NISTIR 89-4038

Report on Interactions Between the National Institute of Standards and Technology and the American Society of Mechanical Engineers

Gail K. Ehrlich

U.S. DEPARTMENT OF COMMERCE
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(Formerly National Bureau of Standards)
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National Bureau of Standards became the National Institute of Standards and Technology on August 23, 1988, when the Omnibus Trade and Competitiveness Act was signed. NIST retains all NBS functions. Its new programs will encourage improved use of technology by U.S. industry.

U.S. DEPARTMENT OF COMMERCE
Robert A. Mosbacher, Secretary

Ernest Ambler, Acting Under Secretary for Technology

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
Raymond G. Kammer, Acting Director

TABLE OF CONTENTS

REPORT ON INTERACTIONS BETWEEN THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY AND THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

Abstract

This report highlights examples of interactions between the National Institute of Standards and Technology (NIST) and the American Society of Mechanical Engineers (ASME) over the past several years. It is meant to be representative, not all-inclusive. The interactions are organized by discipline in the following categories: Conferences, Committee Memberships and Contribution to Standards, Editors, Publications, Honors and Awards, and Special Activities. The report illustrates many activities which are designed to disseminate NIST's most recent technical advances and to learn of the technical challenges facing engineers in industry.

Requests for information, comments, as well as additions and revisions, are welcome. Please contact:

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Key Words: ASME; computers; heat transfer; mechanical engineering; pressure vessel piping; robotics; solar energy; standards; technology transfer; tribology

1. INTRODUCTION

In this era of rapid technological change, the National Institute of Standards and Technology (NIST)[1] and the American Society of Mechanical Engineers (ASME) maintain a synergistic relationship that benefits the engineering profession and the Nation. NIST is the Nation's central reference laboratory for physical, chemical, and engineering measurements. In addition, the Omnibus Trade and Competitiveness Act of 1988 expanded NIST's mission to further assist industry in the development of technology and procedures needed to improve quality, modernize manufacturing processes, ensure product reliability, manufacturability, functionality, and cost-effectiveness, and to facilitate the more rapid commercialization of products based on new scientific discoveries. NIST is the only major Federal laboratory with a direct mission to support American industry.

ASME is a nonprofit technical and educational organization with approximately 118,000 members nationwide working in industry, government and academia. The Society has more than 200 local Sections covering all 50 states and 34 technical divisions representing a broad diversity of engineering expertise. The ASME plays an important role in NIST's efforts to fulfill its mission. Technical conferences and publications sponsored by the ASME provide a forum for NIST staff to disseminate their most recent technical advances and in turn to learn of the technical challenges facing engineers in industry. NIST staff contribute to the development of ASME standards as these standards are an effective means of assuring that technical advances are incorporated in industrial practice.

NIST has had extensive interactions with ASME for many years. Peer relationships in many technical areas have led to these interactions which are distributed throughout the NIST organization. Likewise, within ASME many of the committees and technical divisions have been interacting with NIST.

In 1985, ASME formed a Committee to increase interactions between NIST and ASME. ASME recognized the extensive on-going activities underway between the two organizations and stressed that the new Committee's work will not disrupt or interfere with these on-going activities. On the contrary ASME and NIST agreed to use these on-going activities as models to expand the relationship in other areas of mutual interest. In preparation for the first Committee meeting in August 1985, a report was prepared to summarize ASME/NIST interactions. It has been periodically updated.

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[1]The National Bureau of Standards (NBS) became the National Institute of Standards and Technology (NIST) on August 23, 1988, when the President signed the Omnibus Trade and Competitiveness Act. NIST retains all of the NBS functions in addition to new programs that will further encourage improved use of technology by U.S. industry.

In view of this change in the name, the ASME/NBS Interactions Committee has been redesignated as the ASME/NIST Interactions Committee. The abbreviations NBS and NIST are both used in this report depending on the time of the activity being reported.

2. SUMMARY OF ACTIVITIES

This report is meant to be representative, not all-inclusive. It excludes general Society membership.

The NIST/ASME activities are summarized in the following categories:

- Conferences
- Committee Memberships and Contributions to Standards
- ASME Editors
- Publications
- Honors and Awards
- Special Activities

Details of these activities are contained in Appendix A of this report and are organized by the appropriate NIST working unit. A summary of these activities follows.

Conferences

Recently, NIST scientists and engineers have participated as session chairmen, co-chairmen, organizers, and panel members in over 35 ASME conferences, meetings, symposiums, and workshops. For example, they have been very active in many of the Winter and Summer Annual Meetings, the National Heat Transfer Conferences, Computers in Engineering Conferences, and the Solar Energy Division Conferences. In addition, over 90 papers by NIST authors have been presented at ASME conferences and meetings.

Committee Memberships and Contributions to Standards

Over the past few years, NIST scientists and engineers have been active in over 30 ASME committees and subcommittees and hold such positions as chairman and vice-chairman.

As a result of NIST research and coordination with ASME committee members, several significant standards and measurement practices have been adopted. For example, based on major input from the members of the Heat Transfer in Electronic Equipment Committee, as well as industry and academia, the 1987 Book of Semiconductor Equipment and Materials International (SEMI) Standards published the first standardized approach for using a wind-tunnel for forced-air convection testing of microelectronic devices. NIST participation in the Committee on Surface Roughness helped to carry out two major revisions of the surface roughness standard. A standard for the Coordinate Measurement Machine was also developed in the Coordinate Measuring Machine Performance Evaluation Committee in which two NIST engineers are members. Progress in PDES and IGES has also been advanced as the result of ASME and NIST interactions in the Computer Representation of Product Definition Data Committee.

