



# HTD

## Heat Transfer Division Newsletter

A. M. Jacobi, Editor

Summer 2002

### Chair's Remarks



Jong Kim

I am pleased to report to you that the Heat Transfer Division has continued to thrive with its robust programs and activities.

The Division accomplished much in the past year. The 2001 National Heat

Transfer Conference was held in Anaheim in June. Our Division Representative for the conference was Prof. Ted Bergman, whose dedicated efforts were essential in making the conference successful. As usual, our Division contributed the largest number of papers and sessions among the participating societies.

The Heat Transfer Memorial Award is now fully endowed. Recently, this flagship award of our Division had experienced a lack of funding, but the funding is now secure. Thanks are due to Professors Larry Witte and Richard Goldstein for their fund-raising efforts and to Prof. Jack Lloyd for influencing ASME.

Our Division activities in IMECE continued a strong upward trend. Our Division drew 500 abstracts at 2001 IMECE in New York City, with over 300 final papers. Our appreciation is due to our Division Representative for 2001 IMECE, Prof. Yogesh Jaluria, for his outstanding performance.

Conference organization has been facilitated greatly with the web-based system that was adopted by the Division two years ago. The Division home page was

redesigned by our Webmaster, Prof. Yong Tao, with the aim to further improve the efficiency and ease of use of the web-based conference organization process.

Two ad hoc committees, Heat Transfer Visualization Committee and Heat Transfer Education Committee, have been so active as to deserve an elevation to regular K-Committee status, with the Education Committee attaining K-21 and the Visualization Committee becoming K-22.

Looking ahead, the future of our Division looks equally bright, with much-strengthened technical programs, especially at IMECE, which now is expected to draw over 300 final papers for the third year in a row. The same level of enthusiasm and participation shown at 2001 IMECE is expected at 2002 IMECE to be held in New Orleans, where our Division Representative will be Prof. Yildiz Bayazitoglu.

The Division goals for the coming year entail the following:

We will keep improving the web-based conference organization scheme until the entire process can be done online, from start to finish, completely eliminating the need to resort to a hardcopy paper trail of any sort.

We face some uncertainties concerning the future of the National Heat Transfer Conference, and there exists the possibility that we may run our own Division summer conference to give our Division members the best they deserve. Whatever the outcome, we will resolve the issues in the most productive way possible. We will evaluate the feasibility of collocating our summer conference with other ASME Division(s) such as Fluids Engineering

Division as well as other societies so that we can hold a single mega conference to serve the entire thermo-fluids engineering community at a single location and time.

For the summer conference of 2003, we are examining the feasibility of commissioning an outside vendor independent of ASME to organize it, with the aim to secure more freedom, flexibility, and control over our Division's own destiny; thus, we can return the maximum value and benefits to our Division members. This move was initiated in direct response to our Division members at large who felt strongly and disapprovingly about the declining value and services they were receiving relative to the escalating conference registration fee. Whatever the outcome of our feasibility study, we will keep trying to find a way to maximize the return to our Division members.

Finally, our goal is to increase the attendance at the summer conference, as the attendance at this conference has been declining for some time while our Division's participation in IMECE has sharply turned upward. I pledge all of us to make the 2003 summer conference a turning point, by actively participating in the conference as authors, session organizers, and in other capacities.

I have learned much from my predecessor, Prof. Larry Witte, and thank him for his kindness to share his vast experience and wisdom with me that helped me serve you better.

It has been a great honor and privilege to serve you all.

Jong Kim

## 2000 Max Jakob Award

The Max Jakob Award is given in recognition of eminent achievement or distinguished service, and it represents the highest honor bestowed by the ASME (with AIChE) in the area of heat transfer. The 2000 Max Jakob Award was presented to Professor Vedat Arpacı during the 2001 National Heat Transfer Conference in Anaheim.

Professor Arpacı has made important discoveries related to the stability of a radiating gas, the radiative behavior of a thick gas layer near a boundary, a thin gas layer far from boundaries, and the photon-vibration interaction in radiating plasma kinetics. He put forward the idea of splitting the heat flux in terms of entropy flux, leading to new concepts such as thermal displacement and deformation. He also explored the microscales of complex turbulent flows, discovering microscale foundations for what are usually assumed as purely empirical heat and mass transfer correlations. Professor Arpacı's research also led to the discovery of a dimensionless number for natural convection involving a combination of the Rayleigh and Prandtl numbers.

