

HTSJ



THE 2012
NUKIYAMA MEMORIAL AWARD

Presented to

PETER STEPHAN

at the Third International Forum on Heat Transfer

November 14, 2012

by the Heat Transfer Society of Japan



Peter Stephan

Dr. Peter Stephan was born on March 25, 1963. He is Professor for Technical Thermodynamics at the Technische Universität Darmstadt and head of the eponymous institute. From 1983 to 1988 he studied Mechanical Engineering with a specialization in Energy and Power Plant Technology at the Technische Universität München. As a Marie-Curie Research Fellow he then moved to the Joint Research Centre of the European Commission in Ispra, Italy. For his work on evaporative heat transfer in heat pipes under the guidance of Professors C.A. Busse, M. Groll, and E. Hahne he received a Ph.D. from the Universität Stuttgart in 1992. In the same year he entered the Daimler-Benz group and subsequently worked as senior process engineer and later as R&D manager for production processes.

In 1997, at the age of 34, Dr. Stephan accepted the call to the full professorship for Technical Thermodynamics at the Technische Universität Darmstadt. Since then he has been teaching numerous undergraduate and graduate courses in the field of engineering thermodynamics and heat and mass transfer. As the head of the Institute of Technical Thermodynamics he was able to build up a large research group with a strong focus on two-phase heat transfer that is nationally and internationally well recognized. His main fields of interest are boiling heat transfer, evaporation of films, droplets, and sprays, microscale heat and mass transfer, interfacial phenomena, heat pipe technology, and drying processes. In all these fields numerical and experimental studies on multiple scales are combined to develop a deep understanding of the relevant phenomena. The results were published in more than 200 journal and conference papers and several book contributions. Since 2007 Peter Stephan is Editor-in-chief of the VDI Heat Atlas.

From 2007 to 2009 Dr. Stephan served in parallel as Dean of the Mechanical Engineering Faculty. Together with his colleague Professor C. Tropea, he initiated a cross-disciplinary research project on “Smart Interfaces” aiming at understanding and designing fluid boundaries. In 2007 the project was awarded a Cluster Prize with an annual budget of 7M Euro until 2012 and a potential prolongation until 2017 within the German Excellence Initiative. Subsequently the Center of Smart Interfaces at the Technische Universität Darmstadt was founded with Dr. Stephan as a co-director. Since 2011 he is Senator of the Technische Universität Darmstadt.

Dr. Stephan received calls to other universities and several awards, e.g. the Sadi Carnot Prize of the International Institute of Refrigeration in 1995, the Prize for Excellence in Heat Transfer Research of the French Society for Thermal Sciences in 2002, the ICNMM08 Outstanding Researcher Award, and the Journal of Heat Transfer Outstanding Reviewer Award, both in 2008 from the American Society of Mechanical Engineers. Since 2006 he serves as the chairman of the German Heat and Mass Transfer Association. He is an editorial board member for Heat and Mass Transfer, Experimental Heat Transfer, Experimental Thermal and Fluid Science, and Heat Pipe Science and Technology.

The Nukiyama Memorial Award

The Nukiyama Memorial Award has been established in 2011 by the Heat Transfer Society of Japan to commemorate outstanding contributions by Shiro Nukiyama as an excellent heat transfer scientist. Nukiyama addressed the challenges of the boiling phenomena and published a pioneering paper which clarified these phenomena in the form of the Nukiyama curve (boiling curve). This epoch-making work was done in 1930s, when heat transfer research was in an early stage and Nukiyama himself was young, under forty years old. The Nukiyama Memorial Award shall be bestowed to a scientist under/about fifty years of age, once every two years in the field of Thermal Science and Engineering.

Board of the 2012 Nukiyama Memorial Award

N. Kasagi (Chairperson)	P. Cheng
M. Monde (Vice Chairperson)	S. Kandlikar
A. Bar-Cohen	H. Yoshida
G. P. Celata	

Shiro Nukiyama 抜山 四郎 (1896–1983)

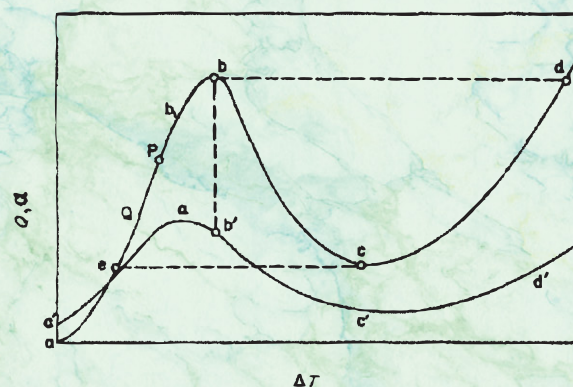
Shiro Nukiyama was born in 1896 in Tokyo, Japan. He graduated from Tokyo Imperial University, and immediately started his professional career as a Lecturer of Tohoku Imperial University (currently Tohoku University). He was appointed Associate Professor in 1921. He visited England, Germany, Switzerland and the United States in 1922~24. He was appointed Professor in 1926. In subsequent years he actively conducted boiling heat transfer research.

In 1934, Nukiyama published a pioneering paper*) which was entitled “The Maximum and Minimum Values of the Heat Q Transmitted from Metal to Boiling Water under Atmospheric Pressure.” This paper clarified and provided an overview of the boiling phenomena in the form of the Nukiyama Curve (boiling curve).

In this work, Nukiyama made an excellent experiment using a metallic wire or a metal wire), in which temperature and heat flux are evaluated accurately, and found that the relation between degree of superheating and heat flux is not monotonous, and that a maximum heat flux points appears in the nucleate boiling region and a minimum heat flux point appears in the film boiling region. He also found the hysteresis behavior that occurs in the transition region between the nucleate boiling and film boiling. Furthermore, he suggested that the boiling curve can be drawn even in the transition region if the state of the boiling water can be changed quasi-statically.

This was an epoch-making work which clarified the physics of boiling phenomena first. It has been highly appreciated in the international academic world of heat transfer. Also, it has become a guideline to heat transfer engineering for the design and control of combustion boilers and/or steam generators, and as such it has laid the foundation of modern energy technology. The Nukiyama Curve appears in every textbook of heat transfer today. Nukiyama is a great person in the international academic world of heat transfer.

In 1956 Nukiyama retired from Tohoku University, and was granted the title of Professor Emeritus. He served as the President of the Heat Transfer Society of Japan in 1963~64. He received the Max Jacob Memorial Award in 1968. In 1983, he passed away in Sendai, Japan.



*) : *Journal of the Japan Society of Mechanical Engineers*, vol. 37, no. 206, pp. 367-374, June 1934. The English translation was published twice in *International Journal of Heat and Mass Transfer*, in vol. 9, pp. 1419-1433, 1966 and in vol. 27, pp. 959-970, 1984.