ASME Editors

Dr. John W. Lyons, the Director of NIST's National Engineering Laboratory, is an Editorial Advisor for ASME's Manufacturing Review. In addition, other NIST researchers have served as associate editors and engineering reviewers for several ASME journals.

Publications

In addition to the numerous papers published in conference proceedings, the NIST technical staff has contributed more than 20 articles in the following major ASME publications: Mechanical Engineering, the Journal of Computers in Mechanical Engineering, the Journal of Engineering for Industry, the Journal of Solar Energy, the Journal of Heat Transfer, and ASME NEWS.

Honors

In 1986, ASME recognized Jeffrey Fong as an ASME Fellow. The ASME Council on Engineering honored him with a Distinguished Lectureship in 1988 and he received a Certificate of Appreciation from the Board of Governors in 1987.

Special Activities

NIST participates in the ASME National Laboratory Technology Transfer Committee with the purpose of promoting technology transfer to the ASME membership.

We wish to acknowledge the support and work of Nate Hurt who, until this year when he became a member of the ASME Board of Directors, served as Chairman of the ASME/NIST Interactions Committee since its establishment in 1985. His personal efforts and commitments have resulted in both NIST and ASME gaining a better understanding of the respective organization's programs and interests.

APPENDIX A

EXAMPLES OF

NIST/ASME INTERACTIONS

NATIONAL ENGINEERING LABORATORY

OFFICE OF THE DIRECTOR

Conferences:

1987 ASME Summer Annual Meeting, Toronto, Canada

- Samuel Kramer - Participated in three ASME committee meetings to present an overview of NBS and to explore opportunities for new collaborative efforts.

ASME Committee Memberships:

ASME/NIST Interactions Committee

- Samuel Kramer - Organized meetings at NIST.

ASME National Laboratory Technology Transfer Committee

- Samuel Kramer - Serves as the NIST representative and attended committee meetings held in Washington, DC on Nov. 6, 1987, and at the MI88 Conference in Atlanta, GA on July 26, 1988. The purpose of these meetings was to discuss how the DoE national labs and NIST can promote technology transfer.

- NIST technology transfer activities described in "Transferring 'Taxpayer' Technology," ASME NEWS, May 1988.

- Mechanical Engineering, Technology Transfer Issue, Sept. 88.
  - Jones, A. and Mattson, B. "Tomorrow's Factories Today." This article describes NIST's program in automated manufacturing and its technology transfer.
  - NIST staff provided a description of their research in other areas of interest to the National Laboratories for inclusion in the following technology transfer articles: "In Search of New Materials," High Performance Buildings," and "A User's Guide to the National Labs."

ASME Editor:

Manufacturing Review

- John W. Lyons, Editorial Advisor

Other ASME Publications:

- Lyons, John W., "Coming Up With New Products that Beat the Odds," Mechanical Engineering, Managing Technology Issue, April 1988.

Special Activities:

ASME Day at NIST, February 17, 1988

- Samuel Kramer and Gail Ehrlich organized this meeting attended by more than 30 ASME members. The one-day meeting included presentations, tours, and discussions covering major technical activities at NIST which are of interest to mechanical engineers. Dr. John W. Lyons, Director, NEL, participated in a question and answer session at the end of the day.

NATIONAL ENGINEERING LABORATORY

CENTER FOR MANUFACTURING ENGINEERING (CME)

Conferences:

Spring 1989 Design Conference
- o T. Kramer - Paper presentation at the CAD/CAM/CAE session.

1988 ASME Winter Annual Meeting
- o Algeo, M.B. and Hopp, T.H., "What is a Tolerance: The Problem of Methods Divergence in Flexible Automation."

September 1988 Workshop on Mechanical Tolerancing
- o T. Hopp - Session Co-chair on Inspection Methods and Machines.

August 1988 Computers in Engineering Conference, San Francisco, CA
- o Meunier, K., "Iterative Respecification: A Computational Model for Hierarchical Mechanical System Design."

April 1988 Manufacturing International (MI 88), Atlanta, GA
- o T. Kramer - Session Co-chair, "Design and Planning of Manufacturing Systems II."

1987 ASME Winter Annual Meeting
- o A. Donmez - Session Chairman of Quality Issues in Measurement and Inspection.
- o Lee, J.D., Haynes, L.S., Wang, B.L., and Tsai, K.H., "Control of Flexible Robot Arm," presented and published in Modeling and Control of Robotic Manipulators and Manufacturing Processes.

December 1987 Symposium of Integrated Intelligent Manufacturing: Analysis and Synthesis
- o Kramer, T., "Process Planning for a Milling Machine from a Feature-Based Design."
- o Kramer, T., Strayer, W.T., "Error Prevention and Detection in Data Preparation for a Numerically Controlled Milling Machine."
- o Nakpalohpo, I., Jun, J., "Automated Equipment Program Generator of the AMRF Vertical Machining Workstation."

May 1987 26th Technical Symposium on New Trends in Automated Manufacturing
- o Swyt, D.A., "Data-Driven Flexibly Automated Manufacturing: The View from NBS."

December 1986 Symposium of Integrated Intelligent Manufacturing: Analysis and Synthesis
- o McLean, C., "Vertical Workstation of the AMRF: Software Integration."
- o Magrab, E., "Vertical Workstation of the AMRF: Equipment Integration."
- o McLean, C., "Interactive Process Planning in the AMRF."

1986 ASME Winter Annual Meeting
- Slocum, A., Greenspan, L., and Peris, J., "Design and Implementation of a Five Axis Robotic Micromanipulator."
- Slocum, A., Yee, K., Peris, J., and Jurgens, P., "A Servo-controlled Pneumatic Double Gripper with Changeable Fingers."
- Donmez, A., Liu, R., Barash, M., "A Generalized Mathematical Model for Machine Tool Errors."