Professor Arpacı is known as an enthusiastic, committed educator, who has won numerous teaching awards. He is widely recognized for mentoring students who become outstanding scholars and teachers under his tutelage. His teaching activities are broad; he has taught or been involved in the development of 16 courses, spanning the thermal sciences from fluid mechanics to radiation. His course development has covered all academic levels, and he has written several text books, including introductory books on heat transfer, and specialized, advanced texts on convection, and on radiation. Professor Arpacı has advised more than forty doctoral students, many of whom have gone on to academic careers at top universities.

### Editor for HTD Newsletter

Please send news items related to heat transfer or Division activities to

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## 2001 Heat Transfer Memorial Awards

**George P. Peterson  
(Art)**

For outstanding contributions in the area of phase-change heat transfer and pioneering investigations of micro-scale heat pipes, which have brought international recognition.

**Portonovo S. Ayyaswamy  
(Science)**

For many seminal contributions to such diverse fields of heat transfer as phase-change, plasma, bio, and natural convection, in particular to transport processes with moving droplets and the thermal design of advanced industrial equipment.

## HTD Authors of Note

Last fall, the Institute for Scientific Information produced a list of the most-cited scientific authors in the world, and the top one hundred authors in engineering included six from the Heat Transfer Division: *A. Bejan, G. M. Faeth, F. P. Incropera, E. M. Sparrow, C.-L. Tien, and R. Viskanta.*

## Nusselt-Reynolds Prize

Bestowed by the Assembly of World Conferences for outstanding scientific and engineering contributions in the fields of experimental heat transfer, fluid mechanics, and thermodynamics. The 2001 recipients were **Prof. R. Adrian** and **Prof. A. E. Bergles.**

Prof. Bergles is also to be named the 2002 Holladay Distinguished Fellow by ASHRAE.

## Heat Transfer Memorial Award Nominations Sought

Nominations for the Heat Transfer Memorial Award will be accepted through October 1 of each year for the awards to be made in the following year. The purpose of the award is to recognize outstanding contribution to the field of heat transfer through teaching, research, design, or a combination of such activities. For more information concerning the nomination procedures and requirements, please contact the 2002-2003 chairperson of the K-3 Honors and Awards Committee Chairperson, Professor James Beck, 1935 Danbury W., Okemas, MI 48864-1873.

## HTD Members Elected to Fellow Grade

### Heat Transfer Fellows List June 2001 - April 2002

Dr. Arvind Atreya, Univ. of Michigan  
Dr. Donald E. Beasley, Clemson Univ.  
Dr. Sanjeev B. Sathe, IBM Corp.  
Dr. Arunava Majumdar, Univ. of California  
Mirza Mohammed Shah, Mechanical Engineer  
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Dr. Christopher Beckerman, Univ. of Iowa  
Dr. Chang H. Oh, Idaho National Engineering and Environmental Lab

# A Heat Transfer Concept Inventory?

Under the auspices of the Foundation Coalition, supported by the National Science Foundation, early attempts to develop a Heat Transfer Concept Inventory are underway as part of a broad-based Foundation Coalition effort to improve engineering education. Members of the Heat Transfer Division are uniquely positioned to help us.

The use of a Concept Inventory is motivated by the highly successful Force Concept Inventory (FCI), as described by Hestenes et al.[1]. A Concept Inventory is designed to assist the development of effective teaching strategies by providing information on the initial knowledge state of students entering a course, and measuring conceptual gains achieved by the end of the course. The Concept Inventory is given as a series of simple questions—usually visually based questions—to explore the founding paradigms of the subject; e.g., the FCI asks a series of pictorial questions to explore Newtonian thinking. A good Concept Inventory is designed to probe misconceptions. Thus, the effective development of such a tool requires identification of the misconceptions in a field.

What are the misconceptions in heat transfer?

