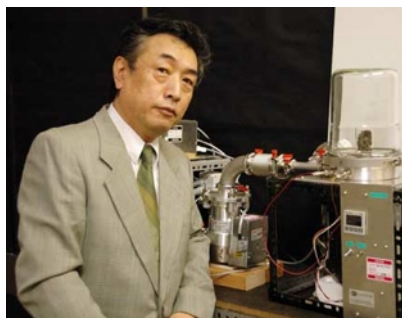


Biographical Sketch of Masamichi Yamashita

Professor, Institute of Space and Astronautical Science, JAXA



Personal: Born February 11, 1948

Katsushika, Tokyo, Japan

Citizenship: Japanese.

Education:

B. Sci. University of Tokyo, Chemistry, 1971.

Dr. Sci. University of Tokyo, 1976.

Dissertation: Chemical Reaction Kinetics Analyzed by a Monopole Mass Spectrometer

PROFESSIONAL EMPLOYMENT:

- 2003-Present Prof., Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency (JAXA). Department of Space Biology and Microgravity Sciences. Field: Space life science, Space Agriculture.
- 1996-2003 Prof., Institute of Space and Astronautical Science. Division--Space System Engineering. Field: Space life science.
- 1987-1996 Assoc. Prof., Space Utilization Research Center, Institute of Space and Astronautical Science. Field: Space life science.
- 1982-1987 Assoc. Prof., Institute of Space and Astronautical Science. Division--Space Propulsion Mechanisms. Field: Space system engineering; Biologically regenerative life support systems.
- 1979-1982 Lecturer, Institute of Space and Aeronautical Science. Division--Rocket Propulsion. Field: Heat and mass transport processes; Fluid dynamics of chemically reactive gases.
- 1976-1979 Assist. Prof., Institute of Space and Aeronautical Science, University of Tokyo. Division--Engines for Aeronautics, Heat and Mass Transport. Field: Kinetics of fast chemical reactions in gas phase (combustion processes in jet engines, emission of pollutant gases); Development of liquid hydrogen and oxygen rocket engine (thrust up to 10 ton).
- 1980-1983 Res. Assoc., Dept. Chemical Engineering, Yale University, studied with Prof. John B. Fenn. Field: Gas dynamics and chemical reactions in hypersonic free jets. Ionization source for biomedical mass spectrometry (ElectroSpray Ionization, ESI, for interfacing Liquid Chromatograph and Mass Spectrometer, to analyze polar water-soluble biomolecules and direct ionization of biological macro-molecules up to m/e 100,000. Became defact source for biomedical mass spectrometry. Dr. Fenn won 2002 Nobel Prize in Chemistry for his achievement of ESI mass spectrometry for protein macro-molecules. Yamashita was invited to the Nobel Prize Ceremony held in Stockholm because of his contribution to the original study on ESI first published in 1984 with the authorship of Yamashita & Fenn.)

EXPERIENCE:

Masamichi Yamashita conducted the "Frogs in Space" experiment onboard the space station Mir in 1990, which was the first space experiment with animals conducted by Japan. In 1995, Yamashita also sent Japanese red-bellied newts (*Cynops*) into orbit in the Space Flyer Unit (SFU), which was retrieved by the Space Shuttle one year later. The "Space Embryology Experiment" using Japanese newts on the IML-2 shuttle mission in 1994 was also implemented by him.

Yamashita has a broad range of professional experience in chemistry, physics and life science, and hands-on expertise in mechanics, electronics, and thermal engineering. For the missions cited above, most of the verification tests and safety engineering of the flight hardware was conducted by him. His technical skills, apropos to this application, include metal cutting and lathing, circuit design (both analog and digital), sewing experimental kits, soldering and printed board construction, assembler code programming on computers, machining and assembly of hardware in various plastics--even amphibian collecting and animal care.

During the flight operational phase of the SFU missions, he acted in the capacity of Flight Operation Director on the satellite and its payload. His activities included the establishment of communication links between the ground station, including NASA's Deep Space Network, and the spacecraft in orbit. Yamashita also coordinated ground operations at the launch and landing site, with other scientists involved in the experiments.

SELECTED RECENT PUBLICATIONS of Masamichi Yamashita:

- N. Katayama, Y. Ishikawa, M. Takaoki, M. Yamashita, S. Nakayama, K. Kiguchi, R. Kok, H. Wada, J. Mitsushashi and Space Agriculture Task Force; Entomophagy; a key to space agriculture, *Adv Space Res*, on line, (2007).
- Masamichi Yamashita, Yoji Ishikawa, Yoshiaki Kitaya, Eiji Goto, Mayumi Arai, Hirofumi Hashimoto, Kaori Tomita-Yokotani, Masayuki Hirafuji, Katsunori Omori, Atsushi Shiraishi, Akira Tani, Kyoichiro Toki, Hiroki Yokota, Osamu Fujita; An Overview of Challenges in Modeling Heat and Mass Transfer for Living on Mars, *Ann. N.Y. Acad. Science*, **1077**, 232-243 (2006).
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- Hiroki Yokota, Yoji Ishikawa, Masamichi Yamashita, Tairo Oshima, and Space Agriculture Task Force, Space agriculture on Mars using hyper-thermophilic aerobic bacteria, *Habitation*, 10, 191 (2006).
- Naomi Katayama, Masamichi Yamashita, Hidenori Wada, Jun Mitsushashi, Space Agriculture Task Force; Entomophagy as Part of a Space Diet for Habitation on Mars, *J. Space Technol. Sci.*, **21-2**, 27-38 (2005).
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