
CONTRIBUTORS

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Recent publication include "Deregulation Has Not Lowered U.S. Industrial Electricity Prices," "Electric Gridlock: A National Solution," "Cascading Failures: Survival vs. Prevention," "Designing an Interdisciplinary Curriculum for the Changing Electric Power Industry," "Managing Soil Carbon," and "Electrical Blackouts: A Systemic Problem." He has co-authored with Lester Lave editorial pieces for the *New York Times* and the *Washington Post*. He received the Metcalf Lifetime Achievement Award for significant contributions to engineering in 2002 and the National Aeronautics and Space Administration's Distinguished Service Medal in 1997.

Philip E. Auerswald, PhD (Editor) is Director of the Center for Science and Technology Policy and an Assistant Professor at the School of Public Policy, George Mason University. Professor Auerswald's work focuses on linked processes of technological and organizational change in the contexts of policy, economics, and strategy. He is the founding co-editor of *Innovations: Technology | Governance | Globalization*, a quarterly journal from MIT Press about people using technology to address global challenges. He was previously a

Research Fellow and Assistant Director of the Science, Technology, and Public Policy Program at the Kennedy School of Government, Harvard University. His published work has addressed entrepreneurial finance, organizational learning, industry dynamics, and innovation policy. He has been a consultant for the National Academies of Science, the National Institute of Standards and Technology, and the Commonwealth of Massachusetts. He holds a PhD in economics from the University of Washington and a BA (political science) from Yale University.

Thomas Bowe is currently PJM Interconnection's Chief Security Officer, responsible for the physical and cyber security of PJM and its business continuity planning. From 2002 to October 2004, he was PJM's Manager of RTO Market Integration, which required the creation of new reliability plans to double PJM's operating area. Additionally, he was the root cause leader in the investigation of the August 14th Power Outage. From 1998 to 2002, he held the position of PJM's Manager of Dispatch, having direct 24/7 responsibility for the operations of the world's third largest centrally dispatched control area. Prior to joining PJM, Mr. Bowe served as a career Infantry Officer in the U.S. Army. He is a graduate of the United States Military Academy, Texas Tech University, and the Harvard Business School.

Lewis M. Branscomb (Editor) is the Aetna Professor of Public Policy and Corporate Management Emeritus and emeritus Director of the Science, Technology, and Public Policy Program in the Center for Science and International Affairs at Harvard University's Kennedy School of Government. Dr. Branscomb graduated from Duke University in 1945, summa cum laude, and was awarded the Ph.D. degree in physics by Harvard University in 1949. A research physicist at the U.S. National Bureau of Standards (now the National Institute of Standards and Technology) from 1951 to 1969, he was Director of NBS from 1969 to 1972. He then became Vice President and Chief Scientist of the IBM Corporation, serving until 1986, when he joined the faculty at Harvard.

President Johnson named him to the President's Science Advisory Committee in 1964, and he chaired the subcommittee on Space Science and Technology during Project Apollo. President Carter appointed him to the National Science Board and he served as Chairman of the NSB during the presidency of Ronald Reagan.

Dr. Branscomb was the co-chairman of the project of the National Academies of Science and of Engineering and the Institute of Medicine, which authored the report *Making the Nation Safer: Science and Technology for Countering Terrorism*, published by the National Academies Press in 2002. He has been

actively engaged in promoting bilateral cooperation in counter-terrorism with India, Russia, Japan, and Korea.

Lloyd Dixon is a senior economist at the Rand Corporation, with more than 15 years of experience conducting research on insurance, compensation, and liability issues. In fall 2004, he completed a study of the compensation and assistance received by individuals and businesses affected by the September 11, 2001, terrorist attacks. In a recent paper, he explored issues and options for government intervention in the market for terrorism insurance, and in a paper published by OECD, he examined the links between national security and insurance and compensation policies for terrorism. He is currently conducting two studies on flood insurance – one study examines opportunities and challenges for increasing participation in the National Flood Insurance Program; the other is developing better information on the role played by private insurers in underwriting flood insurance. Dr. Dixon has also examined the standards for admitting expert evidence into state and federal courts. He holds a Ph.D. in economics from the University of California at Berkeley and B.S. and B.A. degrees in engineering and political science, respectively, from Stanford University.

