

Department of Mechanical and Biomedical Engineering

Seminar Series

Heat Transfer and Energy Engineering

Prof. Chin Pan

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Institute of Nuclear Engineering and Science
Department of Engineering and System science
National Tsing Hua University, Taiwan

Date	September 5, 2017 (Tuesday)
Time	2:30pm – 3:30pm
Venue	B6619 (MBE Conference Room), 6/F, Lift 4, AC1

Abstract

Heat transfer plays an essential role for many energy systems, from power plants to air-conditioners. In this talk, some of our studies related to heat transfer with possible applications on energy engineering will be highlighted. Post dryout heat transfer is critical for nuclear safety. Our quenching studies reveal that film boiling results from the coalescence of bubbles nucleated at ultra-high temperature, while ions in sea water suppress the film boiling through zeta potential effect and others. Consequently, the quenching process is accelerated in sea water, which may be used as an alternative emergency coolant. On the other hand, our earlier studies on transition boiling modeling are referred to in the literature as Pan et al's theory. Nonlinear dynamic analyses of two-phase boiling flow reveal significant and interesting instability phenomena. Energy storage via high temperature molten salt may be enhanced by adding certain amount of nanoparticles and our investigation reveals an optimal concentration. Our recent studies on microchannel two-phase flow and boiling heat transfer address void fraction measurement, bubble dynamics, explaining explosive boiling and instability and possible energy applications.

About the Speaker

Prof. Chin Pan has been a faculty member of the National Tsing Hua University (NTHU) since February 1986 and is now a Tsing Hua distinguished professor of NTHU. He received his BS degree in nuclear engineering from NTHU in 1979, MS and Ph.D degrees in nuclear engineering from the University of Illinois at Urbana-Champaign (UIUC) in 1983 and 1985, respectively. After receiving his doctoral degree, Prof. Pan served as a visiting research assistant professor at UIUC before joining NTHU as an associate professor in February 1986 and was promoted to full professor in August 1990. Since August 2011, Prof. Pan became a Tsing Hua Distinguished Professor. He served as Chairman of the Department of Engineering and System Science of NTHU from February 2001 to January 2004 and Director of the Center for Energy and Environmental Research from December 2003 to July 2008. Prof. Pan was Dean of College of Nuclear Science for two terms from August 2005 to July 2011. He has been serving as chairman of the Advisory Committee of Nuclear Safety in the Atomic Energy Council of Taiwan since October 2008. He is now Chief Principal Investigator (Director) of the Low Carbon Energy Research Center, a center of excellence at NTHU funded by the Ministry of Education through the “Plan to Develop World-Class Universities and Top-Notch Research Centers”. He served as convener of the energy program of the Ministry of Science and Technology from 2014 to 2016. He has also been President of Chung-Hwa Nuclear Society since the beginning of 2012.

Prof. Pan’s research activities for the past three decades have been in the areas of two-phase flow, boiling heat transfer and energy engineering focusing on transition boiling, nucleate boiling near CHF, nuclear reactor thermalhydraulics, two-phase flow instability, two-phase natural circulation loops, microchannel two-phase flow and boiling heat transfer, molten salt heat transfer and direct or reforming methanol fuel cells. He published a book in Chinese entitled “Boiling Heat Transfer and Two-phase Flow” in 2001. He has authored and co-authored about 80 SCI journal papers and 130 conference papers or presentations. He received an outstanding research award in 1998 and three excellent research awards earlier from the National Science Council of Taiwan.

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All are Welcome!