1986 ASME International Computers in Engineering Conference and Exhibition
- H. Bloom - Discussed software standards with ASME Committee chaired by Dr. Raghaven.
- P. Brown - Session Chairman, Robotics I - Manipulation.
- H. Bloom and C. McLean - Paper presentation.

September 1985 ASME Design Technology Conference
- C. McLean - Panel member.

August 1985 ASME Board of Governors, Manufacturing Sciences Program Meeting
- R. Hocken (Former NIST employee)

1985 ASME International Computers in Engineering Conference and Exhibition
- H. Bloom - Keynote Speaker.
- C. McLean - Chairman of Expert System Session.
- C. McLean and A. Jones - Paper presentation.

August 1984 ASME International Computers in Engineering Conference
- C. McLean - Panel member of Expert System Session.
- C. McLean and A. Jones - Paper presentation.

August 1983 ASME International Computers in Engineering Conference
- C. McLean - Chairman of Flexible Manufacturing Systems Session.

ASME Committee Memberships and Contributions to Standards:

B46 - Committee on Surface Roughness
- T.V. Vorburger, Chairman
- C. Teague
- Participated over past 10 years and helped to carry out two major revisions of the surface roughness standard.
- These members are in the process of formalizing a proposal to ASME and the Committee that ASME be the U.S. sponsor or participating sponsor to support the data collection to form the National/International Surface Roughness Data Bank.

Pressure Vessel Codes - Acoustic Emission
- F. Breckenridge

Y14.26 - Computer Representation of Product Definition Data

- B. Smith
- This committee and its parent committee Y14, Engineering Drawings and Related Practices, form the route for ANSI's review and approval of the NIST projects on the Initial Graphics Exchange Specification (IGES) and the Product Data Exchange Specification (PDES).
- IGES Version 3.0 was submitted in June 1986 and has been approved in three rounds of balloting. It was approved as an American National Standard in September 1987. IGES Version 4.0 will be submitted by April 1989.
- A method of electronic exchange of ASME standards submissions and of looseleaf publication of this work has been worked out with ASME staff.
- The first working draft of PDES will be submitted to Y14.26 by December 1988.

B5 - Machine Tool-Components Elements, Performance and Equipment

- Denver Lovett
- Preparing proposed performance standards for machining centers.
- Advising and assisting ASME on the establishment of a new committee on machining centers.

B5-TC52 - Machining Centers Committee

- Denver Lovett

B89.1.12 - Coordinate Measuring Machine Performance Evaluation

- Bruce Borchardt
- Theodore Hopp
- Coordinate Measurement Machine standard worked in consensus with this committee.

B89.1.5 - Master Disks, Plug Gages, Spherical Standards and Thread and Gage Wires

- Ralph Veale

B89.1.6 - Master Ring Gages

- Ralph Veale

Other ASME Publications:

- Roche, M., "Using Available Curve-Shaped Information with a Non-Uniform B-Spline," Computers in Mechanical Engineering, July/August, 1987.
- Lee, J.D., Haynes, L.S., "Finite Element Analysis of Flexible Fixturing System," Journal of Engineering for Industry, 1987.
- Eitzen, D. - prepared article on NBS conical transducer for Mechanical Engineering, Fall, 1985.

NATIONAL ENGINEERING LABORATORY

CENTER FOR COMPUTING AND APPLIED MATHEMATICS (CCAM)

Conferences:

June 1988 Applied Mechanics and Engineering Sciences Conference, Berkeley, CA
- o T. Burns - Session Chairman on "Plasticity."
- o Burns, T., "Similarity and Bifurcation in Unstable Viscoplastic Shear."

Jeffrey T. Fong's extensive conference activities follow:

September 1988 6th International Conference on Pressure Vessel and Piping Technology (ICPVT-6), Beijing, China
- o Technical Program Chairman for the American Region (co-sponsored by ASME).

June 1988 Pressure Vessel Piping Conference, Pittsburgh, PA
- o General Chairman.
- o Co-chairman of Panel technical session on "PVP Code Requirements for the Emerging Bioprocessing Industry."
- o Tutorial Leader of "PC-Based Expert Systems for Managing Engineering Data."

October and June 1987 ASME Pressure Vessel Piping Conference, Knoxville, TN
- o Tutorial Leader on "How to Manage Engineering Data with a PC."

July 1986 ASME Pressure Vessel Piping & Computer-in-Engineering Joint Conference, Chicago, IL
- o Technical Program Co-chairman
- o Tutorial Leader on "How to Manage Engineering Data with a PC."
- o Session Chairman on "U.S. Competitiveness in a Computer-Dominated World Economy" (Invited Speaker: The Hon. Clarence Brown, Deputy Secretary, U.S. Department of Commerce).

June 1984 ASME-ASIS-MPC-NBS Symposium on "Engineering Databases: Software for On-Line Applications," San Antonio, TX
- o Symposium Chairman & Editor of Proceedings as ASME publication PVP-96.

June 1983 ASME-ASNT-NBS-PVRC Symposium on "NDE Reliability Through Round Robin Testing," Portland, OR
- o Symposium Chairman and Editor-in-Chief of Proceedings as ASME publication NDE-1.

