

Appendix 1: PCAST Members 1990-2017

Name	Years of Service	Gender	Race/ Ethnicity	Position (at time of service)	Highest Degree	Experience	Expertise
President G.H.W Bush							
Norman Borlaug	1990-1993	M	White	Distinguished Professor, Department of Soils and Crop Sciences, Texas A&M University	Ph.D., Plant Pathology and Genetics, University of Minnesota	Academia	Bio/Med
D. Allan Bromley*	1990-1993	M	White	Assistant to the President for Science and Technology; Director, Office of Science and Technology Policy	Ph.D., Nuclear Physics, University of Rochester	Academia	Phys Sci
Solomon Buchsbaum	1990-1993	M	White	Senior Vice President, Technology Systems, AT&T Bell Laboratories	Ph.D., Physics, Massachusetts Institute of Technology	Industry	Phys Sci
Charles Drake	1990-1993	M	White	Albert Bradley Professor of Earth Sciences and Professor of Geology, Dartmouth College	Ph.D., Geology, Columbia University	Academia	Phys Sci
Ralph Gomory	1990-1993	M	White	President, The Sloan Foundation	Ph.D., Mathematics, Princeton University	Academia; Industry; Ex-Government	Eng
Mary L. Good	1991-1993	F	White	Senior Vice President, Research and Technology, Allied- Signal, Inc.	Ph.D., Chemistry, University of Arkansas	Academia; Industry	Phys Sci

Science Advice to the President and the Role of PCAST

Name	Years of Service	Gender	Race/ Ethnicity	Position (at time of service)	Highest Degree	Experience	Expertise
Bernadine Healy**	1990-1991	F	White	Director, Research Institute at the Cleveland Clinic Foundation	M.D., Harvard University	Academia; Industry; Ex-Government	Bio/Med
Peter Likins	1990-1993	M	White	President, Lehigh University	Ph.D., Engineering Mechanics, Stanford University	Academia	Eng
Thomas Lovejoy	1990-1993	M	White	Assistant Secretary for External Affairs, The Smithsonian Institution	Ph.D., Biology, Yale University	Academia; Ex-Government	Bio/Med
Walter E. Massey	1990-1991	M	Black or African American	Director, Argonne National Laboratory; Professor of Physics, University of Chicago	Ph.D., Physics, Washington University in St. Louis	Academia; Ex-Government	Phys Sci
John McTague	1990-1993	M	White	Vice President, Technical Affairs, Ford Motor Company	Ph.D., Chemistry, Brown University	Academia; Industry; Ex-Government	Phys Sci
Thomas J. Murrin	1990-1993	M	White	Dean, School of Business and Administration, Duquesne University	B.S., Physics, Fordham University	Academia; Industry; Ex-Government	Eng
Daniel Nathans	1990-1993	M	White	Professor of Molecular Biology and Genetics, Johns Hopkins University School of Medicine	M.D., Washington University in St. Louis	Academia	Bio/Med
David Packard	1990-1993	M	White	Chairman of the Board, Hewlett-Packard Company	M.S., Electrical Engineering, Stanford University	Industry; Ex-Government	Eng
Harold Shapiro**	1990-1993	M	White	President, Princeton University	Ph.D., Economics, Princeton University	Academia	SocSci

Science Advice to the President and the Role of PCAST

Name	Years of Service	Gender	Race/ Ethnicity	Position (at time of service)	Highest Degree	Experience	Expertise
President Bill Clinton							
Norman R. Augustine	1994-2001	M	White	Former Chairman and CEO, Lockheed Martin Corporation	B.S.E., Aeronautical Engineering, Princeton University	Industry	Eng
Francisco J. Ayala	1994-2001	M	Hispanic or Latino	Donald Bren Professor of Biological Sciences, Professor of Philosophy, University of California, Irvine	Ph.D., Biology, Columbia University	Academia	Bio/Med
John M. Deutch	1998-2001	M	White	Institute Professor, Department of Chemistry, Massachusetts Institute of Technology	Ph.D., Physical Chemistry, Massachusetts Institute of Technology	Academia; Ex-Government	Phys Sci
Murray Gell-Mann	1994-2001	M	White	Professor, Santa Fe Institute; R.A. Millikan Professor Emeritus of Theoretical Physics, California Institute of Technology	Ph.D., Physics, Massachusetts Institute of Technology	Academia	Phys Sci
John H. Gibbons*	1994-1998	M	White	Assistant to the President for Science and Technology; Director, Office of Science and Technology Policy	Ph.D., Nuclear Physics, Duke University	Ex-Government	Phys Sci
David Hamburg	1994-2001	M	White	President Emeritus, Carnegie Corporation of New York	M.D., Indiana University	Academia	Bio/Med

