

4 September 2014 v2

NIST Gallery of Distinguished Scientists, Engineers, and Administrators

October 10, 2014





NIST Boulder Laboratories



JILA – University of Colorado

NIST Gallery of Distinguished Scientists, Engineers, and Administrators

Adding Nine Portraits to the Gallery

**Friday October 10, 2014
Gaithersburg — Green Auditorium**

10:30 – 11:45 am

Arranged by
STANDARDS ALUMNI ASSOCIATION



**Jeffrey Horlick, President
Richard N. Wright, Chair, Portrait Gallery Committee**

NIST National Institute of Standards and Technology • U.S. Department of Commerce

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NIST Gaithersburg

Advanced Chemical Sciences Laboratory

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HISTORY OF THE NBS/NIST GALLERY

In the early 1970s NBS Director Lewis Branscomb authorized the establishment of a gallery of portraits of distinguished scientists, engineers, and administrators. Originally, the gallery was limited to a wall in the Lunch Club; now known as the Heritage Room. The expansion into the alcove took place in 1985 under Director Ernest Ambler, who asked the newly established Standards Alumni Association (SAA) to assume the responsibility for establishing criteria for selection and a process for soliciting nominations from the staff and managers of the institution.

The SAA Portrait Committee annually issues a call for nominations, empanels a jury which meets to evaluate the nominations, and forwards its recommendations to the NIST Director for approval. The Committee displays the portraits and biographical information for the honorees and organizes an annual induction ceremony. Over the past 29 years, the Gallery has grown to 302 portraits, with newly allocated space along the cafeteria wall and the installation of a Digital Portrait Gallery at Gaithersburg and Boulder in 2013.

SAA Portrait Gallery Committee 2014

Committee ChairRichard N. Wright
Electronic Portrait Gallery Jeffrey Horlick
Subcommittee: Nominations and Elections..... Bettijoyce Lide and Richard Wright
Subcommittee: Liaison with Honorees, Program BrochureNoël Raufaste and Jeffrey Horlick
Subcommittee: Portrait Ceremony and Advertising.....Sara Torrence, Joan Schneider, Norman Belecki, and Bettijoyce Lide

2014 Jury

* indicates non-voting member

Richard Wright, Chair*	David Lide	Curt Reimann
Bettijoyce Lide*	Richard Lindstrom	Anneke Sengers
Brian Belanger	Roger Martin	Stephen Seltzer
Elaine Bunten-Mines	Richard Martinez	Francis Sullivan
Elizabeth Clark Hessel	Janet Miller	Sheldon Wiederhorn
William Gadzuk	William Ott	
Stuart Katzke	Noël Raufaste	

2014 NIST/SAA Portrait Ceremony Recognizing Nine New Honorees

We are presenting nine honorees whose portraits will be added to the NIST Portrait Gallery today. After an introduction, the honorees or their representatives will be called forward one by one; their accomplishments will be featured in presentations by leaders of NIST organizational units. The honorees will receive a folder with documentation, and will be given the opportunity to make some remarks. A portrait viewing will follow the ceremony.

PROGRAM

Opening Comments Jeffrey Horlick, President, SAA

Welcoming Remarks Willie May, Acting Director, NIST

Presentations Richard N. Wright, Chair, Portrait Gallery Committee

Marvin E. Cage PML Years at NIST: 1976-2005

For materially advancing science and metrology through high accuracy determinations of the quantum Hall effect that contributed significantly to the international adoption of the SI-90 representations of the units of resistance (ohm) and electrical potential (volt).

Kevin Carr IIS Years at NIST: 1989-2005

For outstanding leadership of the Hollings Manufacturing Extension Partnership and implementing it into a model federal program with national impact on business development, innovation, and job creation.

Jack R. Edmonds ITL Years at NIST: 1959-1969

For fundamental contributions in combinatorial optimization, discrete mathematics, and the theory of computing.

Harry S. Hertz IIS Years at NIST: 1973-2013

For visionary leadership, stewardship, and advocacy in promoting the Baldrige performance excellence framework and concepts nationally and internationally and for exemplary leadership and advancement of the analytical chemical sciences.

Jeffrey Horlick ADLP Years at NIST: 1967-2006

For leadership and contributions in laboratory accreditation, standards, and conformity assessment that significantly enhanced the safety and health of consumers and first responders, U.S. homeland security, and product quality.

Paul Sebastian Julienne PML Years at NIST: 1969-1973 & 1974-2013

For pioneering research in the quantum theory of cold, low-energy interactions between atoms, molecules, and light, and its applications to precision measurements and fundamental science.

Walter J. Lafferty PML Years at NIST: 1961-1995

For seminal contributions to measurement and compilation of spectral, structural, and force-field molecular properties important in predictive chemical and physical modeling.

Gabrielle G. Long MML Years at NIST: 1965-1967 & 1980-2003

For outstanding research and group leadership that made NIST an international leader in the measurement of materials microstructure using synchrotron X-rays and neutrons.

Charles R. Tilford MML Years at NIST: 1970-2000

For outstanding technical contributions and leadership in developing world-class primary standards and user-support services for rapidly expanding pressure and vacuum dependent industries.

Closing Remarks and Acknowledgments Richard N. Wright



MARVIN E. CAGE

NBS/NIST: 1976-2005
INDUCTED: 2014

B: 28 July 1942, Kansas City, Missouri

EDUCATION:

Portland State University, BA (Applied Science), 1964
University of Colorado, PhD (Nuclear Physics), 1969
Postdoctoral Fellow, Birmingham, England, 1969-1971

CITATION:

For materially advancing science and metrology through high accuracy determinations of the quantum Hall effect that contributed significantly to the international adoption of the SI-90 representations of the units of resistance (ohm) and electrical potential (volt).