John D. Donahue is the Raymond Vernon Lecturer in Public Policy and Director of the Weil Program in Collaborative Governance at Harvard University. His teaching, writing, and research center on the distribution of public responsibilities across levels of government and sectors of the economy. He has written or edited 11 books, with another – *Leverage: Public Goals, Private Roles* (with Richard J. Zeckhauser) – in progress. Donahue served in the first Clinton administration as an Assistant Secretary and then as Counselor to the Secretary of Labor. He has consulted for business and governmental organizations including the National Economic Council, the World Bank, and the Rand Corporation, and he serves as a trustee or advisor to several nonprofits. A native of Indiana, he holds a B.A. degree from Indiana University and an M.P.P. and Ph.D. from Harvard.

Jacob (Jack) Feinstein is a consultant for the electric power industry. He has more than 38 years of experience in the industry, including 30 years with Consolidated Edison of New York, Inc. Prior to retiring from Con Edison in 1998, he served as Vice President of System and Transmission Operations for seven years. He then joined Cogen Technologies, Inc., as a vice president responsible for new project development before becoming an independent consultant in 1999. His responsibilities at Con Edison included maintaining the operational integrity of the electric bulk power system with an organization that

comprised seven operating departments. His organization was also responsible for the purchase and sale of energy and capacity at the wholesale level and the purchase of fuel oil for use in Con Edison's generating stations.

His career at Con Edison began in 1967 as an assistant engineer. Following a two-year rotational training program for entry-level engineers, he was assigned to the Electrical Engineering Department as an engineer designing generation station projects. From there, he was promoted to manager of the system sequence group in the System Operation Department and became the chief system operator in 1977. In 1982, he was promoted to general manager of the System Operation Department and in 1988 to plant manager of the Arthur Kill Generating Station. Mr. Feinstein has presented numerous technical and managerial lectures during his career to various power industry organizations and has collaborated in the preparation of technical papers. While at Con Edison, his experience included developing and delivering both technical and managerial training programs and seminars. He also developed the training program for Con Edison's senior system operators, a position created in 1977 to place experienced graduate engineers in a position to supervise the operation of the power system on a 24/7 watch assignment. He was a member of the New York Power Pool (NYPP) Operating Committee from 1982 until his retirement and is a recognized expert in the reliable and safe operation of the electric power system. He also served on the New York Independent System Operator (NYISO) Transition Steering Committee that was directing the implementation of the restructuring of the wholesale power and energy market in New York State. He has authored operating procedures for both Consolidated Edison and the NYPP. He served as a member of the Reliability Coordinating Committee (RCC) of the Northeast Power Coordinating Council. He also served on the Electrical Systems Division Advisory Committee of the Electric Power Research Institute (EPRI).

Presently, he provides consulting for a developer of power plants and serves as a member of the board of directors of a public company that produces electric energy by using biogas at landfills as the fuel source. He also serves on the New England Power Pool (NEPOOL) Board of Review, an advisory panel to help resolve disputes among participants in the New England wholesale electric power market. A registered Professional Engineer, he holds a B.E.E. degree from the City College of New York.

Stephen E. Flynn is the Jeane J. Kirkpatrick Senior Fellow for National Security Studies at the Council on Foreign Relations, where he specializes in global transportation security, border management, and homeland security. Dr. Flynn's experience includes Commander, U.S. Coast Guard (retired); Member, Marine Board, National Academy of Sciences (current);