ASME Committee Memberships (J. Fong):

ASME Materials and Structures Technical Group
- o Chairman, Meetings and Publications Committee, 1988-1989
- o Board Member, 1987-1989

Pressure Vessels and Piping Division
- o Senate President, 1988-1989
- o Chairman, 1986-1987
- o Vice-Chairman and Chairman-Elect, 1985-1986
- o Executive Committee Member, 1982-1985

ASME Technical Opportunities and Planning Committee
- o 1985-1987

Elasticity Committee, Applied Mechanics Division
- o 1982-1986

ASME/NBS Interactions Task Force
- o 1984-1985

ASME Editor (J. Fong):

Board of Editors for ASME Journal of Pressure Vessel Technology
- o Associate Editor, 1983-present

Board of Editors for ASME Journal of Computers in Mechanical Engineering (CIME)
- o Associate Editor, 1984-1986

Other ASME Publications:

- o Fong, J.T. and Filliben, J.J., "A Data Analysis Methodology as Applied to the PVRC Round Robin NDE Test Program," ASME spec. pub. NDE-1, 1986.
- o Fong, J.T., "Analysis of Sectioning Data of PVRC 251-J for Estimating Flaw Fabrication Reliability," ASME pub. NDE-1, 1986.
- o Fong, J.T., co-edited with Mordfin, L., Hedden, O.F., and Bush, S.H., "NDE Reliability Through Round Robin Testing," ASME spec. pub. NDE-1, 1986.
- o Chapman, R., "Applications of Operations Research Techniques to System Design and Evaluation," ASME spec. pub. PVP-109, 1986.
- o Fong, J.T., co-edited with Hollinger, G.L., Gowda, B., Ezekoye, L., and Levary, R., "ASME Codes & Recent Advances in Pressure Vessel, Piping, and Valve Technology," ASME spec. pub. PVP-109, 1986.
- o Fong, J.T., "Integration of Analysis and Data Bases for Decision Making," CIME, July, 1986.
- o Fong, J.T., Cramer, R.S., and Redmiles, D.F., "DATAX: A Prototype Software for Engineering Data Evaluation and Decision Support (Extended Abstract)," ASME spec. pub. PVP-96, 1984.

- Redmiles, D.F., "K*: A Fortran-Based Code for Programming and Evaluating Interactive Software, "ASME pub. PVP-96, 1984.
- Filliben, J.J., and Fong, J.T., "DATAPLOT as an Expert System for Interactive Data Analysis," ASME spec. pub. PVP-96, 1984.
- Fong, J.T., ed., "Engineering Databases: Software for On-Line Applications," ASME spec. pub. PVP-96, 1984.
- Fong, J.T., "Computer Software Needs of Materials Property Data Bases for Selected Engineering Applications," ASME spec. pub. MPC-20, 1983.

Honors and Awards:

- Jeffrey T. Fong - Distinguished Lectureship (1988-90) from ASME Council on Engineering, March 1988. The Distinguished Lecturers Program was established by ASME in 1987 as an organized endeavor designed to provide Regions and Sections with an opportunity to hear from outstanding speakers at the leading edge of their technology. Only candidates with exceptional credentials and a proven ability to communicate their insights and excitement to a diverse engineering audience have been invited to participate.

- Jeffrey T. Fong - Certificate of Appreciation from ASME Board of Governors, July 1, 1987. Recognized for his valuable services to ASME in advancing the engineering profession as a member and chairman of the Pressure Vessels and Piping Division Executive Committee.

- Jeffrey T. Fong - ASME Fellow, July 1986. Recognized "for distinguished contribution to the advancement of the arts and sciences of mechanical engineering practice through research, publication, consulting, and conference management."

Special Activities (J. Fong):

China National Standards Committee of Pressure Vessel

- Honorary Advisor, PRC State Bureau of Standards, Bejing, China, 1985-1987.
- Special Assistant to ASME Executive Director and Managing Director for Codes and Standards for planning the hosting of official visit to the U.S. by this Committee, 1985-1986.
- Special Assistant to ASME President and Executive Director for planning an official visit to China, 1984-1985.
- Member of the ASME Delegation to China, May, 1985.

Project Director of a proposed ASME-NBS Software Research project, DATAX, for ASME Committee on Software Research, 1984-1986.

NATIONAL ENGINEERING LABORATORY

CENTER FOR BUILDING TECHNOLOGY (CBT)

Conferences:

1987 ASME Summer Annual Meeting

- R. Wright, Director, Center for Building Technology - Briefed the ASME Council on Engineering and the Council on Codes and Standards on potential cooperative work on machine representations of standards.

Ninth Solar Energy Division Conference, 1987

- A.H. Fanney and B. Mahajan - Session Chairmen.
- Mahajan, B.M., "Flow Coefficients for Interzonal Natural Convection for Various Apertures."
- Liu, S.T., "Experimental and Analytical Investigation of Solar Radiation on Interior Surfaces of a Sunspace."

Eighth Solar Energy Division Conference, 1986

- A.H. Fanney and B. Mahajan - Session Chairmen.
- Fanney, A.H. and Dougherty, B.P., "A Self-Heated Thermistor Flowmeter for Flow Measurements in a Thermosyphon Solar Hot Water System."
- McCabe, M.E., "Diurnal Effectiveness of Phase-Change Energy Storage Cylinders."
- Mahajan, B.M., "Inter-room Air Flow by Natural Convection via a Doorway Opening."

AIAA/ASME Thermophysics and Heat Transfer Conference, 1986

- McCabe, M.E., "Periodic Heat Conduction in Energy Storage Cylinders with Change of Phase."

106th Winter Annual Meeting, 1985

- M.E. McCabe - Session Vice-Chairman.
- Mahajan, B.M., "Interzonal Natural Convection for Various Aperture Configurations."
- Greenberg, J., "Plan for the Development of Test Procedures for Differential Temperature Controllers Used in Solar Energy Systems."