POSITIONS HELD AT NBS/NIST:

Research Physicist, Electricity Division, National Measurement Laboratory, 1976-1990
Senior Research Physicist, Electricity Division, Electronics and Electrical Engineering Laboratory, 1990-2005

HONORS:

NIST Bronze Medal (1982); U.S. Department of Commerce Gold Medal (1989)
Guest Scientist, CSIRO, Australia (1985)
NIST Research Advisory Committee (1991-1994)
Fellow, American Physical Society (1996)
Graduate School Commencement Address, Cajundome, University of Louisiana (2001)
Adjunct Professor, Department of Physics, University of Maryland (2002)

MEMBERSHIPS:

American Physical Society (APS)
Sigma Xi Society

PUBLICATIONS:

More than 50 NIST publications including:
Tsui, D.C., Gossard, A.C., Field, B.F., Cage, M.E. and Dziuba, R.F., "Determination of the Fine-Structure Constant Using GaAs-AlGaAs Heterostructures," *Phys. Rev. Lett.* 48 (Jan. 1982)
Cage, M.E., Dziuba, R.F., Field, B.F., Williams, E.R., Girvin, S.M., Gossard, A.C., Tsui, D.C., and Wagner, R.J., "Dissipation and Dynamic Nonlinear Behavior in the Quantum Hall Regime," *Phys. Rev. Lett.* 51, 1374 (Oct. 1983)
Cage, M.E., Field, B.F., Dziuba, R.F., Girvin, S.M., Gossard, A.C., and Tsui, D.C., "Temperature Dependence of the Quantum Hall Resistance," *Phys. Rev. B* 30, 2286 (Aug. 1984)
Ricketts B.W. and Cage, M.E., "Quantized Hall Resistance Measurement at the NML," *IEEE Trans. Instrum. Meas.*, IM-36, 245 (1987)
Cage, M.E., Dziuba, R.F., Elmquist, R.E., Jones, G.R., Olsen, P.T., Phillips, W.D., Shields, J.Q., Steiner, R.L., Taylor, B.N., and Williams, E.R., "NBS Determination of the Fine-Structure-Constant, and of the Quantized Hall Resistance and Josephson Frequency to Voltage Quotient in SI Units," *IEEE Trans. Instrum. Meas.*, IM-38, 284 (1989)
Cage, M.E., Prange, Richard E., and Girvin, S.M., Editors, Textbook, Chapter 2 "Experimental Aspects and Metrological Applications," *The Quantum Hall Effect*, Springer-Verlag, New York, 1987, 2nd Edition (1989)



KEVIN CARR

NBS/NIST: 1989-2005
INDUCTED: 2014

B: 27 September 1960, Philadelphia, Pennsylvania

EDUCATION:

Widener University, BS (Electrical Engineering), 1982
Hood College, MBA (Graduate Studies)
University of Maryland University College, Executive MS (Technology Management - candidate)

CITATION:

For outstanding leadership of the Hollings Manufacturing Extension Partnership and implementing it into a model federal program with national impact on business development, innovation, and job creation.

POSITIONS HELD AT NBS/NIST:

Associate Director, Manufacturing Technology Centers, 1989-1991
Deputy Director, Manufacturing Extension Partnership, 1991-1994
Director, Hollings Manufacturing Extension Partnership, 1994-2005

HONORS:

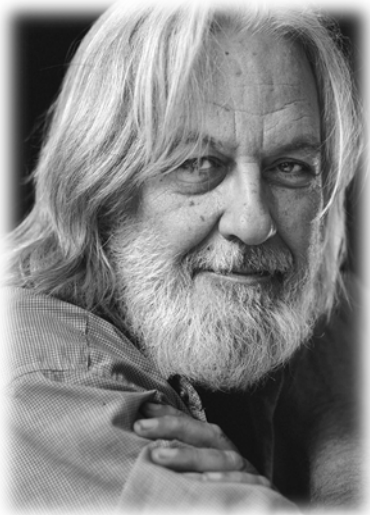
Presidential Letter of Appreciation, Technology Reinvestment Program (1994)
US Department of Commerce Gold Medal (1997)
Service to America Medal finalist for Business and Commerce (2003)
Innovation in American Government Award (Finalist), Harvard University Kennedy School of Government (2004)

MEMBERSHIPS:

Society of Manufacturing Engineers

PUBLICATIONS:

More than 20 publications including:
Carr, K., Nanzetta, P., Gold, D., and Kreider, C., *Manufacturing Extension Partnership: A National Strategy for Manufacturing Excellence*, U.S. Department of Commerce (1992)
Carr, K., *Manufacturing Extension Partnership - Looking Ahead: A Vision, A Strategy, The Future*, U.S. Department of Commerce (1999)
Carr, K., Nanzetta, P., Gold, D., and Kreider, C., *The Manufacturing Extension Partnership - Delivering Measurable Returns to Its Clients*, National Institute of Standards and Technology (2001)
Carr, K., et. al., *The Manufacturing Extension Partnership - Delivering Measurable Returns to Its Clients*, National Institute of Standards and Technology (2002)
Carr, K., et. al., *The Manufacturing Extension Partnership - Delivering Measurable Returns to Its Clients, Fiscal Year 2002 Results*, National Institute of Standards and Technology (2004)



JACK R. EDMONDS

NBS/NIST: 1959-1969
INDUCTED: 2014

B: 5 April 1934, Washington, D.C.

EDUCATION:

Duke University (Liberal Arts & Science), 1956
George Washington University, BSc (Mathematics), 1958
University of Maryland, MS (Mathematics), 1959

CITATION:

For fundamental contributions in combinatorial optimization, discrete mathematics, and the theory of computing.

POSITIONS HELD AT NBS/NIST:

Mathematician, Applied Mathematics Division, Institute for Basic Standards, 1959-1969. For part of that time he was on assignment at the RAND Corporation and as a Research Associate at Princeton University.