Director, Independent Task Force on Homeland Security Imperatives (Gary Hart and Warren Rudman co-chairs, 2002); Consultant on homeland security, U.S. Commission on National Security (Hart-Rudman Commission 2000–2001); Director, Office of Global Issues, National Security Council staff (1997); Associate Professor, U.S. Coast Guard Academy (1994–1999); Guest Scholar and Visiting Fellow, Brookings Institution (1991–1994); and Commanding Officer, U.S. Coast Guard Cutter *Redwood*, 1992–1993, and *Point Arena*, 1984–1986. Selected publications include *America the Vulnerable* (HarperCollins, 2004); “Port Security: Still a House of Cards” in *Far Eastern Economic Review* (Jan/Feb 2006); “U.S. Port Security and the Global War on Terror” in the *American Interest* (Autumn 2005); “The Neglected Homefront” in *Foreign Affairs* (Nov/Dec 2004); and *Defeating the Jihadist: A Blueprint for Action* with Richard A. Clarke et al. (Century Foundation, 2004). Mr. Flynn received his Ph.D. and M.A.L.D. from the Fletcher School of Law and Diplomacy, Tufts University, and his B.S. from the U.S. Coast Guard Academy. Mr. Flynn has received the following honors: Legion of Merit (2001); Coast Guard Academy Distinguished Alumni Achievement Award (1999); Annenberg Scholar-in-Residence, University of Pennsylvania (1993–1994); International Affairs Fellowship, Council on Foreign Relations (1991–1992); and Distinguished Graduate, Fletcher School of Law and Diplomacy, Tufts University (1988).

Robert A. Frosch is a theoretical physicist by education (A.B., Columbia College, 1947; Ph.D., Columbia University, 1952). He conducted research in ocean acoustics at Columbia and later served as Director for Nuclear Test Detection and Deputy Director of the Advanced Research Projects Agency in the Department of Defense, Assistant Secretary of the Navy for Research and Development, Assistant Executive Director of the United Nations Environment Program, Associate Director for Applied Oceanography of the Woods Hole Oceanographic Institution, Administrator of the National Aeronautics and Space Administration, President of the American Association of Engineering Societies, and Vice President of General Motors Corporation (GM) in charge of Research Laboratories. Dr. Frosch retired from GM in 1993 before joining the Kennedy School of Government at Harvard University. He is a member of the National Academy of Engineering, the American Academy of Arts and Sciences, and a Foreign Member of the UK Royal Academy of Engineering.

Sean P. Gorman is the President and CTO of FortiusOne. Prior to founding FortiusOne, Dr. Gorman was a Research Assistant Professor at George Mason University’s School of Public Policy. He also served as a vice president of research and development for a telecommunications mapping firm and was Director of Strategy for a Washington, D.C.–based technology incubator. His

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Geoffrey Heal, Paul Garrett Professor of Public Policy and Corporate Responsibility at Columbia Business School and Professor of Economics in the School of International and Public Affairs, is noted for contributions to economic theory and environmental economics. Author of 14 books and about 200 articles, he is a Fellow of the Econometric Society, past President of the Association of Environmental and Resource Economists, recipient of its prize for publications of enduring quality, a member of the Scientific Advisory Board of the Environmental Protection Agency, and a Director of the Union of Concerned Scientists. He chaired a committee of the National Academy of Sciences on valuing ecosystem services and was a Commissioner of the Pew Oceans Commission. Recent books include *Nature and the Marketplace*, a review of the scope for market-based approaches to environmental conservation; *Valuing the Future*, a theoretical analysis of sustainability from an economic perspective; and *Valuing Ecosystem Services*, a report of the National Research Council. His current research topics include environmental economics and the social and environmental impacts of business.

Michael Kearns is professor in the Computer and Information Science Department at the University of Pennsylvania, where he holds the National Center Chair in Resource Management and Technology. He is also the co-director of Penn's interdisciplinary Institute for Research in Cognitive Science and has a secondary appointment at the Wharton School. His primary research interests are in artificial intelligence and machine learning, including computational learning theory, reinforcement learning, probabilistic inference, and graphical models. In recent years, he has been mainly working on computational issues in game theory, economics, and finance. In the past, he has worked on a variety of applications of artificial intelligence to human-computer interaction, including spoken dialogue systems and software agents in MUDs (multi-user computer games). He also has interests in cryptography, network security, and theoretical computer science. He currently serves on editorial boards

of several journals (*Mathematics of Operations Research*, *Games and Economic Behavior*, *Journal of the ACM*), and the MIT Press series on Adaptive Computation and Machine Learning).

