Journal of Heat and Mass Transfer

Guest Editorial

Special Issue: Ivan Catton Memorial Issue — Innovations and Advancements in Heat & Mass Transfer: Part I

This Special Issue honors and celebrates the career of Professor Ivan Catton, an internationally acclaimed expert in the field of thermal science and engineering and Distinguished Professor Emeritus of Engineering at the University of California, Los Angeles. He was active in research for over five decades and worked in many different areas. The originality, analytical treatment and physical reasoning presented in his papers were impressive. He contributed extensively to natural convection, instability, porous media transport, nuclear reactor thermal-hydraulics and safety, materials processing, and aerospace heat transfer, among others. In each of these areas, he made important innovative fundamental contributions. His work spans a wide range of problems, from basic to applied, and, consequently, his papers are widely cited around the world. Some of his papers, such as his keynote paper *Natural Convection in Enclosures* at the 1978 International Heat Transfer Conference and the paper *Wavenumber Selection* in the 1988 *Journal of Heat Transfer* Special Bicentennial Issue, have become classic and have been extensively cited. Similarly, his other papers, edited conference proceedings, and review articles on convection in porous media, two-phase flow, natural convection, cooling of electronic devices and nuclear plant safety and design have become landmarks in these areas. He stands out as one of the dominant figures in the field, with a long list of outstanding successful graduate students who have made their mark in academia and industry. His work has influenced researchers in many areas in thermal sciences and has thus provided outstanding leadership to generations of researchers, educators, and engineers in heat transfer.

Professor Catton was a member of the Advisory Committee on Reactor Safeguards (ACRS) of the U.S. Nuclear Regulatory Commission (NRC), the top advisory committee in the field. After the NRC, Prof. Catton turned his attention to aerospace engineering's leading-edge cooling problems as well as research on the impact of laser weapons on space power cooling systems. Later, he ventured into the area of information processing using neural nets. His foundational work formed the basis for optimization of heat sinks and heat exchangers. He served as an associate editor of the *Journal of Heat Transfer* and as a member of other editorial boards. He also served as a member and as chair of various committees in the ASME Heat Transfer Division and in the American Nuclear Society. Prof. Catton was the recipient of numerous awards, including the ASME Heat Transfer Memorial Award and the Max Jakob Memorial Award, considered to be the highest international honor in the field of heat transfer.

The papers in this special issue are presented in 2 volumes, containing 33 papers. About half of these papers were invited from former students, colleagues, and friends of Professor Catton, as well as from leading experts in areas of interest to him. The remaining papers were contributed by researchers in heat transfer from around the world. All these papers underwent the rigorous review process of the *Journal of Heat and Mass Transfer* and were revised and updated to meet the standards of the journal. The papers cover a wide range of topics in natural and forced convection, porous media, thermal management of electronic systems, boiling, nanofluids, microchannel flow, heat transfer in biological systems, and several other fundamental and applied areas. A memorial tribute to Professor Catton is also included.

We have been colleagues and friends of Professor Catton for many years. We have admired his fundamental and applied research and have learned a lot from his excellent contributions. We have followed and cited his papers in our own publications. It is certainly an honor and a privilege for us to serve as guest editors for this special issue dedicated to Professor Catton, who passed away on June 12, 2021, leaving behind an impressive legacy of research in heat transfer.

We would like to thank Professor P. S. Ayyaswamy, Editor-in-Chief, *Journal of Heat and Mass Transfer*, for his support, encouragement and help in developing this special issue. We are also very appreciative of the help and guidance provided by Ms. Elizabeth Saas, JHT Editorial Assistant, in processing the papers submitted to the journal. The editorial staff at ASME, particularly Ms. Jennifer Smith, was instrumental in putting the two volumes together and arranging the sequence of the papers. Finally, we would like to thank the authors for their contributions and the reviewers for their insightful and timely review of the papers.

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