105th Winter Annual Meeting, 1984

- M.E. McCabe - Session Organizer and Chairman.
- Mahajan, B.M., Liu, S.T., and Reed, K.A., "Performances of Different Passive Solar Systems at the NBS Test Facility."
- Thomas, W.C. and Reed, K.A., "Effect of Infrared Irradiance on Collector Thermal Performance."
- Waksman, D., Thomas, W.C., "Conclusions and Recommendations for the Testing of Flat-Plate Solar Collector Thermal Performance and Durability."

Sixth Solar Energy Division Conference, 1984

- Fanney, A.H., "An Experimental Technique for Testing Thermosyphon Solar Domestic Hot Water Systems."

Fifth Solar Energy Division Conference 1983

- A.H. Fanney - Session Chairman.
- Mahajan, B.M. and Liu, S.T., "Initial Results from NBS Passive Solar Energy Test Facility."
- Klein, S.A. and Fanney, A.H., "A Rating Procedure for Solar Domestic Hot Water Systems."
- Fanney, A.H. and Klein, S.A., "Performance of Solar Domestic Hot Water Systems at the National Bureau of Standards - Measurements and Predictions."
- Thomas, W.C., Dawson, III, A.G., Waksman, D., "Testing Solar Collector Materials Durability by Integrated Day-Long Stagnation Temperature Measurements."

104th Winter Annual Meeting, 1983

- McCabe, M.E., "Solar Energy Absorption by Vertical Cylindrical Tube Absorbers in Sunspace Enclosures."

ASME Committee Memberships:

ASME Solar Energy Executive Committee

- A.H. Fanney - Vice-Chairman 1988-1990

Solar Testing and Measurement Committee, Solar Energy Division

- A.H. Fanney - Chairman, 1984-1987
- B. Mahajan
- M.E. McCabe

Other ASME Publications:

Journal of Solar Energy Engineering

- Fanney, A.H. and Dougherty, B.P., "A Self-Heated Thermistor Flowmeter for Flow Measurements in a Thermosyphon Solar Hot Water System," 1987.
- Mahajan, B.M., "Measurement of Air Velocity Components of Natural Convective Interzonal Airflow," 1987.
- Waksman, D., Thomas, W.C., "The NBS Solar Collector Reliability/Durability Test Program: Summary of Results and Recommendations for Collector Testing," 1986.
- Thomas, W.C., Dawson, III, A.G., Waksman, D., "Use of Integrated Day-Long Stagnation Temperature for Measuring Changes in Solar Collector Materials Properties," 1985.
- Fanney, A.H., "An Experimental Technique for Testing Thermosyphon Solar Domestic Hot Water Systems," 1984.
- Klein, S.A. and Fanney, A.H., "A Rating Procedure for Solar Domestic Hot Water Systems," 1983.
- Fanney, A.H. and Klein, S.A., "Performance of Solar Domestic Hot Water Systems at the National Bureau of Standards - Measurements and Predictions," 1983.

o Dawson, III, A.G., Thomas, W.C., and Waksman, D., "Solar Collector Durability Evaluation by Stagnation Temperature Measurements," 1983.

NATIONAL ENGINEERING LABORATORY

CENTER FOR FIRE RESEARCH (CFR)

Conferences:

109th ASME Winter Annual Meeting, 1988

- J.G. Quintiere - Panelist, "Panel on Program Emphasis in Heat Transfer Research at Federal Funding Agencies."

108th ASME Winter Annual Meeting, 1987

- V. Motevalli, C.H. Marks, (NIST Guestworkers from the University of Maryland), B. McCaffrey (CRF), "Measurement of Velocity and Temperature Profiles in Low-Speed Turbulent, Non-Isothermal Flows."

ASME-JSME Thermal Engineering Joint Conference, March 22-27, 1987, Honolulu, Hawaii

- Len Cooper (CFR), along with B. Farouk (Drexel University) - Organized the Heat and Mass Transfer in Compartment Fires Sessions.
- Pitts, W.M., "The Effects of Global Density and Reynolds Number Variations on Mixing in Turbulent Axisymmetric Jets - Implication for Turbulent Diffusion Flames."
- DiMarzo, M., Evans, D.D., and Trehan, A.K., "The Cooling Effect of a Single Evaporating Droplet on a Hot Semi-Infinite Metal Body."
- Finlayson, E., Aung, W. and Kashiwagi, T., "Interaction of Radiation and Conduction in Polymeric Materials Exposed to External Thermal Radiation."
- Morehart, J. and Evans, D.D., "Investigation of the Effects of a Stratified Two-Layer Environment on Fire Plume Temperatures."
- Woodhouse, A., Marks, C.H. and Cooper, L.Y., "An Experimental Study of the Transient Thermal Response of Unconfined Ceilings Above Fire Plumes."

24th ASME/AIChE National Heat Transfer Conference, 1987

- DiMarzo, M. and Evans, D.D., "Evaporation of a Water Droplet Deposited on a Hot High Thermal Conductivity Solid Surface."
- Cooper, L.Y., "Heat Transfer in Compartment Fires Near Regions of Ceiling Jet-Impingement."
- Saito, K., Williams, F.A., Wichman, S., Quintiere, J., "Upward Turbulent Flame Spread on Wood Under External Radiation."

23rd ASME/AIChE National Heat Transfer Conference, 1985

- Cooper, L. and Woodhouse, A., "The Buoyant Plume-Driven Adiabatic Ceiling Temperature Revisited."

22nd ASME/AIChE National Heat Transfer Conference, 1984

- L. Cooper - Paper presentations.