He spent the decade 1991–2001 in basic artificial intelligence and machine learning research at AT&T Labs and Bell Labs. During his last four years there, he was the head of the AI department. During his time at AT&T/Bell Labs, he also served as the head of the Machine Learning department and as the head of the Secure Systems Research department. He joined the Penn faculty in January 2002. A graduate from the University of California at Berkeley in math and computer science, he received a Ph.D. in computer science from Harvard University and was a postdoctoral Fellow at the Laboratory for Computer Science at M.I.T. and at the International Computer Science Institute in Berkeley.

Dr. Kearns is also an active member and the vice-chair of DARPA's Information Science and Technology study group and the head of quantitative strategy development in the Equity Strategies department of Lehman Brothers in New York City.

Paul Kleindorfer is the Anheuser Busch Professor of Management Science at the Wharton School of the University of Pennsylvania. Dr. Kleindorfer's primary appointment is in the Department of Operations and Information Management. He is also professor of Business and Public Policy. Dr. Kleindorfer graduated with distinction (B.S.) from the U.S. Naval Academy in 1961. He studied on a Fulbright Fellowship in Mathematics at the University of Tübingen, Germany (1964–1965), followed by doctoral studies at Carnegie Mellon University, from which he received his Ph.D. in 1970 in Systems and Communication Sciences at the Graduate School of Industrial Administration. Dr. Kleindorfer has held university appointments at Carnegie Mellon University (1968–1969), Massachusetts Institute of Technology (1969–1972), The Wharton School (1973–present), and several universities and international research institutes, including the University of Frankfurt, INSEAD, Ulm University, IIASA, and The Science Center (Berlin). He has published more than 25 books and many research papers in the areas of managerial economics and regulation. Dr. Kleindorfer has held a number of editorial and professional positions over the years, including his current positions as President of the Society for Economic Design and Associate Editor of the *Journal of Regulatory Economics*. He has consulted with companies and governmental agencies worldwide on risk management and technology strategy.

Dr. Kleindorfer's early research was concerned with the application of optimal control theory to deterministic and stochastic production planning

problems. His later work has been concerned primarily with risk management and with the integration of operations, economics, and finance. His sectoral interests have included a long-standing interest in electric power, in the postal and logistics area, and more recently in capital-intensive sectors such as chemicals and semiconductors. In these areas, he has been concerned with a broad range of risk management activities, ranging from traditional supply chain contracts to hedging and trading arising from derivatives defined on spot markets ancillary to the sector in the question. As part of his ongoing interest in risk management, Dr. Kleindorfer has also developed and maintained a continuing research program in environmental, health, and safety risks, with a primary focus on the chemical and process industries.

Michael Kormos is Vice President of the System Operations Division for PJM Interconnection. He is responsible for ensuring the safe and secure operation of the PJM transmission grid and energy markets. He oversees dispatching, operations development, operations planning, real-time operations, and scheduling functions at PJM. Previously, he was the Operations Coordination Manager of the System Operations Division and was responsible for the oversight of the day-to-day operations and implementation of Locational Marginal Pricing and the new market structures. Mr. Kormos was Acting Manager for the Scheduling Department and as such was responsible for coordination and scheduling of all bilateral energy transactions for the PJM participants, evaluation and scheduling of all PJM spot market transactions, support of the Unit Commitment and generation scheduling functions, load forecasting support, and hydro unit coordination and scheduling. He received a B.S. in Electrical Engineering from Drexel University and a Master of Business Administration from Villanova University.

Howard Kunreuther is the Cecilia Yen Koo Professor of Decision Sciences and Public Policy at the Wharton School, University of Pennsylvania, as well as Co-Director of the Wharton Risk Management and Decision Processes Center. He has a long-standing interest in the ways that society can better manage low-probability–high-consequence events as they relate to technological and natural hazards, and he has published extensively on the topic. He is a Fellow of the American Association for the Advancement of Science and Distinguished Fellow of the Society for Risk Analysis, receiving the Society's Distinguished Achievement Award in 2001. Dr. Kunreuther has written or co-edited a number of papers and books including *On Risk and Disaster: Lessons from Hurricane Katrina* (with Ronald Daniels and Donald Kettl), *Catastrophe Modeling: A New Approach to Managing Risk* (with Patricia Grossi), and *Wharton on Making Decisions* (with Stephen Hoch). He is a recipient of the Elizur