Let me provide an example misconception I have observed in my students. Many students new to heat transfer are very good Newtonian thinkers, and some apply Newtonian mechanics to heat transfer. A resulting misconception might be probed with the following question:

A very small copper ball at room temperature is dropped into a large pan of vigorously boiling water. The copper ball is carried by the boiling water and it never touches the metal of the pan; it is only in contact with the water. Circle the plot below best describing the temperature of the copper ball as a function of time. See Figure 1.

With respect to misconceptions in Newtonian mechanics, Hestenes et al. say [1], “few physicists can recall having ever believed, let alone having overcome, any of the misconceptions, though research has established unequivocally that everyone has them before learning physics.” The challenge in developing a Heat Transfer Concept Inventory is identifying the common misconceptions. Do you remember ever having held a heat transfer misconception? Do you see them in your family or friends? Do you see them in your students? Please tell us about heat transfer misconceptions with which you are familiar. Send them to me by email at a-jacobi@uiuc.edu.

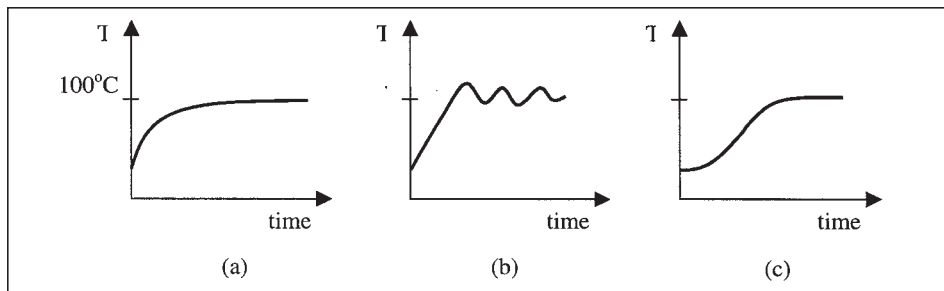


Figure 1. A very small copper ball at room temperature is dropped into a large pan of vigorously boiling water. The copper ball is carried by the boiling water and it never touches the metal of the pan; it is only in contact with the water. Circle the plot above best describing the temperature of the copper ball as a function of time.

If you want more information on the Foundation Coalition visit <http://www.foundationcoalition.org/>.

Anthony M. Jacobi

[1] Hestenes, D., Wells, M., and G. Swackhamer, “Force Concept Inventory,” *The Physics Teacher*, Vol. 30, March, 1992, pp. 141-158.

## 2001-2002 Heat Transfer Division <http://www.asme.org/divisions/htd/>

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Covering: Aircraft and Astronautical; Biotechnology; Cooling and Electronic Equipment; Energy Technology and Systems; Environmental; Fire and Combustion Systems; Gas Turbine; Heat Exchangers; Low Temperature and Arctic Region; Materials Processing; Nuclear Theory and Fundamental Research; Thermophysical Properties.

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#### • Heat Transfer - Recent Contents

This bimonthly journal is designed to provide a quick look at titles of the latest research papers published internationally in the field of heat transfer. To see a list of the 30 international journals regularly covered by HTRC visit the HTRC Journals Page at <http://www.asme.org/pubs/heattran/index.html>

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#### • Journal of Electronics Packaging

This journal publishes papers that use experimental and theoretical (analytical and computer-aided) methods, approaches, and techniques to address and solve various mechanical, materials, and reliability problems encountered in the analysis, design, manufacturing, testing, and operation of electronic, optoelectronics, and photonics components, devices, and systems. Originally, practicality, high engineering level, and mechanical (materials) orientation are the major criteria for the acceptance of a submitted paper. Visit our website for more information <http://www.asme.org/pubs/journals/elecpack/>

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### ASME Press Books

- **Hot Air Rises And Heat Sinks: Everything You Know About Cooling Electronics Is Wrong**  
Published 1998

#### • Numerical Thermal Analysis

Published 1999

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#### Continuing Education Institute - For

information about a course listed below or if you are ready to register, call ASME at 800-843-2763.

