058-1070, 1997
  61. Yuichi Murai, Yoichiro Matsumoto, “Numerical Analysis of Detailed Flow Structures in Bubble Plume (2nd Report, Three-Dimensional Flow Structure and Turbulence Mechanism)” (in Japanese), *Trans. JSME Series B* 63-611, pp2283-2288, 1997
  62. Masaharu Kameda, Naoto Shimaura, Yoichiro Matsumoto, Fumio Higashino, “Propagation of Shock Waves in Dilute Bubbly Liquids (4th Report, Comparison between Theory and Experiment for a Uniform Bubbly Mixture)” (in Japanese), *Trans. JSME Series B* 63-611, pp2289-2295, 1997
  63. Y. Matsumoto and T. Tokumasu, “Parallel computing of diatomic molecular rarefied gas flows”, *Parallel Computing* 23, pp1249-1260, 1997
  64. Toshiyuki Hasegawa, Takashi Kobayashi, Takao Iwasaki, Yoichiro Matsumoto, “Visualization of Diesel Sprays Injected from a Variable Orifice Nozzle” (in Japanese), *Journal of the visualization society of Japan Vol.17 suppl.,No.2*, pp247-250, 1997
  65. Yuichi MURAI and Yoichiro MATSUMOTO, “Numerical Analysis of Detailed Flow Structures of a Bubble Plume”, *JSME International Journal, Series B, Vol.41, No.3*, pp568-574, 1998
  66. Yoichiro Matsumoto and Shu Takagi, “Numerical Simulations of Multiphase Flows”, *Computational Fluid Dynamics Review* 1998,2, pp994-1010, 1998
  67. Masaharu Kameda, Masuyoshi Yamada, Yoichiro Matsumoto, “Motion of a Spherical Gas Bubble in an Oscillatory Pressure Field” (in Japanese), *Trans. JSME Series B, 64-622*, pp1650-1658, 1998
  68. Shu Takagi, Yoichiro Matsumoto, “The Behavior of a Deformable Bubble in an Accelerating Fluid” (in Japanese), *Trans. JSME Series B, 64-624*, pp2483-2490, 1998
  69. Toshiyuki Hasegawa, Takashi Kobayashi, Takao Iwasaki, Yoichiro Matsumoto, “Studies on the Diesel Sprays Injected by the Variable Orifice Nozzle (VON) Using PIV” (in Japanese), *Journal of the visualization society of Japan Vol.18 supplement, No.2*, pp29-30, 1998
  70. Masaharu Kameda, Naoto Shimamura, Fumio Higashino and Yoichiro Matsumoto, “Shock waves in a uniform bubbly flow”, *Physics of Fluids, Vol.10 No.10*, pp2661-2668, 1998

71. Yuichi Murai, Yoichiro Matsumoto, Xiang-Qun Song, Fujio Yamamoto, "Numerical Analysis of Turbulence Structures induced by Bubble Buoyancy" (in Japanese), *Trans. JSME Series B 64-626*, pp3257-3263, 1998
72. Takashi Tokumasu, Yoichiro Matsumoto, "Construction of Collision Model of Diatomic Molecules (3rd Report, Improvement of Collision Model)" (in Japanese), *Trans. JSME Series B 64-627*, pp3544-3550, 1998
73. Takashi Tokumasu, Yoichiro Matsumoto, "Construction of Collision Model of Diatomic Molecules (4th Report, Improvement of Energy Transfer Model and Its Verification)" (in Japanese), *Trans. JSME Series B 64-627*, pp3551-3557, 1998
74. Nobuhiro Yamanishi, Yoichiro Matsumoto, "Molecular Dynamics Study of Gas-Surface Interaction (2nd Report, Analysis on the Energy Distribution after the Collision and the Vibration of the Potential Energy Surface)" (in Japanese), *Trans. JSME Series B 64-628*, pp3978-3984, 1998
75. Nobuhiro Yamanishi, Yoichiro Matsumoto, "Molecular Dynamics Study of Gas-Surface Interaction (3rd Report, The Construction of a Gas-Surface Scattering Model)" (in Japanese), *Trans. JSME Series B 64-628*, pp3985-3991, 1998
76. Takashi TOKUMASU, Yoichiro MATSUMOTO, Kenjiro KAMIJO, "The Structure of Jet Expansion of Binary Gas Mixture", *Thermal Science & Engineering Vol.7 No.6*, pp17-22, 1999
77. Nobuhiro Yamanishi, Yoichiro Matsumoto, Isao Aoki, Kosuke Shobatake, "Molecular Beam Study of Gas-Surface Interaction (1st Report, In-plane and Out-of-plane Scattering of Gas Molecule)" (in Japanese), *Trans. JSME Series B 64-630*, pp437-443, 1999
78. Yuichi MURAI and Yoichiro MATSUMOTO, "Eulerian Analysis of Bubbly Two-phase Flows Using CIP Scheme", *Computational Fluid Dynamics JOURNAL*, vol.8 no.1, pp26-33, 1999
79. Masahiro Shimada, Yoichiro Matsumoto, Takashi Kobayashi, "Dynamics of the Cloud Cavitation and Cavitation Erosion" (in Japanese), *Trans. JSME Series B 65-634*, pp1934-1941, 1999
80. You-Taek Kim, Kazuhiro Tanaka, Young-Ho Lee, Yoichiro Matsumoto, "Effects of Entrained Air on the Characteristics of a small Screw-type Centrifugal Pump" (in Korean), *Journal of Fluid Machinery* 2-3, pp37-44, 1999
81. Takashi Tokumasu and Yoichiro Matsumoto, "Dynamic molecular collision (DMC) model for rarefied gas flow simulations by the DSMC method", *Physics of Fluids*, Vol.11, No.7, pp1907-1920, 1999
82. Masahito Shimada, Yoichiro Matsumoto, Takashi Kobayashi, "Influence of the Nuclei Size Distribution on the Collapsing Behavior of the Cloud Cavitation" (in Japanese), *Trans. JSME Series B*, 65-637, pp66-71, 1999
83. Kazuyasu Sugiyama, Shu Takagi, Yoichiro Matsumoto, "Three Dimensional Numerical Analysis for Bubbly Flow around a Circular Cylinder" (in Japanese), *Trans. JSME Series B 65-638*, pp3260-3267, 1999
84. Nobuhiro YAMANISHI, and Yoichiro MATSUMOTO, "Molecular Dynamics Study of Gas-Surface Interaction (Construction of a Gas-Surface Scattering Model)", *JSME International Journal, Series B*,

*Vol.42, No.4*, pp708-714, 1999

85. Nobuhiro Yamanishi, Yoichiro Matsumoto and Kosuke Shobatake, "Multistage gas-surface interaction model for the direct simulation Monte Carlo Method", *Physics of Fluids, Vol.11, No.11*, pp3540-3552, 1999
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**Funded Projects (Selected)**

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The Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan, Grant-in-Aid for Scientific Research (A), No. 18206020, “Micro bubble enhanced High intensity focused ultrasound (HIFU) for no-invasive diagnosis and treatment system”, 2006-2008, as a head investigator

The Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan, Grant-in-Aid for Scientific Research (A), No.21246033, “Multiscale analysis of multiphase flows through modeling of physics and the interfaces”, 2009-2011, as a head investigator

Japan Agency of Science and Technology (JST), No.06060088, “The Human Body Simulator Development Project”, 2007-2012, as a head investigator

The Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan, Grant-in-Aid for Scientific Research (A), No.24246035, “Minimally-invasive integrated diagnostic and therapeutic system using in vivo measurement and control methods of ultrasound beam”, 2012-present, as a head investigator