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Todd M. La Porte (Editor) is an associate professor in the School of Public Policy at George Mason University. His current research interests include public organizations, governance, and the use and impacts of networked information technologies, for which he has received National Science Foundation and Pew Foundation support. He is also working on public attitudes to technology and homeland security, critical infrastructure protection, and organizational responses to extreme events, specifically the attacks of September 11, 2001, and Hurricane Katrina. Dr. La Porte teaches courses on critical infrastructures and extreme events, global Internet public policy, introductory international political economy, technology and institutional change, and culture, organizations, and technology.

Before joining George Mason, La Porte was a member of the Faculty of Technology, Policy and Management at the Delft University of Technology in The Netherlands, where he was Associate Professor. From 1989 to 1995, he was an analyst at the Office of Technology Assessment, a research office of the U.S. Congress, where he worked on the role of wireless telecommunications and the National Information Infrastructure, international trade in telecommunications services and U.S. policy, and international defense industrial cooperation and the arms trade. In addition to his work at OTA, Dr. La Porte has published works on public organizational challenges of the World Wide Web in disaster assistance, on European technology assessment methodologies and practices, and on the social implications of telecommunications mobility. He received his Ph.D. in political science from Yale University in 1989 and his B.A. in sociology and political science from Swarthmore College in 1980. He lives in Washington, D.C.

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power, air traffic control, and nuclear aircraft carriers. His research concerns the evolution of large-scale organizations operating technologies demanding a very high level of operating reliable performance across a number of management generations, and the relationship of large-scale technical systems to political legitimacy. This took him to Los Alamos National Laboratory (1998–2003) to examine the institutional challenges of multi-generation nuclear missions. Most recently, he has taken up questions of crisis management in the face of new types of threats emerging from the United States' sustained engagement with radical Islamic movements.

He was elected to the National Academy of Public Administration in 1985 and was a Fellow with the Woodrow Wilson International Center for Scholars, Smithsonian Institution, and a Research Fellow at Wissenschaftszentrum (Sciences Center) in Berlin and the Max Planck Institute for Social Research, Cologne. Service on editorial boards includes *Policy Sciences*, *Public Administration Review*, *Technology Studies*, *Journal of Contingencies and Crisis Management*, and the Steering Committee, Large Technical Systems International Study Group. He has been a member of the Board on Radioactive Waste Management and has served on panels of the Committee on Human Factors and Transportation Research Board, National Academy of Sciences. He served on the Secretary of Energy Advisory Board, Department of Energy, and chaired its Task Force on Radioactive Waste Management, examining questions of institutional trustworthiness, and he was on the Technical Review Committee, Nuclear Materials Technology Division, Los Alamos National Laboratory. He has also served as a member of the Committee on Long Term Institutional Management of DOE Legacy Waste Sites: Phase Two and the Committee on Principles and Operational Strategies for Staged Repository Systems, both of the Board on Radioactive Waste Management, the National Academies of Science (2001–2003). He is currently a Faculty Affiliate, Decision Science Division, Los Alamos National Laboratory, and has consulted with the U.S. Department of Energy's Defense Nuclear Facilities Safety Board.

Patrick Lagadec is author of 10 books on emerging risks and crises, among which are *States of Emergency* (1990), *Preventing Chaos in a Crisis* (1991), and *Treatise on New Risks* (2002). Director of Research at the Ecole Polytechnique (Paris), he is founding member of the European Crisis Management Academy and a member of its Governing Council. Dr. Lagadec has a long history of direct involvement with critical infrastructure and vital network operators internationally (e.g., space, energy, banks, transport, public health). He developed the theory of Major Technological Risk (1979) and is a specialist in crisis prevention and management.