HONORS:

John von Neumann Theory Prize, INFORMS (1985)

Eureka! You Shrink, Fifth Aussois Combinatorial Optimization Workshop, 2001, dedicated to Jack Edmonds
“Paths, Trees, and Flowers” identified as one of NIST’s outstanding publications in *A Century of*

Excellence in Measurements Standards and Technology, NIST SP 958 (2001)

Honorary Doctorate: University of Odense (2006)

PUBLICATIONS:

Selected NBS publications include:

Edmonds, Jack, "Paths, Trees, and Flowers", *Canad. J. Math.* 17, 449-467 (1965)

Edmonds, Jack, "Maximum Matching and a Polyhedron with 0,1-Vertices", *J. Res. Natl. Bur. Stand.* 69B, 125-130 (1965)

Edmonds, Jack, "Minimum Partition of a Matroid into Independent Subsets", *J. Res. Natl. Bur. Stand.* 69B, 67-72 (1965)

Edmonds, Jack, "Optimum Branchings," *J. Res. Natl. Bur. Stand.* 71B, 233-240 (1967)

Edmonds, Jack, "Systems of Distinct Representatives and Linear Algebra," *J. Res. Natl. Bur. Stand.* 71B, 241-245 (1967)

Edmonds, Jack, "Submodular Functions, Matroids, and Certain Polyhedra", *Combinatorial Structures and their Applications* (Proceedings of the Calgary International Conference on Combinatorial Structures and their Applications, University of Calgary, Calgary, Alberta, Canada (1969), Gordon and Breach, New York, pp. 69-81 (1970)

BOOKS REFERENCING/DESCRIBING JACK EDMONDS’ WORK AT NBS:

50 Years of Integer Programming 1958-2008, 2010; Papadimitriou & Steiglitz, *Combinatorial Optimization: Algorithms and Complexity* (1982); Lovasz & Plummer, *Matching Theory* (1986); Grotschel, Lovasz, & Schrijver, *Geometric Algorithms and Combinatorial Optimization* (1988); Nemhauser & Wolsey, *Integer and Combinatorial Optimization* (1988); Fujishige, *Submodular Functions and Optimization* (1991); Lenstra et al, *History of Mathematical Programming* (1991); *Handbook of Combinatorics* (1995); West, *Graph Theory* (2001); Schrijver, *Combinatorial Optimization: Polyhedra and Efficiency* (2003); Sipser, *Introduction to the Theory of Computation* (2006); Bondy & Murty, *Graph Theory* (2008); Frank, *Connections in Combinatorial Optimization* (2011); Cook, *In Pursuit of the Traveling Salesman* (2012); Korte & Vygen, *Combinatorial Optimization* (2012)



HARRY S. HERTZ

NBS/NIST: 1973-2013
INDUCTED: 2014

B: 25 February 1947, New York, New York

EDUCATION:

Polytechnic Institute of Brooklyn, BS (Chemistry), 1967
Massachusetts Institute of Technology, PhD (Organic Chemistry),
1971
Alexander von Humboldt Fellowship, University of Munich, 1971-
1973
Executive Development, National Academy of Public
Administration and Federal Executive Institute

CITATION:

For visionary leadership, stewardship, and advocacy in promoting
the Baldrige performance excellence framework and concepts
nationally and internationally and for exemplary leadership and
advancement of the analytical chemical sciences.

POSITIONS HELD AT NBS/NIST:

Research Chemist, Trace Organic Analysis Group, Analytical Chemistry Division, National Measurement Laboratory
(NML), 1973-1978
Chief, Organic Analytical Research Division, Center for Analytical Chemistry, NML, 1978-1983
Director, Center for Analytical Chemistry, NML, 1983-1991
Director, Chemical Science and Technology Laboratory, 1991-1992
Deputy Director, Baldrige National Quality Program (BNQP), 1992-1995
Director, Baldrige Performance Excellence Program (formerly BNQP), 1995-2013
Director Emeritus, Baldrige Performance Excellence Program (BPEP), 2013- present

HONORS:

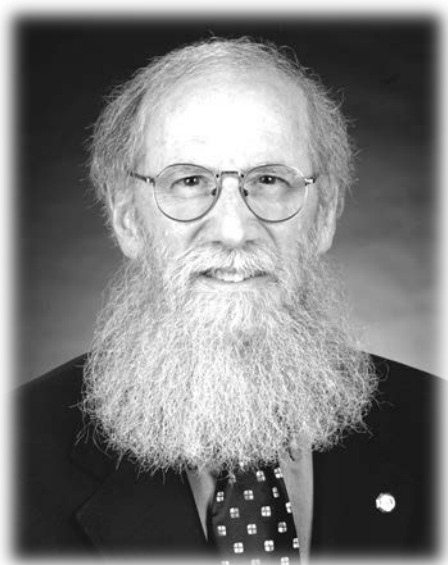
NIST Bronze Medal (1981); Department of Commerce Silver Medal (1986), Gold Medal (1998)
Arthur S. Flemming Award (1986)
Senior Executive Service Meritorious Executive Rank Award (1987)
Fellow, American Association for the Advancement of Science (1992)
Quality Digest, recognized as one of 15 people driving quality today (October 2005)
Honorary Fellow, American College of Healthcare Executives (2011)
Harry S. Hertz Leadership Award, Foundation for the Malcolm Baldrige National Quality Award, namesake and first
recipient (2013)

MEMBERSHIPS:

American Association for the Advancement of Science
American Chemical Society
American Friends of the Alexander von Humboldt Foundation
Sigma Xi

PUBLICATIONS:

More than 50 publications including:
Hertz, H.S., May, W.E., Wise, S.A., Chesler, S.N., "Trace Organic Analysis," *Analytical Chemistry*, 50 (4), 428A-
436A (1978)
Baldrige Performance Excellence Program, 2013-2014 Criteria for Performance Excellence, Gaithersburg, MD: U.S.
Department of Commerce, National Institute of Standards and Technology (2013)
Hertz, H.S., "The Future of Baldrige-Based Performance Excellence," *Futurescan 2013 – Healthcare Trends and
Implications 2013-2018*, 42-48 (2013)



JEFFREY HORLICK

NBS/NIST: 1967-2006
INDUCTED: 2014

B: 26 May 1945, New York, New York

EDUCATION:

University of Maryland, BS (Physics), 1967
University of Manchester, England, Graduate studies (Microwave Spectroscopy), 1967-1968

CITATION:

For leadership and contributions in laboratory accreditation, standards, and conformity assessment that significantly enhanced the safety and health of consumers and first responders, U.S. homeland security, and product quality.

