



## **Professor Bengt Sundén**

*Lund University, Lund, Sweden*

### **Education:**

M. Sc. in Mechanical Engineering 1973, Chalmers University of Technology, Göteborg, Sweden. Ph. D. in Applied Thermodynamics and Fluid Mechanics 1979, Chalmers University of Technology, Göteborg, Sweden. Thesis Supervisor: Professor Nils Frössling. Docent in Applied Thermodynamics and Fluid Mechanics 1980, Chalmers University of Technology, Göteborg, Sweden.

### **Present position:**

Professor Emeritus and Senior Professor in Heat Transfer since 2016-10-01.

### **Previous positions:**

Assistant, Researcher, Docent, University lecturer, Chalmers University, 1973-1993.

Professor of Heat Transfer, Lund University, Lund, Sweden 1992-2016.

Head Department of Energy Sciences, Lund University, Lund, Sweden for 21 years, 1995-2016.

Director Heat Transfer Research, 1992.

### **Supervision:**

Professor Sundén has supervised 50 Licentiate of Engineering theses, 51 PhD-theses. Out of these six licentiate theses and eight PhD theses are at Chalmers University. Besides, he has co-supervised many PhD theses in China and Iran. Most of these have spent a time period with him at Lund University. More than 25 post docs have been supervised. More than 180 MSc theses have been supervised.

#### *Most recent completed PhD theses:*

Jian Liu, Investigations of heat transfer and fluid flow in the pocket region of a gas turbine engine and cooling of a turbine blade, 2019

Safeer Hussain, Experimental and numerical investigations of heat transfer related to gas turbine applications, 2019

Zhen Cao, Pool boiling on structured surfaces: Heat transfer and critical heat flux - experiments and mechanistic modelling, 2019

### **Grants Awarded in competition:**

A huge amount of projects have been financed by Swedish Governmental agencies like Energy Agency (and its precursors STU, NUTEK), Scientific Council (VR, TFR), KK-foundation, STINT, SIDA, EU and ERC (European Research Council-Senior Research Grant), companies.

#### *Most recent VR projects:*

Efficient heat transfer processes at intermediate temperatures by using nanofluids based on Ionic liquids, 2017-04724 (lasting 2018-2021).

Efficient heat transfer and multistage thermal storage of solar energy for direct steam generation with combined disc shaped solar collector and steam generator, 2018-06040 (lasting 2019-2021).

Fundamental studies of nanostructured surfaces for enhancement of pool boiling and

forced convection boiling in micro-channels, Dnr 621-2013-3897 (lasting 2014-2018).

*ERC*

Multiscale and multiphysics modeling in Electrochemical Cells and Stacks, Advanced Senior Grant, ERC (European Research Council), 2009-2014.

*Energy Agency*

Thermal radiation in grate furnaces for biofuels and waste, Swedish Energy Agency and Völund-Babcock & Wilcox, Denmark, 2013-2015.

HIGH-H<sub>2</sub>-new cooling strategies for guide vanes in hydrogen-rich fuels in gas turbines, Swedish Energy Agency, Siemens, 2017-2021. (part in bigger project with another PI)

**Other information:**

Founding and first editor-in-chief IJHEX – International Journal of Heat Exchangers (R.T. Edwards Inc., USA) 1999-2008, Editor-in-chief Book Series – Developments in Heat Transfer (WIT Press, UK), 1995-2018.

More than 900 papers in journals (> 500), books, proceedings.

Fellow ASME, Honorary Professor Xian Jiaotong Univ, China 2006-, Guest Professor Northwestern Polytechnical University, Xi'an, China 2013-, Guest Professor Harbin Institute of Technology, Harbin, China 2017-, Honorary Professor Hebei University of Technology, Tianjin, China 2018-, Guest Professor Dalian Maritime University, Dalian, China 2019-. Guest Professor Central South University, Changsha, China 2020-2025. Adjunct Professor, VIT University, Vellore, Chennai, India, Fellow WIT, Eminent Scientist WIT.

2011 Recipient of ASME Heat Transfer Memorial Award, 2013 recipient of ASME Heat Transfer Division 75<sup>th</sup> Anniversary Medal, Donald Q. Kern Award 2016.

Regional editor Journal of Enhanced Heat Transfer 2007-, Associate editor J. Heat Transfer Research 2011-, Associate editor ASME J. Thermal Science, Engineering and Applications 2010-2016, Associate editor ASME J. Electrochemical Energy Conversion and Storage 2017-2020, 2020-2023, Associate Editor ASME J. Heat Transfer 2005-2008.

According to ISI knowledge Web of Science and Scopus the overall number of citations is 40 per year and the total number of citations is more than 11000. The h-index is 49. (Google Scholar more than 12000 citations, h-index 47).

*Teaching activities:*

Undergraduate and graduate courses since 1973, first as an assistant teacher for problem solving and laboratory sessions. Then as main and responsible lecturer and examiner as well as developer of new courses. Topics taught: Thermodynamics, fluid mechanics, heat transfer and heat exchangers, numerical heat transfer, thermal radiation, boiling and evaporation, heat and mass transfer, hydrogen-batteries-and-fuel cells, project course energy technology. Number of students in class varies from 10 to 150.

**Recent Publications:**

1. F. Salimi Nanagedani, B. Sunden, Prediction of mass transfer coefficient of the continuous phase in a structured packed extraction column in the presence of SiO<sub>2</sub> nanoparticles, **Frontiers in Heat Mass Transfer**, Vol.14, 11, 21 pages, 2020.