In the past 10 years, he has broadened his work on governance of organizations and complex systems confronted by global crises and paradigm shifts,

in terms of safety, security, and sustainability (e.g., climate, natural disasters, health, social, terrorist threats, and breakdowns). He has extensive experience as a strategic advisor and trainer in the field of major risks, unconventional crises, and global “ruptures” for the past 25 years. His expertise is in preparedness and implementation of new paradigms and innovative operational processes to help public officials, executive committees, and citizen groups to build new frameworks and more sustainable capability to deal with a world in rapid mutation. A member of the French National Academy of Technologies, Dr. Lagadec received the Engelberg Prize in 1999.

Lester B. Lave is University Professor and Higgins Professor of Economics at Carnegie Mellon University, with appointments in the Business School, Engineering School, and the Public Policy School. He has a B.A. from Reed College and a Ph.D. from Harvard University. He was elected to the Institute of Medicine of the National Academy of Sciences and is a past president of the Society for Risk Analysis. He has acted as a consultant to many government agencies and companies. He has received research support from a wide range of federal and state agencies, as well as foundations, nongovernmental organizations, and companies. Dr. Lave is the director of the CMU university-wide Green Design Institute and, with M. Granger Morgan, directs the CMU Electricity Industry Center. His research focuses on applying economics to public policy issues, particularly those related to energy in general and electricity in particular.

Brian Lopez is a computer scientist at Lawrence Livermore National Laboratory (LLNL). For the past eight years, he has led LLNL’s Vulnerability and Risk Assessment Program (VRAP), which provides in-depth, multi-disciplinary assessments of threat, vulnerability, and consequence. Past projects include work in 26 U.S. states and internationally across a variety of sectors such as electric power, oil, gas, water, chemical, aviation, rail, maritime, telecommunications, national icons, and classified sites. He assembled and led security teams for the 2002 Winter Olympics, California Energy Crisis, and 9/11 response. Currently he is leading a comprehensive assessment of a 34-city region for the Department of Homeland Security. His previous work has been in the areas of nuclear material tracking, secure systems design, knowledge management, and counterterrorism.

James W. Macdonald is an independent commercial insurance and reinsurance consultant based in Philadelphia. Between 2001 and 2005, he was the Chief Underwriting Officer for ACE USA. He has more than 30 years of insurance industry experience and is an experienced author and public speaker. Prior to joining ACE, he served in a variety of executive, brokerage, consulting, and underwriting roles at CNA Financial, American International

Group, Conning & Company, Marsh & McLennan, and Munich American Reinsurance.

His recent publications and presentations include *The Terrorism Risk Insurance Extension Act of 2005* (International Risk Management Institute); *Risk Report* (February 2006); *Caveat Emptor When Buying Terrorism Insurance* (National Underwriter, February 2006); *Underwriting Discipline in a Softening Market* (John Liner Review, Summer 2005); *Terrorism, TRIA & a Timeline for Market Turmoil?* (RIMS Convention, 2004); *Terrorism, Insurance & TRIA: Are We Asking the Right Questions?* (John Liner Review, Summer 2004); and *Medical Malpractice: A Prescription for Chaos* (Conning & Company, May 2001).

Mr. Macdonald is a former member of the Advisory Board of the Rand Corporation's Institute for Civil Justice and the Rand Corporation Center for Terrorism Risk Management Policy. He is also a former Board member of the National Patient Safety Foundation at the American Medical Association. A graduate of the University of Notre Dame with a B.A. in English Literature, he has completed postgraduate studies in Fine Arts at Montreal's Concordia University and in Philosophy and Finance at the New School for Social Research and New York University.

Prior to his retirement from active duty with the U.S. Air Force in 1984 following a distinguished career, **General Robert T. Marsh** commanded the Air Force Systems Command. After retirement, General Marsh has been employed as an aerospace consultant. He served as the Chairman of Thiokol Corporation from 1989 to 1991, as it transitioned from Morton Thiokol Corporation to independent status. He served as the Executive Director of the Air Force Aid Society from 1995 until April 2001. He was appointed by the President as Chairman of the President's Commission on Critical Infrastructure Protection in 1996 and served in that capacity through 1997. Currently, he serves as a director of Verint Technology, Inc., and SI International, Inc. He is a Trustee Emeritus of the MITRE Corporation.