POSITIONS HELD AT NBS/NIST:

Physicist, Metallurgy Division, Institute for Materials Research (IMR), 1967-1968
Physicist, Product Evaluation Technology Division, IMR, 1969-1972
Physicist, Paper Section, NBS Collaborative Reference Programs, Polymers Division, IMR, 1972-1978
Physicist, National Voluntary Laboratory Accreditation Program (NVLAP), 1977-2006
NIST Guest Researcher, Standards Coordination Office, 2006-present

HONORS:

NIST Bronze Medal (2002); U.S. Department of Commerce Silver Medal (2003)
Fellow, Washington Academy of Sciences
Senior Member, Institute of Electrical and Electronics Engineers
Senior Member, American Society for Quality

MEMBERSHIPS:

Washington Academy of Sciences
Institute of Electrical and Electronics Engineers
IEEE Electromagnetic Compatibility Society
American Society for Quality
Sigma Xi

PUBLICATIONS:

More than 25 publications including:
Gladhill, R.J., Horlick, J., and Eisenhower, E., *The National Personal Radiation Dosimetry Accreditation Program*, NBSIR 86-3350 (1986)
Horlick, J., "Interlaboratory and Intralaboratory Proficiency Testing", *Accreditation Practices for Inspections, Tests, and Laboratories*, ASTM STP 1057, pp 85-94 (1989)
Carnahan, L., Carver, G., Gray, M., Hogan, M., Hopp, T., Horlick, J., Lyon, G., and Messina, E., *Metrology for Information Technology (IT)*, NISTIR 6025 (1997)
Faison, C.D., Horlick, J., Merkel, W.R., and White, V.R., Editors, *NVLAP Procedures and General Requirements*, NIST Handbook 150 (2006)
Horlick, J. and Knab, L., "Thermal Conductivity Proficiency Testing Results – Nineteen NVLAP Proficiency Testing Rounds from 1986 Through 2004," *Thermal Conductivity 30 - Proceedings of the Thirtieth International Thermal Conductivity Conference and Proceedings of the Eighteenth International Thermal Expansion Symposium*, pp 651-659 (2009)
Horlick, J. and 13 other joint-authors, *Public Safety Bomb Suit Certification Program Requirements*, National Institute of Justice (2012)



PAUL SEBASTIAN JULIENNE

**NBS/NIST: 1969-1973 and 1974-2013
INDUCTED: 2014**

B: 8 May 1944, Spartanburg, South Carolina

EDUCATION:

Wofford College, BS (Chemistry), 1965
University of North Carolina at Chapel Hill, PhD (Chemical Physics), 1969

CITATION:

For pioneering research in the quantum theory of cold, low-energy interactions between atoms, molecules, and light, and its applications to precision measurements and fundamental science.

POSITIONS HELD AT NBS/NIST:

NRC Postdoctoral Research Associate, 1969-1971
NBS Postdoctoral Research Associate, 1971-1973
Chemist, Physical Chemistry Division, Institute for Materials Research, 1974-1977
Chemist, Molecular Spectroscopy Division, National Measurement Laboratory, 1978-1990
Chemist, Molecular Physics Division, Physics Laboratory (PL), 1991-1994
Group Leader, Quantum Processes Group, Atomic Physics Division, PL, 1995-2003
NIST Fellow, Physics Laboratory and Physical Measurement Laboratory, 2003-2013
Fellow, Joint Quantum Institute, NIST and the University of Maryland, 2007-2013

HONORS:

Fellow, American Physical Society (1990)
Department of Commerce Silver Medal (1992), Gold Medal (1998)
Davisson-Germer Prize, American Physical Society (2004)
NIST Samuel Wesley Stratton Award (2004)
Washington Academy of Sciences Annual Award (2005)
Meritorious Presidential Rank Award (2007)

MEMBERSHIPS:

American Physical Society (APS) and APS Divisional Councilor (2007-2010)
American Geophysical Union
National Research Council, Committee on Atomic, Molecular, and Optical Science (1994-1998)
Advisory Board, Harvard-Smithsonian Institute for Atomic and Molecular Physics (2005-2007)

PUBLICATIONS:

More than 230 publications including:

Thorsheim, H.R., Weiner, J., and Julienne, P.S., "Laser-induced Photoassociation of Ultracold Sodium Atoms", *Physical Review Letters*, 58, 2420 (1987)
Tiesinga, E., Williams, C.J., Julienne, P.S., Jones, K.M., Lett, P.D., and Phillips, W.D., "A Spectroscopic Determination of Scattering Lengths for Sodium Atom Collisions", *Journal of Research of the National Institute of Standards and Technology*, 101, 505 (1996)
Weiner, J., Bagnato, V.S., Zilio, S., and Julienne, P.S., "Experiments and Theory in Cold and Ultracold Collisions", *Review of Modern Physics* 71, 1 (1999)
Deng, L., Hagley, E.W., Wen, J., Trippenbach, M., Band, Y., Julienne, J.S., Simsarian, J.E., Helmerson, K., Rolston, S.L., and Phillips, W.D., "Four-wave Mixing with Matter Waves", *Nature*, 398, 218 (1999)
Ni, K.K., Ospelkaus, S., de Miranda, M.H.G., Peér, A., Neyenhuis, B., Zirbel, J.J., Kotochigova, S., Julienne, P.S., Jin, D.S., and Ye, J., "A High Phase-space-density Gas of Polar Molecules", *Science*, 322, 231 (2008)
Chen, C., Grimm, R., Julienne, P.S., and Tiesinga, E., "Feshbach Resonances in Ultracold Gases", *Review of Modern Physics* 82, 1225 (2010)



WALTER J. LAFFERTY

NBS/NIST: 1961-1995

INDUCTED: 2014

B: 10 February 1934, Wilmington, Delaware

EDUCATION:

University of Delaware, BS (Chemistry), 1956

Massachusetts Institute of Technology, PhD (Physical Chemistry), 1962

Johns Hopkins University, Postdoctoral Research Associate, 1961

CITATION:

For seminal contributions to measurement and compilation of spectral, structural, and force-field molecular properties important in predictive chemical and physical modeling.