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Name	Years of Service	Gender	Race/ Ethnicity	Position (at time of service)	Highest Degree	Experience	Expertise
John P. Holdren	1994-2001	M	White	Class of 1935 Professor of Energy, University of California, Berkeley; Teresa and John Heinz Professor of Environmental Policy, John F. Kennedy School of Government, Harvard University	Ph.D., Aerospace Engineering and Theoretical Plasma Physics, Stanford University	Academia	Phys Sci
Neal Lane*	1998-2001	M	White	Assistant to the President for Science and Technology; Director, Office of Science and Technology Policy	Ph.D., Physics, University of Oklahoma	Academia; Ex-Government	Phys Sci
Diana MacArthur	1994-2001	F	White	Chair and CEO, Dynamac Corporation	B.A., Economics, Vassar University	Industry	Eng
Shirley M. Malcom	1994-2001	F	Black or African American	Head, Directorate for Education and Human Resources Programs, American Association for the Advancement of Science	Ph.D., Ecology, Pennsylvania State University	Academia	SocSci
Mario J. Molina	1994-2001	M	Hispanic or Latino	Lee and Geraldine Martin Professor of Environmental Sciences, Massachusetts Institute of Technology; Institute Professor, Department of Earth, Atmospheric and Planetary Sciences, Massachusetts Institute of Technology	Ph.D., Chemistry, University of California, Berkeley	Academia	Phys Sci

Science Advice to the President and the Role of PCAST

Name	Years of Service	Gender	Race/ Ethnicity	Position (at time of service)	Highest Degree	Experience	Expertise
Peter H. Raven	1994-2001	M	White	Director, Missouri Botanical Garden; Engelmann Professor of Botany, Washington University in St. Louis	Ph.D., Botany, University of California, Los Angeles	Academia	Bio/Med
Sally K. Ride	1994-2001	F	White	Director, California Space Institute; Professor of Physics, University of California, San Diego	Ph.D., Physics, Stanford University	Academia; Ex-Government	Phys Sci
Judith Rodin	1994-2001	F	White	President, University of Pennsylvania	Ph.D., Psychology, Columbia University	Academia	SocSci
Charles A. Sanders	1994-2001	M	White	Former Chairman and CEO, Glaxo-Wellcome Inc.	M.D., University of Texas Southwestern Medical College	Academia; Industry	Bio/Med
Phillip A. Sharp	1994-1997	M	White	Professor of Biology; Head, Department of Biology, Massachusetts Institute of Technology	Ph.D., Chemistry, University of Illinois at Champaign-Urbana	Academia	Bio/Med
David E. Shaw	1994-2001	M	White	CEO, D.E. Shaw and Co.; Chairman, D.E. Shaw and Co. and Juno Online Services	Ph.D., Computer Science, Stanford University	Academia	Bio/Med
Charles M. Vest	1994-2001	M	White	President, Massachusetts Institute of Technology	Ph.D., Mechanical Engineering, University of Michigan	Academia	Eng

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Name	Years of Service	Gender	Race/ Ethnicity	Position (at time of service)	Highest Degree	Experience	Expertise
Virginia V. Weldon	1994-2001	F	White	Senior Vice President for Public Policy, Monsanto Company; Director, Center for the Study of American Business, Washington University in St. Louis	M.D., State University of New York at Buffalo	Academia; Industry	Bio/Med
Lilian Wu	1994-2001	F	Asian	Member, Research Staff, Thomas J. Watson Research Center, IBM; Research Scientist and Consultant, Corporate Technical Strategy Development, IBM	Ph.D., Applied Mathematics, Cornell University	Academia	Eng
John A. Young*	1994-2001	M	White	Former President and CEO, Hewlett-Packard Co.	M.B.A., Stanford University	Industry	Eng

President G.W. Bush

F. Duane Ackerman	2006-2009	M	White	Former Chairman and CEO, BellSouth Corporation	M.S., Management, Massachusetts Institute of Technology	Industry	Eng
Paul M. Anderson	2006-2009	M	White	Chairman of the Board, Spectra Energy Corporation	M.B.A., Stanford University	Industry	Eng

