

HTSJ



**THE 2020
NUKIYAMA MEMORIAL AWARD**

Presented to

RONGGUI YANG

at the Second Asian Conference on Thermal Sciences
October, 2021

by the Heat Transfer Society of Japan



Ronggui Yang

Dr. Ronggui Yang was born on October 25, 1973. Dr. Yang is currently an endowed Professor of Energy and Power Engineering at Huazhong University of Science and Technology in Wuhan, China. Dr. Yang received his BS degree in Thermal Engineering from Xi'an Jiaotong University in 1996, a MS degree in Engineering Thermophysics from Tsinghua University in 1999, a MS degree in MEMS from UCLA in 2001, and a PhD in Mechanical Engineering under Professor Gang Chen from MIT in 2006. He started his faculty career as an Assistant Professor of Mechanical Engineering at the University of Colorado Boulder since January 2006, was promoted to Tenured Associate Professor in 2011 (2 years ahead of the tenure clock), and was promoted to Full Professor in 2016, where he was on leave since Summer 2018 but remained his position until December 2019. At the University of Colorado Boulder, he was also a Faculty Fellow for the Materials Science and Engineering Program and a Faculty Affiliate for the CU/NREL Renewable and Sustainable Energy Institute.

Dr. Yang's research focuses on understanding the fundamentals of thermal energy transport in micro-/nano- scales and developing scalable micro-/nano-structured materials and surfaces to advance the energy conversion and thermal management technologies. He has made outstanding contributions to the following research areas: 1) Developing numerical and experimental tools for understanding thermal and thermoelectric transport in novel micro/nanostructured materials, such as micro-/nano-structured polymers, two-dimensional materials, hybrid inorganic-organic materials, and nanocomposites; 2) Developing scalably-manufactured micro-/nano-structured surfaces for enhancing phase-change heat transfer processes (boiling, condensation, evaporation and spray cooling); and 3) Developing scalably-manufactured low-cost hybrid materials for radiative sky cooling and the deployment of radiative sky cooling for buildings, vehicles, cold chains, and consumer products.

Dr. Ronggui Yang has published approximately 180 journal papers, delivered approximately 150 invited seminars, and is associated with more than 140 invited and contributed conference talks and posters that garnered numerous best paper/presentation/poster awards with his advisees. His journal papers are highly cited.

Per ISI Web of Science (SCI), Dr. Yang has an annual citation more than 1000 times since 2017, a total citation more than 10000 times and an H-index of 48 as of July 20, 2020. Per Google Scholar, Dr. Yang has an annual citation more than 2000 times since 2018, a total citation more than 15500 times and an H-Index of 62 as of July 20, 2020. His innovative research has won him numerous awards including the 2017 Top 10 Physics Breakthroughs by Physics World, the 2014 ITS Young Investigator in Thermoelectrics from International Thermoelectric Society (ITS), the 2010 ASME Bergles-Rohsenow Young Investigator Award in Heat Transfer, an NSF CAREER Award in 2009, the MIT Technology Review's TR35 Award, the DARPA Young Faculty Award in 2008, the 2005 Goldsmid Award from ITS, and a NASA Tech Brief Award in 2004.

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.

Past Recipients

2012 Peter Stephan
2014 Gang Chen
2016 Mamoru Takahashi
2018 Ruzhu Wang

Board of the 2020 Nukiyama Memorial Award

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Shiro Nukiyama 拔山 四郎 (1896 – 1983)

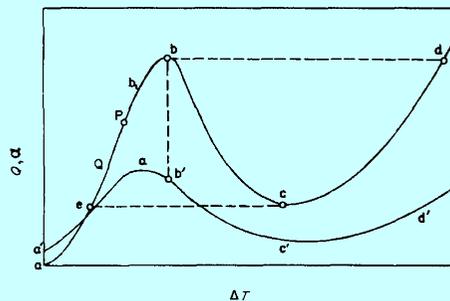
Shiro Nukiyama was born in 1896 in Tokyo, Japan. He graduated from Tokyo Imperial University, and immediately started his professional career as a Lecturer of Tohoku Imperial University (currently Tohoku University). He was appointed Associate Professor in 1921. He visited England, Germany, Switzerland 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 point 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 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.