POSITIONS HELD AT NBS/NIST:

Research Chemist, Radiometry Section, Physics Division, 1961-1995

Scientist Emeritus, Sensor Science Division, PML, 1995-Present

HONORS:

U.S. Department of Commerce Silver Medal (1973)

Visiting Leverhulm Fellow, University of Reading, England (1971-1972)

Visiting Professor, Univ. de Pierre et Marie Curie, Paris (July 1988 & March 1989, 1990, 1991)

Visiting Professor, Univ. de Paris Sud (Feb. 1990, Feb. 1994, Feb. 1995, March 1996, March 1997, March 1998, Feb. 1999, Feb. 2000, Feb. 2001, March 2002, March 2003)

IBERDROLA Visiting Professor, CSIC, Madrid (1995)

MEMBERSHIPS:

Coblentz Society

American Physical Society

American Chemical Society

PUBLICATIONS:

More than 130 publications including:

Lafferty, W.J., Maki, A.G., and Plyler, E.K., "High Resolution Infrared Determination of the Structure of Carbon Suboxide," *J. Chem. Phys.* 40, 244 (1964)

Lafferty, W.J., Maki, A.G., and Coyle, T.D., "High Resolution Infrared Spectrum of Diborane", *J. Mol. Spectrosc.* 33, 345 (1970)

Harmony, M.D., Laurie, V.W., Kuczkowski, R.L., Schwendeman, R.H., Ramsay, D.A., Lovas, F.J., Lafferty, W.J., and Maki, A.G., "Molecular Structure of Gas-Phase Polyatomic Molecules Determined by Spectroscopic Methods," *J. Phys. Chem. Ref. Data* 8, 619 (1979)

Pine, A.S. and Lafferty, W.J., "Rotational Structure and Vibrational Predissociation in the H-F Stretching Bands of the HF Dimer," *J. Chem. Phys.* 78, 2154 (1983)

Pine, A.S., Lafferty, W.J., and Howard, B.J., "Vibrational Predissociation, Tunneling and Rotational Saturation in the HF and DF Dimers," *J. Chem. Phys.* 81, 2939 (1984)

Fraser, G.T., Pine, A.S., Lafferty, W.J., and Miller, R.E., "Sub-Doppler Infrared Spectrum of the Carbon Dioxide Trimer," *J. Chem. Phys.* 87, 1502 (1987)



GABRIELLE G. LONG

**NBS/NIST: 1965-1967 & 1980-2003
INDUCTED: 2014**

B: 11 February 1942, New Brunswick, New Jersey

EDUCATION:

Barnard College, New York, NY, AB (Physics), 1964
Polytechnic Institute of Brooklyn, New York, NY, MS (Physics),
1970
Polytechnic Institute of Brooklyn, New York, NY, PhD (Physics),
1972

CITATION:

For outstanding research and group leadership that made NIST an international leader in the measurement of materials microstructure using synchrotron X-rays and neutrons.

POSITIONS HELD AT NBS/NIST:

Physicist, Polymers Division, Institute for Materials Research 1965-1967
Physicist, Ceramics Division, Materials Science and Engineering Laboratory (MSEL), 1980-1991
Group Leader, Microstructural Characterization Group, Ceramics Division, MSEL, 1991-2001
Chief (Acting), Ceramics Division, MSEL, 2002
Emeritus Scientist, Ceramics Division, Material Measurement Laboratory, 2003-present

HONORS:

NIST Bronze Medal (1998)
Fellow, American Physical Society (1992)
Maria Goeppert-Mayer Distinguished Scholar, Argonne National Laboratory (2001)
Fellow, American Association for the Advancement of Science (2005)

MEMBERSHIPS:

Editorial Board, Materials Research Society (MRS) *Bulletin* (1997-2007)
Basic Energy Sciences Advisory Committee (BESAC) U. S. Department of Energy (2001-2007)
Scientific Council, DESY, Hamburg, Germany (2006-2010)
LANSCE Advisory Board, Los Alamos National Laboratory (2007-2012)
Scientific Advisory Board, Max Planck Institute for Metals Research, Stuttgart, Germany (2008-2013)
Panel on Public Affairs (PoPA) American Physical Society (2010-2012)

PUBLICATIONS:

More than 150 publications including:

Luecke, W.E., Wiederhorn, S.M., Hockey, B.J., Krause Jr., R.F., and Long, G.G., "Cavitation Contributes Substantially to Tensile Creep in Silicon Nitride" *J. Am. Ceram. Soc.* 78, 2085-2096 (1995)
Ilavsky, J., Allen, A.J., Long, G.G., Krueger, S., Berndt, C.C., and Herman, H., "Influence of Spray Angle on the Pore and Crack Microstructure of Plasma-sprayed Deposits," *J. Am. Ceram. Soc.* 80, 733-742 (1997)
Levine, L.E., Long, G.G., Ilavsky, J., Gerhardt, R.A., Ou, R., Parker, C.A., "Self-assembly of Carbon Black into Nanowires that Form a Conductive Three Dimensional Micronetwork," *Appl. Phys. Lett.*, 30 (2007)
Zhang, F., Long, G.G., Jemian, P.R., Ilavsky, J., Milam, V.T., Lewis, J.A., "Quantitative Measurement of Nanoparticle Halo Formation Around Colloidal Microspheres in Binary Mixtures," *Langmuir* 24, 6504-6508 (2008)
Xie, R., Long, G.G., Weigand, S.J., Moss, S.C., Carvalho, T., Roorda, S., Hejna, M., Torquato, S., Steinhardt, P.J., "Hyperuniformity in Amorphous Silicon Based on the Measurement of the Infinite-wavelength Limit of the Structure Factor", *Proc. Nat'l Acad. Sci.* 110, 13250-13254 (2013)
Long, G.G., Chapman, K.W., Chupas, P.J., Bendersky, L.A., Levine, L.E., Mompiou, F., Stalick, J.K., Cahn, J.W., "Highly Ordered Noncrystalline Metallic Phase", *Phys. Rev. Lett.* 111, 015502 (2013)



CHARLES R. TILFORD

NBS/NIST: 1970-2000
INDUCTED: 2014

B: 24 September 1941, Wallace, Idaho

EDUCATION:

University of Notre Dame, BS (Physics), 1963
Iowa State University, PhD (Physics), 1969

CITATION:

For outstanding technical contributions and leadership in developing world-class primary standards and user-support services for rapidly expanding pressure and vacuum dependent industries.

