
editorial

Leaders in Thermal Evolution—Heat Transfer Research Laboratories in Academic Institutions

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Research and innovation in heat transfer technology is closely linked with technological advancement in other scientific and technical fields. Compact heat exchanger surfaces were developed in response to the increasing demands from the automotive, aviation, and air separation industries. The robust shell and tube heat exchangers that have served faithfully as the workhorse of chemical, power generation, and process industries for over a century are being challenged by plate-and-frame and heliflow heat exchangers to meet the growing need for compactness, low maintenance, and flexibility in design and operation. Although actual product development often takes place in industrial settings, new concepts based on solid theory generally emerge from academic research laboratories.

Over the past century, academic heat transfer laboratories played a key role in transforming the field of heat

transfer into a science, formulating concepts derived from sound mathematical treatment and tested through carefully planned and conducted experiments. The creative minds of graduate students toiled in these fertile grounds, and they went on to become the architects of new products in industry.

The Massachusetts Institute of Technology has been a major contributor to this technological transformation. The article featured in the *Heat in History* Department of this issue provides us with a historical perspective of the heat transfer laboratory at MIT, with glimpses of its changing focus in response to the industry needs, and the inner workings from its formation to the current state. Professor John H. Lienhard V presents an interesting roadmap of this laboratory, aptly named after one of the leading researchers of our times, Professor Warren M. Rohsenow.

We hope to present articles related to other academic and industrial research laboratories in the future as a part of the *Heat in History* Department offerings. We recognize that the path to the future invariably goes through the historical neighborhoods.

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Satish Kandlikar is a Professor in the Mechanical Engineering Department at RIT for last twenty-two years. He received his Ph.D. from the Indian Institute of Technology in Bombay in 1975 and has been a faculty member there before coming to RIT in 1980. His research is mainly focused in the area of flow boiling. After investigating the flow boiling phenomena

from an empirical standpoint, which resulted in widely accepted correlations for different geometries, he started to look at the problem from a fundamental perspective. Using high-speed photography techniques, he demonstrated that small bubbles are released at a high frequency under flow conditions. He is also working in the area of binary flow boiling and bubble formation in inkjet printing application. He has given a number of invited and keynote talks nationally and internationally.