21st ASME/AIChE National Heat Transfer Conference, 1983

- J. Quintiere - Organized the fire dynamics and fire heat transfer sessions.
- L. Cooper, D. Evans, and T. Kashiwagi - Presented papers at these sessions published by ASME in a single volume which serves as an introduction to fire science, fire dynamics, and heat transfer (edited by J. Quintiere).
- Cooper, L.Y., "On the Significance of a Wall Effect in Enclosures with Growing Fires."
- Evans, D.D., "Plume Flow in a Two-Layer Environment."

1983 ASME Winter Annual Meeting - Symposium on Modeling of Environmental Flow Systems

- Cooper, L.Y., "A Buoyant Source in the Lower of Two, Homogeneous Stably Stratified Layers."

ASME Committee Memberships:

K-11 Committee on Heat Transfer in Fire and Combustion Systems

- J. Quintiere - Chairman of the K-11 Committee (1986-1988)
- Len Cooper
- Various NIST grantees
- The founder of K-11 and recent past Chairman of the Heat Transfer Division, Prof. John R. Lloyd, is currently a member of the NAS-NAE-NRC Board of Assessment of NIST Programs for CFR which serves to advise and evaluate the Center's program.

Other ASME Publications:

- Cooper, L.Y., "Heat Transfer in Compartment Fives Near Regions of Ceiling-Jet Impingement on a Wall," accepted for publication in Journal of Heat Transfer.
- Cooper, L.Y. and Stroup, D.W., "Thermal Response of Unconfined Ceilings Above Growing Fires and the Importance of Convective Heat Transfer," Journal of Heat Transfer, 1987.
- Cooper, L.Y. and Kennedy, L.A., "Heat and Mass Transfer Research Topics in Fire and Controlled Combustion Systems," Mechanical Engineering, 1986.
- Cooper, L.Y. and Woodhouse, A., "A Buoyant Plume-Driven Adiabatic Ceiling Temperature Revisited," Journal of Heat Transfer, 1986.

NATIONAL ENGINEERING LABORATORY

CENTER FOR ELECTRONICS AND ELECTRICAL ENGINEERING (CEEE)

Conferences:

1987 ASME Winter Annual Meeting

- Frank F. Oettinger - Lead speaker on the "Panel on Standardization in Thermal Resistance for Microelectronics" jointly sponsored by the Electrical and Electronics Packaging Division and the Heat Transfer Division's K-16 Committee.

ASME Committee Memberships and Contributions to Standards:

K-16 Committee on Heat Transfer in Electronic Equipment

- Frank Oettinger facilitated a working relationship with the K-16 Subcommittee on Measurement Standards and Procedures and related Semiconductor Equipment and Materials International (SEMI) standardization activities in ceramic and plastic IC package thermal test methods.

- This interaction has resulted in the publication of SEMI Test Method G43-87, "Still- and Forced-Air Junction-to-Ambient Thermal Resistance Measurements of IC packages," in the 1987 Book of SEMI Standards. This is the first document of its kind in which a standardized approach has been agreed upon by the semiconductor industry using a wind-tunnel for forced-air convection testing of microelectronic devices.

- As General Chairman of the 1988 IEEE Semiconductor Thermal and Temperature Measurement Symposium (SEMI-THERM), Oettinger discussed with Dr. Richard Wirtz, Chairman of ASME K-16 Committee, the possibility of K-16 being a co-sponsor or cooperating society with IEEE. No decision has as yet been made.

NATIONAL ENGINEERING LABORATORY

CENTER FOR CHEMICAL ENGINEERING (CCE)

Conferences:

25th ASME/AIChE National Heat Transfer Conference, 1988

- H.G. Semerjian - Session Chairman on Combustion Fundamentals.

AIAA/ASME/SAE/ASEE 24th Joint Propulsion Conference, Boston, MA, July 11-12, 1988

- C. Presser - Session Chairman on Sprays/Injectors.
- Presser, C., Gupta, A.K., and Semerjian, H.G., "Dynamics of Pressure-Jet and Air-Assist Nozzle Sprays: Aerodynamic Effects."

1988 10th ASME International Symposium on Thermophysical Properties, NBS, Gaithersburg, MD, June 20-24, 1988

- Berg, R.F., "Low Frequency Critical Viscosity of Four Binary Liquids."
- Bruno, T.J., "Supercritical Fluid Chromatograph for Physicochemical Studies: Binary Diffusion Coefficients."
- Cezairliyan, A. and Sengers, J.V. - Organizers and Chairmen.
- Clark, E.J., "Crystallization and Fibril Formation in Polymers."
- Diller, D.E., "Torsional Piezoelectric Crystal Viscometer for Compressed Gases and Liquids."
- Ely, J.F., and Magee, J.W., "PVT Relationships in a Carbon Dioxide Rich Mixture with Ethane."
- Fox, J.R., "A Field-Space Conformal Solution Method."
- Friend, D.G., "The Viscosity Surface for Mixtures of Methane and Ethane."
- Gallagher, J.S., "The Modelling of the Thermodynamic Properties of Sodium Chloride in Steam Through Extended Corresponding States."
- Goodwin, A.R.H., "Measurements of the Speed of Sound in Argon, Methane, a Natural Gas and Air at High Pressures using a Spherical Resonator."
- Hanley, H.J.M., "Prediction of Shear Viscosity and Non-Newtonian Behavior in the Soft Sphere Liquid."
- Haynes, W.M., "Automated Magnetic Suspension Densimeter with Optical Sensing."
- Huber, M.L., "Extension of an Improved One-Fluid Conformal Solution Theory to Real Fluid Mixtures with Large Size Differences."
- Jacobsen, R.T., Clarke, W.P., and Penoncello, S.G., and McCarty, R.D., "A Revised Interium Thermodynamic Property Formulation for Air."
- Miller, A.P., "Thermal Expansion of Tungsten in the Range 1500-3600 K by a Transient Interferometric Technique."
- Moldover, M.R., "The Tension and Thickness of Interfaces in the Critical Region of Fluids."