POSITIONS HELD AT NBS/NIST:

Physicist, later Section Chief, Heat Division, Institute for Basic Standards, 1970-1978
Physicist, Thermophysics Division, Center for Thermodynamics and Molecular Sciences, National Measurement Laboratory (NML), 1978-1980
Group Leader, Temperature and Pressure Division, Center for Absolute Physical Quantities, NML, 1980-1990
Group Leader, Thermophysics Division, Chemical Science and Technology Laboratory (CSTL), 1990-1995
Physicist, Process Measurements Division, CSTL, 1995-2000

HONORS:

NIST Bronze Medal (1981); Department of Commerce Silver Medal (1987), Gold Medals (1995 and 2001)
IR-100 Award (1981)
Woodington Award, Measurement Science Conference (1990)
E.U. Condon Award (1993)
Fellow, American Vacuum Society (1996)

MEMBERSHIPS:

American Physical Society
American Vacuum Society
Sigma XI

PUBLICATIONS:

More than 60 publications including:
Tilford, C.R., "Analytical Procedure for Determining Lengths from Fractional Fringes", *App. Optics*, Vol. 16, No. 7, 1857-1860 (1977)
Tilford, C.R., "Reliability of High Vacuum Measurements", *JVST A*, Vol. 1, No. 2, 152-162 (1983)
Tilford, C.R., "The Speed of Sound in a Mercury Ultrasonic Interferometer Manometer," *Metrologia* 24, 121 (1987)
Tilford, C.R., "Pressure and Vacuum Measurements", book chapter in *Physical Methods of Chemistry*, 2nd ed., Vol. 6: *Determination of Thermodynamic Properties*, John Wiley & Sons, 101-173 (1992)
Tilford, C.R., "Three and Half Centuries Later - The Modern Art of Liquid-column Manometry", *Metrologia* 30, p. 545-552 (1994)
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Name, Tenure, Year Inducted into Gallery

Abramowitz, Milton	1938-1958	1995
Achenbach, Paul R.	1937-1979	1995
Albus, James S.	1973-2008	2009
Alexander, Samuel N.	1946-1967	1988
Allan, David W.	1960-1992	1995
Appel, William D.	1922-1959	N/A
Armstrong, George T.	1951-1982	2002
Bailey, Dana K.	1947-1955 & 1959-1965	2003
Barbrow, Louis E.	1921-1969	1988
Barnes, James A.	1957-1983	1995
Bates, Phaon H.	1910-1945	2006
Bates, Roger	1939-1969	1988
Baum, Howard	1975-2006	2007
Bay, Zoltan L.	1955-1972	2006
Bean, Howard S.	1917-1958	2007
Beatty, Robert W.	1948-1974	2001
Beckett, Charles	1950-1976	N/A
Bennett, John A.	1936-1976	1995
Bennett, Lawrence	1958-1996	2000
Berger, Martin J.	1952-1988	2001
Berger, Patricia W.	1976-1978 & 1979-1992	2006
Berquist, James	1978-2013	2013
Bertocci, Ugo	1971-1992	2013
Birmingham, Bascom W.	1951-1982	1988
Birnbaum, George	1946-1956 & 1975-1995	2000
Blum, William	1909-1952	1988
Boettinger, William	1972-2011	2012
Brady, Edward L.	1963-1987	1988
Branstad, Dennis K.	1973-1994	2002
Brenner, Abner	1930-1971	1988
Brickwedde, Ferdinand G.	1925-1956	1988
Brode, Wallace R.	1923-1928 & 1947-1958	1988
Broida, Herbert P.	1949-1963	1988
Brombacher, William G.	1922-1954	1988
Brown, Frederick W.	1954-1962	1988
Buckingham, Edgar	1906-1937	2006
Bunten-Mines, Elaine	1968-1997	2010
Burrows, James H.	1979-1995	1999
Cage, Marvin	1975-2005	2014
Cahn, John W.	1977-2006	2007
Cali, J. Paul	1966-1978	1995
Cameron, Joseph M.	1947-1977	2002
Carpenter, B. Stephen	1964-2005	2007
Carpenter, Robert J.	1955-1992	1999
Carr, Kevin	1989-2005	2014
Carter, Robert S.	1958-1989	2003
Cassidy, Esther C.	1955-1997	1999
Caswell, Randall S.	1952-1994	1999
Clark, Alan F.	1964-2004	2011
Coblentz, William W.	1905-1944	1988
Colvin, Burton H.	1972-1991	2002