2. W. Wang, K. Fu, Y. Zhang, Y. Yan, B. Li, B. Sunden, Entropy study on the enhanced heat transfer mechanism of the coupling of detached and spiral vortex fields in spirally corrugated tubes, **Heat Transfer Engineering**, 2020, accepted for publication.

3. J. Wang, Y. Liu, M. Chen, G. Xie, B. Sunden, Performance of Fuel-air Combustion in a Reheating Furnace at Different Flowrate and Inlet Conditions, **Energy**, 2020, accepted for publication.

4. Y. Li, G. Xie, B. Sunden, Flow and thermal performance of supercritical n-decane in double layer channels for regenerative cooling of a scramjet combustor, **Applied Thermal Engineering**, Vol. 180, paper no. 115695, 2020.

5. F. Sun, G. Xie, B. Sunden, The transport and thermodynamic characteristics of thermally oscillating phenomena in a buoyancy-driven supercritical fuel flow, **Int. J. Thermal Sciences**, Vol. 159, paper no 106550, 2020.
6. W. Du, L. Luo, S. Wang, J. Liu, B. Sunden, Numerical investigation of flow field and heat transfer characteristics in a latticework duct with jet cooling structures, **Int. J. Thermal Sciences**, 2020, accepted for publication.
7. F. Zhang, G. Liao, J. E., J. Chen, E. Leng, B. Sunden, Thermodynamic and exergoeconomic analysis of a novel CO<sub>2</sub> based combined cooling, heating and power system, **Energy Conversion and Management**, Vol. 222, paper no 113251, 2020.
8. L. Luo, Y. Zhang, C. Wang, S. Wang, B. Sunden, On the heat transfer characteristics of a Lamilloy cooling structure with curvatures with different pin fins configurations, **Int. J. Numerical Methods Heat and Fluid Flow**, 2020, accepted for publication.
9. F. Zhang, G. Liao, B. Sunden, Numerical investigation on the effect of convex-dimple streamwise arrangements on the flow and heat transfer characteristics of rectangular convex-dimple-grooved channels, **Numerical Heat Transfer, part A**, Vol. 78, no. 9, 443-460, 2020.
10. D. Zheng, J. Wang, Y. Pang, Z. Chen, B. Sunden, Heat transfer performance and friction factor of various nanofluids in a double-tube counter flow heat exchanger, **J. Thermal Science**, 2020, accepted for publication.
11. Z. Zhao, L. Luo, D. Qiu, S. Wang, Z. Wang, B. Sundén Vortical Structures and Heat Transfer Augmentation of a Cooling Channel in a Gas Turbine Blade with Various Arrangements of Tip Bleed Holes, **Numerical Heat Transfer, part A**, Vol. 79, 1, 40-67, 2021.
12. S.M. Hosseinalipour, H. Shahbazian, B. Sunden, Coriolis and buoyancy effects on heat transfer in viewpoint of field synergy principle and secondary flow intensity for maximization of internal cooling, **Heat Mass Transfer**, 2021, online March 1.
13. Y. Chen, Y. Li, P. Ferla, G. Xie, B. Sunden, Flow Characteristics and Heat Transfer of Supercritical n-decane in Novel Nested Channels for Scramjet Regenerative Cooling, **Int. J. Heat Mass Transfer**, Vol. 167, paper no 120836, 2021.
14. S. Beale, A. Weber, M. Andersson, M. Ni, S. MsPhail, A. Weber, C. Boiques, H. Lund Frandsen, B. Sunden, Continuum Scale Modelling and Complementary Experimentation of Solid Oxide Cells, **Progress in Energy and Combustion Science**, Vol. 85, paper no 100902, 2021.
15. H. Gu, Y.P. Chen, J. Wu, Y. Jiang, B. Sundén, Impact of discharge port configurations on performance of sliding vane compressor with rotating cylinder, **Applied Thermal Engineering**, Vol. 186, paper no 116526, 2021.
16. H. Gu, X. Zhou, Y.P. Chen, J. Wu, Z. Wu, Y. Jiang, B. Sunden, Analysis, modeling, and simulations of an innovative sliding vane rotary compressor with a rotating cylinder, **Energy Conversion and Management**, Vol. 230, paper no 113822, 2021.
17. J. Wang, Q.W. Wang, B. Sunden, Hydraulic and heat transfer characteristics in structured packed beds with methane steam reforming reaction for energy storage, **Int. Comm. Heat Mass Transfer**, Vol. 121, paper no 105109, 2021.
18. H. Mao, Y. Li, J. Wang, Y. Ma, L. Wang, B. Sunden, A novel pipe structure for geyser elimination in a vertical cryogenic pipe, **Int. J. Heat Mass Transfer**, 2021, accepted for publication.
19. M. Hothar, Z. Wu, B. Sunden, Thermal conductivity of ionic liquid-based nanofluids containing magnesium oxide and aluminum oxide nanoparticles, **Heat Transfer Engineering**, Vol. 43, issue 21, 2021, accepted for publication.
20. Y. Zhang, G. Xie, B. Sunden, Y. Li, An LBM-based investigation of thermal buoyancy and arrangement angle on flow characteristics and heat transfer over four heated square cylinders, **Numerical Heat Transfer, Part B: Fundamentals**, Vol. 79, issue 5-6, 278-301, 2021.