- Moldover, M.R., "Measurement of the Universal Gas Constant R with a Spherical Acoustic Resonator."
- Morrison, G., "Phase Transitions in the Liquid Phases of Monomolecular Films."
- Morrison, G., "New Methods for Locating Phase Boundards."
- Morrison, G., "Critical Points in Electrolytes: What are the Issues? What Experiments Should be Done?"
- Nieto de Castro, C.A., "The Viscosity of Liquid Toluene Under Pressure."
- Nieto de Castro, C.A., "The Thermal Conductivity of Refrigerant R142b."
- Outcalt, S.L., "Direct Fugacity Measurements on Hydrogen Mixtures."
- Rainwater, J.C., "Asymptotic Expansions for Dew-Bubble Curves Near the Critical Locus."
- Roder, H.M., and Nieto de Castro, C.A., "Thermal Conductivity, Thermal Diffusivity and Heat Capacity of Nitrogen from Transient Hot-Wire Measurements."
- Schmidt, J.W., "Structure of the Liquid-Liquid Interface Near T_c."
- Storvick, T.S., "A Field-Space Conformal Solution Method: Binary Vapor-Liquid Phase Behavior."
- Van Poolen, L.J., "Representation of Binary Mixture Liquid-Vapor Equilibria by Means of Critical Isochores."
- Van Poolen, L.J., "Thermodynamic Properties of Air on the Dew and Bubble Lines."

1987 ASME Winter Meeting, Anaheim, CA

- Morrison, G., "Application of the Carnahan-Starling-DeSantis Equation of State to Mixtures of Refrigerants."

1987 ASME Winter Annual Meeting, Boston, MA, Nov. 3-4, 1988

- Mattingly, G.E. - Organized and Chaired Session on Fluid Flow Measurement Uncertainty (I and II).

24th ASME/AIChE National Heat Transfer Conference, 1987

- Jones, M.C., "Retrograde Condensation of Carbon Dioxide--N-Decane Mixtures on Horizontal Cylinders."

AIAA/SAE/ASME 23rd Joint Propulsion Conference, San Diego, CA, July 1987.

- Presser, C., Gupta, A.K., Semerjian, H.G., "Nozzle Design Effects on Droplet Size and Transport in Fuel Sprays."

ASME, MFFCC Meetings, New York, NY, May 1987.

- G.E. Mattingly - Described NBS' Round Robin Flowmeter Testing.

2nd ASME/JSME Thermal Engineering Joint Conference, Honolulu, Hawaii, March 1987.

- H.G. Semerjian - Organized three sessions on Combustion Fundamentals and chaired one session.

International Symposium on Fluid Flow Measurement, Washington, DC, Nov. 1986; jointly sponsored by AGA, API, ASME, GPA, GRI and NBS.
- N.A. Olien - Member of organizing committee.

23rd ASME/AIChE National Heat Transfer Conference, 1985
- Santoro, R., Yeh, T., and Semerjian, H., "The Transport and Growth of Soot Particles in Laminar Diffusion Flames."

June 1985 9th ASME Symposium on Thermophysical Properties, NBS, Boulder, CO.
- H. Hanley - Chairman.

ASME Committee Memberships:

ASME Research Committee on the Properties of Steam
- J.M.H.L. Sengers
- J.V. Sengers
- J.S. Gallagher

ASME K-7 Thermophysical Properties of the Heat Transfer Division
- A. Cezairliyan
- H. Hanley
- J.V. Sengers
- J.F. Ely

George E. Mattingly's memberships include:
- ASME (Main) Committee on the Measurement of Fluid Flow in Closed Conduits
- ASME SC-2, Pressure Differential Devices
- ASME SC-6, Glossary of Terms for Flow Measurements (Past Chairman)
- ASME SC-14, Measurement of Fluid Flow Using Gravimetric and Volumetric Techniques (Chairman)
- ASME SC-15, Installation Effects on Orifices
- ASME SC-16, Vortex Shedding Type Flowmeters (Past Chairman)
- ASME (Main) Research Committee on Fluid Meters
- ASME SC-11, Test Methods and Calculation Procedures (Chairman)

ASME K-6 Committee on Heat Transfer in Energy Systems
- C. Presser

ASME K-11 Committee on Heat Transfer in Fires and Combustion Systems
- H.G. Semerjian

ASME PTC 19.18, Committee on Humidity Determination
- S. Hasegawa

Special Activities:

NIST and ASME work together in the North American Fluid Flow Measurement Council. Other members include the American Gas Association, Canadian Gas Association, Pacific Energy Association, Gas Processors Association, American Petroleum Institute, Gas Research Institute, Institute of Gas Technology, and Instrument Society of America.

NATIONAL MEASUREMENT LABORATORY

STANDARD REFERENCE DATA (SRD)

ASME Committee Memberships and Contributions to Standards:

ASME Research and Technology Committee on Water and Steam in Thermal Systems

- Dr. Howard J. White, Jr. - This Committee serves as the U.S. National Committee to the International Association for the Properties of Steam (IAPS), for which Dr. White is the Executive Secretary. The next Committee meeting will be held at NIST on May 8,9, 1989. The Research Committee is also represented at the annual meeting of IAPS -- this meeting was held in August 1988 in Vancouver, B.C. The next meeting will be held during the 11th International Conference on the Properties of Steam in Prague, Czechoslovakia in September 1989. In its own right and through IAPS, there are extensive interactions between the activities of the Research Committee and those of the NIST Office of Standard Reference Data.