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Name	Years of Service	Gender	Race/ Ethnicity	Position (at time of service)	Highest Degree	Experience	Expertise
Charles J. Arntzen	2001-2009	M	White	Director, Arizona Biomedical Institute and The Florence Ely Nelson Presidential Chair, Department of Plant Biology, Arizona State University	Ph.D., Cell Physiology, Purdue University	Academia	Bio/Med
Norman R. Augustine	2001-2009	M	White	Former Chairman and CEO, Lockheed Martin Corporation	B.S.E., Aeronautical Engineering, Princeton University	Industry; Ex-Government	Eng
Carol Bartz	2001-2009	F	White	Executive Chairman of the Board, President, and CEO, Autodesk, Inc.	B.S., Computer Science, University of Wisconsin-Madison	Industry	Eng
M. Kathleen Behrens	2001-2009	F	White	Managing Director, RS Investments; General Partner, RS & Co., Venture Partners	Ph.D., Microbiology, University of California, Davis	Industry	Bio/Med
Erich Bloch	2001-2009	M	White	Corporate R&D Management Consultant, The Washington Advisory Group; Director, The Washington Advisory Group	B.S., Electrical Engineering, University of Buffalo	Industry; Ex-Government	Eng
Robert Brown	2006-2009	M	White	President, Boston University	Ph.D., Chemical Engineering, University of Minnesota	Academia	Eng

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Name	Years of Service	Gender	Race/ Ethnicity	Position (at time of service)	Highest Degree	Experience	Expertise
Stephen B. Burke	2001-2005	M	White	President, Comcast Cable Communications	M.B.A., Harvard University	Industry	Eng
G. Wayne Clough	2001-2009	M	White	President, Georgia Institute of Technology; Secretary, Smithsonian Institution	Ph.D., Civil Engineering, University of California, Berkeley	Academia	Eng
Michael S. Dell	2001-2009	M	White	Chairman and CEO, Dell Computer Corporation	No Degree, University of Texas at Austin	Industry	Eng
Nance K. Dicciani	2006-2009	F	White	Former President and CEO, Honeywell Specialty Materials	Ph.D. Chemical Engineering; M.B.A., Wharton School of the University of Pennsylvania	Industry	Eng
Raul Fernandez	2001-2009	M	Hispanic or Latino	CEO, Dimension Data of North America; CEO, ObjectVideo	B.A., Economics, University of Maryland-College Park	Industry	Eng
Marye Anne Payne Fox	2001-2009	F	White	Chancellor, North Carolina State University; Chancellor, University of California, San Diego	Ph.D., Chemistry, Dartmouth College	Academia	Phys Sci
Martha Gilliland	2001-2009	F	White	Chancellor, University of Missouri-Kansas City; Senior Fellow, RAND; Council for Aid to Education	Ph.D., Environmental Engineering and Systems Ecology, University of Florida	Academia	Phys Sci

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Name	Years of Service	Gender	Race/ Ethnicity	Position (at time of service)	Highest Degree	Experience	Expertise
Ralph Gomory	2001-2009	M	White	President and Former President, Alfred P. Sloan Foundation	Ph.D., Mathematics, Princeton University	Academia; Industry; Ex-Government	Eng
Bernadine Healy	2001-2009	F	White	Medical Senior Writer & Columnist, US News and World Report; Retired President and CEO, American Red Cross	M.D., Harvard University	Academia; Industry; Ex-Government	Bio/Med
Robert J. Herbold	2001-2009	M	White	Retired Chief Operating Officer and Former Executive Vice President, Microsoft Corporation	Ph.D., Computer Science, Case Western Reserve University	Industry	Eng
Richard H. Herman	2006-2009	M	White	Chancellor, University of Illinois at Urbana-Champaign	Ph.D., Mathematics, University of Maryland-College Park	Academia	Eng
Martin J. Jischke	2006-2009	M	White	President and President Emeritus, Purdue University	Ph.D., Aeronautics and Astronautics, Massachusetts Institute of Technology	Academia	Eng
Fred Kavli	2006-2009	M	White	Founder and Chairman, Kavli Foundation	B.S.E., Engineering, Norwegian Institute of Technology	Industry	Eng
Barbara Kilberg	2001-2009	F	White	President, Northern Virginia Technology Council	J.D., Yale University	Ex-Government	SocSci