Erwann O. Michel-Kerjan (Editor) is Managing Director of the Wharton School's Risk Management and Decision Processes Center, a center with 20 years of experience in developing strategies and policies for dealing with catastrophic risks. Dr. Michel-Kerjan joined the Wharton School in 2002, where his research has been focused on managing and financing extreme events, primarily natural disasters and mega-terrorism, and on the consequent strategic crisis management. In particular, his interest is in the creation, implementation, and development of private-public collaboration among top decision makers to deal with emerging large-scale risks. His work also includes several projects on

national security and the protection of critical infrastructure in partnership with Lockheed Martin and several federal agencies.

Dr. Michel-Kerjan has been working on these issues in collaboration with industry, governments, academia, and international organizations in North America and in Europe for nearly 10 years. He is invited regularly to bring his dual experience from and to each side of the Atlantic. Michel-Kerjan's work on financing extreme events has appeared in leading media in the United States and abroad. His first book, *Treatise on New Risks* (with O. Godard, C. Henry, and P. Lagadec), was published in 2002.

Between 2003 and 2005, he served on the OECD Task Force on Terrorism Insurance, and in 2005 he co-led, with Howard Kunreuther, the Wharton initiative on the future of terrorism risk financing in the United States (*TRIA and Beyond*). He is a member of the American Economic Association, the American Risk and Insurance Association, and the Econometric Society, and he is a faculty research associate at the Ecole Polytechnique in Paris. He also serves as an expert for the Division of Financial Affairs of the OECD and he is a member of the Global Risk Network of the World Economic Forum.

M. Granger Morgan currently holds the following positions at Carnegie Mellon University: University and Lord Chair Professor in Engineering; Head, Department of Engineering and Public Policy; Professor, Electrical and Computer Engineering; and in the H. John Heinz III School of Public Policy and Management. Dr. Morgan is interested in a wide range of problems in science, technology, and public policy. Much of his work has involved the development and demonstration of methods to characterize and analyze uncertainty. With colleagues in two NSF-supported climate research centers, he has addressed issues in the integrated assessment of climate change impacts and policy. With colleagues in the Electricity Industry Center, he is exploring problems such as distributed resources, carbon management, and basic technology research to support clean energy. He has worked extensively in risk analysis, communication, and ranking. He chairs the EPA Science Advisory Board, EPRI's Advisory Board, and the S&T Council for the International Risk Governance Council. He received a B.A. (Physics) in 1963 from Harvard College; an M.S. (Astronomy and Space Science) in 1965 from Cornell University; and a Ph.D. (Applied Physics and Information Science) in 1968 from University of California, San Diego.

Franklin W. Nutter has been president of the Reinsurance Association of America (RAA) since May 1991. He held the same position with the RAA from 1981 to 1984. Prior to becoming president of the RAA in 1981, he served as the Association's general counsel from 1978 to 1981. In the interim, he was

president of the Alliance of American Insurers and the Property Loss Research Bureau.

Mr. Nutter currently serves on the Board of Trustees of the Bermuda Biological Station for Research; the Board of the International Hurricane Center; the Advisory Board of the Center for Health and the Global Environment, an adjunct to the Harvard University Medical School; and the Advisory Board to the National Center for Atmospheric Research.

Mr. Nutter has chaired the Natural Disaster Coalition, an effort to develop a program to respond to catastrophic earthquakes, hurricanes, and volcanic eruptions in the United States. He served as a trustee to the National Commission Against Drunk Driving and has served as a member of the Board of Directors of the Advocates for Highway and Auto Safety, the Insurance Institute for Highway Safety and the Worker's Compensation Research Institute, and the Board of Overseers of the Institute for Civil Justice, a subsidiary of the Rand Corporation. Mr. Nutter was also a member of the Department of Commerce's Industry Sector Advisory Committee on Services for Trade Policy Matters. He has been active on reinsurance advisory committees and task forces of the American Bar Association and of the National Association of Insurance Commissioners. He served on the faculty of the American Institute's first advanced education program and served on the Brookings Council, an affiliate of the Brookings Institution in Washington, D.C. Mr. Nutter has a Juris Doctorate from the Georgetown University Law Center and a bachelor's degree in economics from the University of Cincinnati. He is a Vietnam veteran and is listed in *Who's Who in America*.