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- PD074 - Experimental Methods in Heat Transfer
- PD418 - Computational Thermal Analysis (CTA)
- PD158 - Numerical Solution of Fluid Flow and Heat Transfer
- PD417 - Thermoeconomics

#### CD ROMs

- Finite Element Analysis: A Self-Study Course with Software

#### Videos

- [Heat Transfer Commercial Codes to Buy or Not to Buy](#)
- [Heat Transfer Industrial Applications for Radiation Numerical Modeling](#)
- [Heat Transfer/Heat Exchangers-2 Hrs: Module #5 \(One VHS Video And 1 Bound Set Of Notes\)](#)
- [Advanced Heat Exchanger Technology](#)
- [Commercial Applications of Heat Sinks](#)
- [Advanced Materials for Electronic Packaging, Thermal Control and High Temperature Applications](#)

#### ASME Codes and Standards

The following is a sample of codes and standards that may be of interest to members of the **Heat Transfer Division**. ASME maintains and distributes hundreds of codes and standards used around the world for the design, manufacturing and installation of various mechanical devices. For more detailed information visit the Codes and Standards web page at <http://www.asme.org/codes/>

- [Air Cooled Heat Exchangers](#)  
PTC 30
- [Closed Feedwater Heaters](#)  
PTC 12.1
- [Flue and Exhaust Gas Analyses](#)  
PTC 19.10
- [Heating And Cooling Equipment Performance Test Code Package \(PTC\)](#)

#### For information or questions on purchasing codes and standards:

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[infocentral@asme.org](mailto:infocentral@asme.org)

#### For other information or questions on an ASME code or standard:

Tel: 1-212-591-8500

[cs@asme.org](mailto:cs@asme.org)

## Upcoming Conferences and Meetings

### *International Mechanical Engineering Congress and Exposition*

November 17–22, 2002, New Orleans Hilton/Ernest Morial Convention Center, New Orleans, LA. See [www.asme.org/congress/](http://www.asme.org/congress/)

### *6th ASME-JSME Thermal Engineering Joint Conference*

A series of joint conferences on thermal engineering, held at four-year intervals. AJTEC 2003 is the sixth such joint conference; it will be held from 16 to 20 March, 2003, in Kohala Coast, Hawaii. See [www.jsme.or.jp/ted/AJ2003.html](http://www.jsme.or.jp/ted/AJ2003.html)

### *6th ISHMT-ASME Heat and Mass Transfer Conference*

The Conference will be held in Kalpakkam, Tamil Nadu, INDIA, 5–7 January 2004.

### *8th AIAA/ASME Joint Thermophysics and Heat Transfer Conference*

Addresses topics in conduction, convection, radiation, and phase change heat transfer, combustion, computational aspects of heat transfer problems. The Division has sessions on microscale heat transfer, heat transfer in porous media, thermal management of electronic equipment, boiling and phase change heat transfer, and heat transfer in fires and combustion systems. Held 24 to 26 June 2002, St. Louis, MO. See [www.aiaa.org/calendar/](http://www.aiaa.org/calendar/)

### *15th Symposium on Thermophysical Properties*

This is part of the well-established series of conferences on thermophysical properties. The Symposium is concerned with theoretical, experimental, simulation, and applied aspects of the thermophysical properties of gases, liquids, and solids, including biological systems. 22–27 June 2003, Boulder CO. See [symp15.nist.gov](http://symp15.nist.gov)

### *2nd International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics*

Held from 23 to 26 June 2003, next to the Victoria Falls in Zambia. The focus is on the application of experimental, analytical or computational heat and mass transfer, fluid flow, and physical properties. Contact Prof. Josua P Meyer, [hefat2003@mweb.co.za](mailto:hefat2003@mweb.co.za), See [www.hefat.com](http://www.hefat.com)

### *12th International Heat Transfer Conference*

To be held 18 to 23 August, 2002 in Grenoble, France at the Espace Congrès World Trade Center. The Conference will cover both fundamental and applied topics in heat transfer. See [www.ihtc12.ensma.fr/](http://www.ihtc12.ensma.fr/)

### *5th International Conference on Boiling Heat Transfer*

To be held 4 to 8 May, Montego Bay, Jamaica, See [www.doce-conferences.ufl.edu/ICBHT/](http://www.doce-conferences.ufl.edu/ICBHT/)