Name, Tenure, Year Inducted into Gallery

Cook, Richard K.	1935-1966 & 1971-1976	2006
Costrell, Louis	1946-1987	2006
Crittenden, Eugene C.	1909-1950	1988
Croarkin, M. Carroll	1955-1963 & 1973-2000	2013
Cullen, William C.	1948-1981	2002
Currie, Lloyd A.	1962-2000	2004
Curtis, Harvey L.	1907-1946	1988
Curtiss, John H.	1946-1953	1988
Curtiss, Leon F.	1926-1961	2003
Day, Gordon W.	1969-2003	2004
Dellinger, J. Howard	1907-1948	1988
Deprit, Andre	1979-2003	2007
Deslattes, Richard D.	1962-2001	2002
Diamond, Harry	1927-1948	1988
Didion, David A.	1960-1962 & 1971-2002	2007
Digges, Thomas G.	1920-1962	1998
DiMarzio, Edmund A.	1963-1998	2004
Dorsey, N. Ernest	1903-1920 & 1928-1943	1988
Dowd, Ellen	1967-1973 & 1980-2006	2010
Dryden, Hugh L.	1918-1947	1988
Dunfee, Bernadine	1943-1976	2002
Dunmore, Francis W.	1918-1949	1988
Dunn, Gordon	1961-2002	2010
Durst, Richard A.	1963-1990	2009
Dziuba, Ronald F.	1961-2000	2007
Eberhardt, Keith	1978-2000	2009
Eby, Ronald K.	1963-1984	2003
Edmonds, Jack	1959-1969	2014
Egelhoff, William F.	1979-2010	2011
Eisenhart, Churchill	1946-1983	1988
Ekin, John (Jack)	1973-2007	2013
Engen, Glenn F.	1954-1986	2001
Evenson, Kenneth M.	1963-2001	2002
Fano, Ugo	1946-1966	1988
Fickett, Frederick R.	1967-2003	2007
Fields, Richard J.	1977-2004	2009
Fischer, Louis A.	1901-1921	1988
Fletcher, Donald G.	1951-1985	2002
Foote, Paul D.	1911-1927	1988
Franzen, Douglas L.	1970-1997	1999
Frederikse, Hans P.R.	1953-1996	2006
French, Judson C.	1948-1999	2001
Frohnsdorff, Geoffrey J.	1973-2002	2005
Furlani, Cita	1981-2012	2013
Furukawa, George T.	1948-1985	2003
Gadzuk, J. William	1968-2008	2009
Gann, Richard	1976-2012	2013
Gardner, Irvine C.	1921-1959	1988
Gary, Thomas A.	1962-2000	2005
Gibson, Kasson	1916-1955	N/A

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Name, Tenure, Year Inducted into Gallery

Glinka, Charles	1975-2007	2012
Green, Melville	1954-1968	2010
Greenspan, Martin	1935-1974	2000
Hall, John L.	1961-2004	2005
Hamer, Walter J.	1935-1970	1988
Hamilton, Clark A.	1971-1999	2004
Han, Charles C.	1974-2002	2004
Handwerker, Carol A.	1984-2005	2006
Harman, George G.	1950-2003	2004
Harris, Forest K.	1925-1971	1988
Harris, Milton	1931-1944	1988
Harris, Richard E.	1975-2006	2008
Haynes, William M.	1970-2003	2005
Hayward, Evans	1950-1990	1995
Hayward, Raymond	1950-1986	N/A
Hebner, Robert E.	1972-1999	2004
Heinrich, Kurt F. J.	1964-1988	2008
Hermach, Francis L.	1939-1976	2001
Hertz, Harry	1973-2013	2014
Heydemann, Peter L. M.	1964-2001	2004
Heyl, Paul R.	1920-1942	1988
Heyman, Matthew	1978-2008	2010
Hill, James E.	1972-2007	2008
Hillebrand, William F.	1908-1925	1988
Hilsenrath, Joseph	1948-1974	2003
Hines, Verna Brown	1975-2006	2011
Hinman, Wilbur S.	1928-1953	1988
Hoer, Cletus A.	1956-1989	2001
Hoffman, James I.	1918-1962	1988
Hoffman, John D.	1954-1982	1988
Hord, Jesse L.	1961-1992	2003
Horlick, Jeffrey	1967-2006	2014
Horowitz, Emanuel	1951-1980	1988
Hougen, Jon T.	1967-2002	2003
Hudson, Ralph P.	1951-1980	1988
Huntoon, Robert D.	1941-1968	1988
Ingberg, Simon H.	1914-1947	1988
Isbell, Horace S.	1927-1968	1988
Jacox, Marilyn E.	1962-1995	2000
Jennings, Donald A.	1961-1991	2001
Johnson, Donald R.	1967-1993	2008
Johnson, Victor J.	1950-1972	1995
Jones, Sarah A.	1920-1966	1988
Judd, Deane B.	1927-1970	1988
Judson, Lewis V.	1917-1962	N/A
Julienne, Paul S.	1969-1973 & 1974-2013	2014
Kamper, Robert A.	1963-1994	1999
Kashiwagi, Takashi	1971-2001	2005
Katzke, Stuart	1975-1999 & 2001-2008	2013
Kautz, Richard	1976-1997	1999
Kerns, David M.	1946-1980	2001
Kessler, Karl G.	1948-1990	1999

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Kim, Yong-Ki	1983-2006	2008
Kirby, Richard C.	1948-1950 & 1951-1965	2003
Kirsch, Russell A.	1951-1985	2006
Klebanoff, Philip S.	1941-1985	1995
Kline, Gordon M.	1929-1963	1988
Koch, H. William	1949-1966	1988
Kostkowski, Henry J.	1954-1981	2001
Kramer, Samuel	1970-1997	1999
Krauss, Morris	1955-2004	2004
Kruger, Jerome	1955-1984	1998
Ku, Hsien (Harry)	1959-1985	2002
Kushner, Lawrence	1946-1973	1988
Kusuda, Tamami	1962-1986	1998
Kuyatt, Chris E.	1960-1998	1999
Lafferty, Walter	1961-1995	2014
Lanczos, Cornelius	1943-1944 & 1949-1952	2010
Landon, Harry H.	1958-1972	2003
Lawn, Brian	1982-2009	2012
Leiss, James E.	1954-1986	2007
Levelt Sengers, Johanna M.H.	1963-1995	2000
Lias, Sharon G.	1956-2001	2005
Lide, David R.	1954-1988	1999
Lindstrom, Richard	1972-2007	2012
Little, C. Gordon	1958-1965	2003
Lloyd, Frances L.	1977-1989	2009
Long, Gabrielle	1965-1967 & 1980-2003	2014
Lowell, Percival D.	1913-1924 & 1941-1962	1988
Lyons, Harold	1941-1955	1988
Madden, Robert	1961-1998	2000
Madey, Theodore E.	1963-1988	2003
Mandel, John	1947-2000	2002
Mann, Wilfred B.	1951-1980	1995
Marshall, Richard D.	1968-1996	2001
Martin, William C.	1957-1998	2002
Martinis, John M.	1987-2004	2008
Marton, Ladislaus L.	1946-1970	1998
McLaughlin, William L.	1951-1996	2000
McMurdie, Howard F.	1928-1966	1998
McNish, Alvin G.	1920-1925 & 1946-1970	1988
McPherson, Archibald T.	1923-1965	1988
Meggers, William F.	1914-1958	1988
Meinke, W. Wayne	1963-1973	1988
Menzer, James P.	1954-1976	1999
Meyerson, Melvin R.	1946-1978	2001
Milligan, Dolphus E.	1963-1973	1988
Mohler, Fred L.	1917-1960	1988
Moore, Robert F.	1973-2007	2008
Muehlhause, Carl O.	1958-1982	2003
Murphy, Thomas J.	1946-1986	2003
Narella, Mary G.	1950-1987	1998