Daniel B. Prieto III is Director of the Homeland Security Center and Senior Fellow at the Reform Institute. Previously, he served as Research Director of the Homeland Security Partnership Initiative and Fellow at the Belfer Center for Science and International Affairs at the Harvard University Kennedy School of Government. He is author, with Stephen Flynn, of *Neglected Defense: Mobilizing the Private Sector to Support Homeland Security*, a special report from the Council on Foreign Relations.

Mr. Prieto has served on the professional staff of the Select Committee on Homeland Security in the U.S. House of Representatives. As a former technology-industry executive and investment banker, he has served as a strategist or advisor on more than \$100 billion in transactions. He is an associate member of the Markle Foundation Task Force on National Security in the Information Age and recently chaired the management working group of the Center for Strategic and International Studies/Heritage Foundation Task Force Examining the Roles, Missions, and Organization of the Department of Homeland Security. He is a past recipient of the International Affairs Fellowship from the

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Robert Reville is a labor economist who serves as the director of the Rand Institute for Civil Justice and the co-director of the Rand Center for Terrorism Risk Management Policy. His research focuses on compensation and insurance public policy. Dr. Reville has recently written several articles on terrorism insurance. He is a national expert in workplace injury compensation policy and the impact of disability on employment, and he has written extensively on workers' compensation in California, New Mexico, and other states. His publications in this area have been widely cited in the California legislature and have helped bring about new legislation to improve the workers' compensation system in the state. He was recently appointed to the Board of Scientific Counselors of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention. He also serves on the Workers' Compensation Steering Committee of the National Academy of Social Insurance. Dr. Reville received his Ph.D. in economics from Brown University.

Emery Roe is a practicing policy analyst working on science, technology, and environmental controversies. He specializes in better understanding of management strategies in large technical systems for the provision of highly critical services, such as electricity and water. He is author or co-author of many publications, including *Narrative Policy Analysis* (1994), *Taking Complexity Seriously* (1998), *Except Africa* (1999), and *Ecology, Engineering and Management* (2002, co-authored with M. J. G. van Eeten). He has also helped design and direct initiatives on, among others, agriculture and urban sprawl in California's Central Valley, indicators of ecosystem health in the San Francisco Bay-Delta region, and campus/community partnerships in underserved urban minority neighborhoods, in addition to research on issues at the intersection of global population growth, natural resource utilization, and the environment.

Paul R. Schulman Professor of Government at Mills College, has also taught at Brown University and the University of California, Berkeley. He has done extensive research on large-scale public policy undertakings and on organizations that attempt to design and manage large and complex technologies. These organizations include NASA, nuclear power plants, air traffic control centers, and, most recently, California's electrical grid management organization, the California Independent System Operator. He is also researching the problem of medical errors in large health care facilities. His writings include *Large-Scale Policy-Making; California's Electricity Restructuring* with Emery Roe, Michel van Eeten, and Mark de Bruijne; as well as numerous

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Richard J. Zeckhauser is Frank P. Ramsey Professor of Political Economy, Kennedy School, Harvard University. He pursues a mix of conceptual and applied research. He is among the world's foremost authorities on economic behavior in the context of uncertainty. (In this spirit, he is an avid contract bridge player, and he placed second and third in U.S. national championships in the last three years.) Dr. Zeckhauser is a pioneer in the field of policy analysis and the author of numerous studies applying these methodologies to a range of public policy issues in areas such as health care, the environment, and terrorism. The primary challenge facing society, he believes, is to allocate resources in accordance with the preferences of the citizenry.

Dr. Zeckhauser is a Fellow of the Econometric Society, the Institute of Medicine (National Academy of Sciences), and the American Academy of Arts and Sciences. His current research projects are directed at environmental disasters, deception and reputations, bad apples and bad bets in social policy, trust in Islamic and Western nations, information economics and Italian Renaissance art, and the blending of negotiations and auctions. He is writing a book with John D. Donahue – his co-author in this volume – on collaborative undertakings between the public and private sectors.