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Name	Years of Service	Gender	Race/ Ethnicity	Position (at time of service)	Highest Degree	Experience	Expertise
E. Floyd Kvamme*	2000-2009	M	White	Partner, Kleiner Perkins Caufield & Byers	M.S., Semiconductor Material Science and Engineering, Syracuse University	Industry	Eng
John H. Marburger*	2001-2009	M	White	Director, Office of Science and Technology Policy	Ph.D., Applied Physics, Stanford University	Academia	Phys Sci
Walter Massey	2001-2009	M	Black or African American	President and President Emeritus, Morehouse College	Ph.D., Physics, Washington University in St. Louis	Academia; Ex-Government	Phys Sci
Gordon E. Moore	2001-2005	M	White	Chairman Emeritus, Intel Corporation	Ph.D., Chemistry, California Institute of Technology	Industry	Eng
E. Kenneth Nwabueze	2001-2009	M	Black or African American	CEO, SageMetrics	B.S., Industrial and Manufacturing Engineering; California State University- Northridge	Industry	Eng
Steven G. Papermaster	2001-2009	M	White	Chairman, Powershift Ventures	B.B.A., University of Texas at Austin	Industry	Eng
Luis M. Proenza	2001-2009	M	Hispanic or Latino	President, University of Akron	Ph.D., Neurobiology and Psychology, University of Minnesota	Academia; Ex-Government	Bio/Med

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Daniel A. Reed	2006-2009	M	White	Director, Renaissance Computing Institute; Director of Scalable and Multicore Computing Strategy, Microsoft Corporation	Ph.D., Computer Science, Purdue University	Academia; Industry	Eng
Hector de Jesus Ruiz	2006-2007	M	Hispanic or Latino	Chairman and CEO, Advanced Micro Devices, Inc.	Ph.D., Electrical Engineering, Rice University	Industry	Eng
George Scalise	2001-2009	M	White	President, Semiconductor Industry Association	B.S.M.E., Mechanical Engineering, Purdue University	Industry	Eng
Stratton Sclavos	2006-2009	M	White	Chairman of the Board, President, and CEO, VeriSign, Inc.	B.S., Electrical and Computer Engineering, University of California, Davis	Industry	Eng
John Brooks Slaughter	2006-2009	M	Black or African American	President and CEO, The National Action Council for Minorities in Engineering	Ph.D., Engineering Sciences, University of California, San Diego	Academia; Ex-Government	Eng
Joseph Tucci	2006-2009	M	White	Chairman, President, and CEO, EMC Corporation	M.S., Business Policy, Columbia University	Industry	Eng
Charles M. Vest	2001-2009	M	White	President, National Academy of Engineering; President, Massachusetts Institute of Technology	Ph.D., Mechanical Engineering, University of Michigan	Academia	Eng

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Name	Years of Service	Gender	Race/ Ethnicity	Position (at time of service)	Highest Degree	Experience	Expertise
Robert Witt	2006-2009	M	White	President, University of Alabama	Ph.D., Economics, Pennsylvania State University	Academia	SocSci
Tadataka Yamada	2006-2009	M	Asian	President, Global Health Program, Bill and Melinda Gates Foundation	M.D., New York University	Academia; Industry	Bio/Med

President Barack Obama

Wanda M. Austin	2015-2017	F	Black or African American	President and CEO, The Aerospace Corporation	Ph.D., Systems Engineering, University of Southern California	Industry	Eng
Rosina Bierbaum	2009-2017	F	White	Professor, School of Natural Resources and Environment, University of Michigan; Roy F. Westin Chair in Natural Economics, School of Public Policy, University of Maryland-College Park	Ph.D., Ecology and Evolution, University of New York at Stony Brook	Academia; Ex-Government	Phys Sci
Christine Cassel	2009-2017	F	White	Planning Dean, Kaiser Permanente School of Medicine	M.D., University of Massachusetts	Academia	Bio/Med
Christopher Chyba	2009-2017	M	White	Professor, Astrophysical Sciences and International Affairs, Princeton University	Ph.D., Astronomy and Space Sciences, Cornell University	Academia	PhySci