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Nelson, Harold E.	1975-1992	2001
Nigro, James P.	1947-1974	1999
Nyyssonen, Diana	1969-1985	2008
Odishaw, Hugh G.	1946-1953	1988
Ohlemiller, Thomas J.	1979-2008	2011
Olien, Neil	1961-1991	2007
Olsen, Paul Thomas	1963-1994	2012
Olver, Frank W.J.	1961-1986	2011
Paffenbarger, George C.	1929-1941 & 1946-1984	1988
Page, Chester H.	1941-1974	1988
Parr, Albert C.	1980-2007	2011
Parsons, Douglas E.	1923-1963	1988
Passaglia, Elio	1961-1987	1988
Peiser, H. Steffen	1957-1989	2009
Petersons, Oskars	1968-1994	2000
Pfrang, Edward O.	1966-1983	1995
Pierce, Daniel T.	1975-2007	2008
Plyler, Earle K.	1945-1963	1998
Powell, Cedric	1962-2006	2010
Priest, Irwin G.	1907-1932	N/A
Rabinow, Jacob	1934-1953 & 1972-1989	1988
Raby, Tawfik M.	1968-2009	2009
Radebaugh, Ray	1966-2009	2010
Reed, Richard P.	1956-1990	1995
Reimann, Curt	1962-1995	1999
Roberts, James R.	1964-1999	2003
Robertson, Alexander F.	1950-1981	1999
Romanoff, Melvin	1937-1970	1995
Rosa, Edward B.	1901-1921	1988
Rosenberg, Samuel J.	1920-1964	1998
Rosenblatt, Joan	1955-1995	2000
Rosenstock, Henry	1960-1982	N/A
Rossini, Frederick D.	1928-1950	1988
Roth, Robert S.	1951-1991	2000
Rowe, J. Michael	1973-2004	2006
Rubin, Michael Rogers	1988-2009	2011
Ruegg, Rosalie T.	1970-2000	2005
Rush, John J.	1962-2004	2006
Saylor, Charles P.	1931-1968	1988
Schaffer, Robert	1950-1988	2001
Schooley, James	1960-1990	2010
Schoonover, Irl C.	1928-1930 & 1935-1969	1988
Schubauer, Galen B.	1929-1968	1995
Schwartz, Lyle	1984-1997	2010
Scott, Russell B.	1928-1965	1988
Seltzer, Stephen	1962-2010	2012
Semerjian, Hratch G.	1977-2007	2008
Silsbee, Francis B.	1911-1959	1988
Simpson, John A.	1948-1993	1999
Sitterly, Charlotte E. Moore	1945-1968	1988
Skillington, Jr., James	1960-1977	1999
Smid, Miles E.	1978-1999	2005

Name, Tenure, Year Inducted into Gallery

Smith, Ernest K.	1951-1965	2003
Snell, Jack E.	1971-2003	2005
Snyder, Wilbert F.	1927-1969	1995
Sorrows, Howard E.	1941-1952 & 1956-1987	1988
Souder, Wilmer	1910-1913 & 1917-1954	1988
Stegun, Irene A.	1943-1983	1995
Stephenson, John C.	1971-2005	2009
Stiehler, Robert D.	1946-1981	2002
Stimson, Harold F.	1916-1960	1988
Sullivan, Donald B.	1967-2003	2004
Talbot, Terri	1972-2011	2012
Taussky-Todd, Olga	1947-1957	2002
Taylor, Barry N.	1970-2001	2003
Taylor, John K.	1929-1986	1988
Taylor, Lauriston S.	1927-1964	1988
Teal, Gordon K.	1965-1967	N/A
Thomas, James L.	1927-1962	2003
Thomas, Richard N.	1957-1973	2011
Thomson, Robb	1971-1995	2000
Tilford, Charles	1970-1997	2014
Tilley, W. Reeves	1946-1980	1995
Todd, John	1947-1957	2002
Tuckerman, Louis B.	1919-1949	1988
Uriano, George A.	1961-1995	1999
Van Brunt, Richard J.	1978-1996	2003
Vinal, George W.	1904-1950	1988
Wachtman, Jr., John. B.	1951-1983	1988
Waidner, Charles W.	1901-1922	N/A
Wait, James R.	1955-1980	1995
Walleigh, Robert. S.	1943-1953 & 1957-1978	1988
Washburn, Edward W.	1926-1934	1988
Wegstein, Joseph H.	1951-1984	1995
West, E. Dale	1948-1974	2002
Wichers, Edward	1917-1963	1988
Wiederhorn, Sheldon	1963-2008	2011
Wiese, Wolfgang L.	1960-2004	2005
Wildhack, William A.	1935-1969	1988
Willenbrock, F. Karl	1970-1976	N/A
Williams, Edwin Ross	1971-2008	2011
Wolff, Frank A.	1901-1941	1988
Wright, James R.	1960-1985	1999
Wright, Richard N.	1971-1999	2002
Wu, Wen-li	1979-2013	2013
Yates, Jr., John T.	1963-1982	2003
Youden, William J.	1948-1965	1988
Young, Russell D.	1961-1981	1988
Zimmerman, James E.	1970-1985	2001

N/A not available



Portrait Gallery photographs in the alcove before the transition to the Digital Portrait Gallery. Most portraits have been moved to the other side of the hall. In the alcove currently is the touch screen digital display that appears on the cover of this brochure and the portraits of the most recent honorees.



NIST Gaithersburg, Maryland



Advanced Chemical Sciences Laboratory



Advanced Measurement Laboratory