Special Activities:

Dr. John Rumble is on the Board of Trustees of ACTIS, Inc., a new corporation established to build tribology information systems. ASME and NIST worked together on this effort.

NATIONAL MEASUREMENT LABORATORY

CENTER FOR CHEMICAL PHYSICS (CCP)

Conferences:

13th National Waste Processing Conference, Philadelphia, PA, May 1988

- Buckley, T.J., and Domalski, E.S., "Evaluation of Data on Higher Heating Values and Elemental Analysis of Refuse-Derived Fuels."
- Churney, K., Ledford, Jr., A.E., Buckley, T.J., and Domalski, E.S., "Chlorine Mass Balance in the Combustion of Refuse-Derived Fuel."

12th National Waste Processing Conference, June 1986

- Domalski, E., "The Chlorine Content of municipal Solid Waste from Baltimore County, MD and Brooklyn, NY."
- Churney, K., "Assessing the Credibility of the Calorific Value of Municipal Solid Waste."

ASME Committee Memberships:

Research Committee on Industrial and Municipal Wastes

- Dr. Eugene Domalski

ASME Dioxin Committee

- K. C. Churney

Research Committee on Properties of Steam

- D. Neumann

Other ASME Publications:

- Domalski, E.S., and Jobe, Jr., T.L., "Thermodynamic Data for Biomass Materials and Waste Components," 1987, (ASME/NBS/SERI publication).

INSTITUTE FOR MATERIALS SCIENCE AND ENGINEERING

Conferences:

ASME/JSME Pressure Vessel and Piping Conference, July 1989
- Tom Siewert - Session Organizer on Real-Time Radiography and Paper Presentation.

ASME/STLE Joint Conference, October 1988
- S.M. Hsu - Session Organizer and Speaker.
- R.S. Gates - Paper presentation.
- J. Perez - Paper presentation.

Pressure Vessel and Piping Conference, June 1988
- Sumio Yukawa - Co-Author of paper on ASME Code Toughness Requirements.

ASME Manufacturing Science and Technology Program, Manufacturing International Conference - April 1988
- Bruce Christ - Submitted invited paper on plastic materials in car and truck construction.

ASME Offshore Mechanics and Arctic Engineering Conference, 1988
- Harry I. McHenry - Session Organizer, Paper presentation.

ASME Offshore Mechanics and Arctic Engineering Conference, 1987
- Harry I. McHenry - Paper presentation.

Winter Annual Meeting, December 1987
- Sumio Yukawa - Panel Session Organizer on Databases.

Fifth National Congress on Pressure Vessels and Piping Technology, 1987
- Harry I. McHenry - Paper presentation.

ASME Tribology Workshop, 1985
- Jointly sponsored by NBS, DoE, and ASME.
- Bill Ruff and John Rumble - Participants.

ASME Committee Memberships:

Materials and Structures Group
- Sumio Yukawa - Immediate Past Vice-President

Council on Engineering Database Committee
- Sumio Yukawa

Boiler and Pressure Vessel Code Committee
- Sumio Yukawa participation includes:
  - Subgroup on Toughness, SC on Properties
  - Task Group on Very High Temperature Design, SC on Design
  - Subgroup on Evaluation Standards, SC XI
  - Working Group on Materials, Subgroup on NUPACK, SC II

ASME/NIST Interaction Committee
- Sumio Yukawa - Corresponding Member

Tribology Division
- A.W. Ruff
- S.M. Hsu
- S. Jahanmir

Research Committee on Tribology
- S. Jahanmir - Chairman
- A.W. Ruff
- M.B. Peterson
- S.M. Hsu

ASME Technical Economics Program - Materials Committee
- Bruce Christ

ASME Editor:

Journal of Applied Mechanics
- R.D. Kriz - Reviewer.

Special Activities:

Bill Ruff - NIST liaison with ASME Washington office on Tribology data.

NBS-114A (REV. 2-8C)

U.S. DEPT. OF COMM. BIBLIOGRAPHIC DATA SHEET (See instructions)	1. PUBLICATION OR REPORT NO. NIST 89-4038	2. Performing Organ. Report No.	3. Publication Date FEBRUARY 1989

4. TITLE AND SUBTITLE

Report on Interactions Between the National Institute of Standards and Technology and the American Society of Mechanical Engineers

5. AUTHOR(S)

Gail K. Ehrlich

6. PERFORMING ORGANIZATION (If joint or other than NBS, see instructions)

NATIONAL BUREAU OF STANDARDS
DEPARTMENT OF COMMERCE
WASHINGTON, D.C. 20234

7. Contract/Grant No.

8. Type of Report & Period Covered
NIST-IR
FY 1982 - FY 1989

9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS (Street, City, State, ZIP)

10. SUPPLEMENTARY NOTES

☐ Document describes a computer program, SF-185, FIPS Software Summary, is attached.

11. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)

This report highlights examples of interactions between the National Institute of Standards and Technology (NIST) and the American Society of Mechanical Engineers (ASME) over the past several years. It is meant to be representative, not all-inclusive. The interactions are organized by discipline in the following categories: Conferences, Committee memberships and contribution to standards, Editors, Publications, Honors and awards, and Special activities. The report illustrates many activities which are designed to disseminate NIST's most recent technical advances and to learn of the technical challenges facing engineers in industry.

12. KEY WORDS (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons)

ASME; computers; heat transfer; mechanical engineering; pressure vessel piping; robotics; solar energy; standards; technology transfer; tribology

13. AVAILABILITY

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☐ For Official Distribution. Do Not Release to NTIS
☐ Order From Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
☒ Order From National Technical Information Service (NTIS), Springfield, VA. 22161

14. NO. OF PRINTED PAGES
31

15. Price
$12.95