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S. James Gates, Jr.	2009-2017	M	Black or African American	John S. Toll Professor of Physics; Director, Center for String and Particle Theory, University of Maryland-College Park	Ph.D., Theoretical Physics, Massachusetts Institute of Technology	Academia	Phys Sci
Mark Gorenberg	2011-2017	M	White	Managing Member, Zetta Venture Partners	M.S., Engineering Management, Stanford University	Industry	Eng
Susan L. Graham	2013-2017	F	White	Pehong Chen Distinguished Professor Emerita in Electrical Engineering and Computer Science, University of California, Berkeley	Ph.D., Computer Science, Stanford University	Academia	Eng
John P. Holdren*	2009-2017	M	White	Assistant to the President for Science and Technology; Director, Office of Science and Technology Policy	Ph.D., Aerospace Engineering and Theoretical Plasma Physics, Stanford University	Academia; Ex-Government	Phys Sci
Shirley Ann Jackson	2009-2014	F	Black or African American	President, Rensselaer Polytechnic Institute	Ph.D., Physics, Massachusetts Institute of Technology	Academia; Ex-Government	Phys Sci
Eric S. Lander*	2009-2017	M	White	President, Broad Institute of Harvard and Massachusetts Institute of Technology	Ph.D., Mathematics, Oxford University	Academia	Bio/Med

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Richard Levin	2009-2014	M	White	President, Yale University	Ph.D., Economics, Yale University	Academia	SocSci
J. Michael McQuade	2013-2017	M	White	Senior Vice President for Science and Technology, United Technologies Corporation	Ph.D., Physics, Carnegie Mellon University	Industry	Phys Sci
Chad Mirkin	2009-2017	M	White	George B. Rathmann Professor of Chemistry; Director, International Institute for Nanotechnology, Northwestern University	Ph.D., Chemistry, Pennsylvania State University	Academia	Phys Sci
Mario J. Molina	2009-2017	M	Hispanic or Latino	Distinguished Professor, Chemistry and Biochemistry, University of California, San Diego; Professor, Center for Atmospheric Sciences, Scripps Institution of Oceanography	Ph.D., Chemistry, University of California, Berkeley	Academia; Ex-Government	Phys Sci
Ernest J. Moniz	2009-2013	M	White	Cecil and Ida Green Professor of Physics and Engineering Systems; Director, MIT's Energy Initiative, Massachusetts Institute of Technology	Ph.D., Theoretical Physics, Stanford University	Academia; Ex-Government	Phys Sci
Craig Mundie	2009-2017	M	White	President, Mundie Associates	M.S., Information Theory, Georgia Institute of Technology	Industry	Eng

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Edward Penhoet	2009-2017	M	White	Director, Alta Partners; Professor Emeritus, Biochemistry and Public Health, University of California, Berkeley	Ph.D., Biochemistry, University of Washington	Academia; Industry	Bio/Med
William Press**	2009-2017	M	White	Warren J. and Viola Mae Raymer Professor in Computer Science and Integrative Biology, University of Texas at Austin	Ph.D., Theoretical Physics, California Institute of Technology	Academia	Eng
Maxine Savitz**	2009-2017	F	White	Retired General Manager for Technology Partnerships at Honeywell, Inc.	Ph.D., Chemistry, Massachusetts Institute of Technology	Industry; Ex-Government	Eng
Barbara Schaal	2009-2017	F	White	Dean of the Faculty of Arts and Sciences, Mary- Dell Chilton Distinguished Professor of Biology, Washington University of St. Louis	Ph.D., Biology, Yale University	Academia	Bio/Med
Eric Schmidt	2009-2017	M	White	Executive Chairman, Alphabet, Inc.	Ph.D., Electrical Engineering, University of California, Berkeley	Industry	Eng

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Daniel Schrag	2009-2017	M	White	Sturgis Hooper Professor of Geology, Professor, Environmental Science and Engineering, Harvard University; Director, Harvard University Center for Environment	Ph.D., Geology, University of California, Berkeley	Academia	PhySci
David E. Shaw	2009-2013	M	White	Chief Scientist, D.E. Shaw Research; Senior Research Fellow, Center for Computational Biology and Bioinformatics, Columbia University	Ph.D., Computer Science, Stanford University	Academia; Ex-Government	Bio/Med
Harold Varmus	2009-2010	M	White	President, Memorial Sloan-Kettering Cancer Center	M.A., English, Harvard University; M.D., Columbia University	Academia; Ex-Government	Bio/Med
Ahmed Zewail	2009-2013	M	White	Linus Pauling Professor of Chemistry and Physics; Director, Physical Biology Center, California Institute of Technology	Ph.D., Chemistry, University of Pennsylvania	Academia	Bio/Med

* Denotes Chair or Chairman

** Denotes Vice Chair or Chairman

Note: **Phys Sci** includes physics, chemistry, astronomy, and environmental sciences; **Bio/Med** includes biology and medicine; **Soc Sci** includes economics, psychology, education, and law; **Eng/Tech** includes engineering, computer sciences, math, and technology. Race and ethnicity appear as defined by the U.S. Census Bureau.