

W I N T E R 2 0 0 7



Improving Intelligence Analysis: *What works?*

How can we tell?

*Lessons from outside the
Intelligence Community*

Heritage Conference Center
Chantilly, Virginia

January 9–10, 2007





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DIRECTOR OF NATIONAL INTELLIGENCE
WASHINGTON, DC 20511

DEC 23 2006

To my Intelligence Community Colleagues,

I want to welcome you to *Improving Intelligence Analysis: What works? How can we tell? Lessons from outside the Intelligence Community*, an analytic tradecraft conference hosted by the Office of Analytic Integrity and Standards in the Office of the Director of National Intelligence. As the Intelligence Community (IC) works to implement changes, and overcome challenges, identified through legislation and assessments such as the Intelligence Reform and Terrorism Prevention Act of 2004, the Weapons of Mass Destruction Commission Report (2005) and the Iraq Study Group (2006), conferences like this play a critical role.

Over the next two days, experts from business and academia will introduce analytic approaches that are beginning to transform work practices in medicine, education, management, and social policy. These are not simply fresh ideas, but innovative methods that scientific testing suggests will produce better, more accurate results. During and following the presentations, IC commentators will examine how these approaches might be adapted to the work of analysts in the IC.

I challenge you to become an active participant in these discussions contributing your perspectives to this exciting venture.

Sincerely,

A handwritten signature in black ink, appearing to read "John D. Negroponte", with a stylized flourish at the end.

John D. Negroponte

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OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE
ASSISTANT DEPUTY DIRECTOR OF NATIONAL INTELLIGENCE FOR
ANALYTIC INTEGRITY AND STANDARDS & ANALYTIC OMBUDSMAN
WASHINGTON, DC 20511

Welcome!

In the Intelligence Community (IC) today, a vigorous debate has been joined over the best approaches for reforming the craft of analysis. Analysts at all 16 agencies are experimenting with new techniques, adopting innovative tools, and acquiring fresh insights. They have a unique opportunity to examine and select analytic practices. How should the IC choose among existing approaches and develop even better ones? The “evidence-based” movement, which is sweeping other fields such as management, medicine, and education, provides a deceptively simple answer: Acquire the best evidence about which practices are effective and in which conditions, and adopt those practices. In short: Find out what works and use it.

The simplicity of this injunction is deceptive because even medicine, a pioneer in collecting rigorous evidence on the efficacy of its practices, often fails to use the best research. As Jeffrey Pfeffer and Robert Sutton point out in a recent article in *Harvard Business Review*, most physicians’ decisions are not evidence-based. “For the most part, here’s what doctors rely on instead: obsolete knowledge gained in school, long-standing but never proven traditions, patterns gleaned from experience, the methods they believe in and are most skilled in applying, and information from hordes of vendors with products and services to sell.”

If doctors behave in this way, we cannot assume that the IC is immune. Moreover, far less is known about the effectiveness of analytic methods than medical procedures. This conference will discuss how analytic practices can become evidence-based: how to tell which are effective, how to develop even better practices, and what we can learn from other fields. The Office of Analytic Integrity and Standards (AIS) has assembled a notable group of outside experts as well as a dynamic and influential assortment of IC officials who will strive to answer these questions. We hope that you, the audience, will join the discussion with an open yet skeptical mind—challenging the proposals and reminding speakers of distinctive features of the analytic environment.

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This is the first in what I anticipate will become an annual series of AIS-sponsored conferences, but the exploration of these novel ideas will not be limited to a single forum. AIS launched a workshop series in September 2006 through which analysts have examined topics such as aggregating diverse judgments, overcoming groupthink, and expressing analytic uncertainty. This series of meetings will continue in 2007.

Finally, as you know, AIS exists because Congressional legislation (the Intelligence Reform and Terrorism Prevention Act of 2004) mandates that the Office of the Director of National Intelligence seek best practices and utilize lessons learned from analytic work in the IC. AIS's central task has been to develop and adopt a series of Analytic Standards to guide analysts throughout the community. These standards informed our work in organizing this meeting. I wish to share the standards with you as you begin exploring how to improve the analytic process.

Sincerely,
Nancy Bernkopf Tucker
Assistant Deputy Director of National Intelligence for
Analytic Integrity and Standards & Analytic Ombudsman

Intelligence Community Analytic Standards

- | | |
|---|---|
| A. Objectivity | intelligence and analysts' assumptions and judgments |
| B. Independent of Political Considerations | |
| C. Timeliness | 4. Incorporates alternative analysis where appropriate |
| D. Based on All Available Sources of Intelligence | 5. Demonstrates relevance to US national security |
| E. Exhibits Proper Standards of Analytic Tradecraft | 6. Uses logical argumentation |
| Specifically: | 7. Exhibits consistency of analysis over time, or highlights changes and explains rationale |
| 1. Properly describes quality and reliability of underlying sources | 8. Makes accurate judgments and assessments (Evaluated retrospectively when and if data permit) |
| 2. Properly caveats and expresses uncertainties or confidence in analytic judgments | |
| 3. Properly distinguishes between underlying | |

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Tuesday, 9 January 2007

8:00 Registration and Coffee

9:00 Welcome

*Nancy Bernkopf Tucker, ADDNI for Analytic Integrity and Standards and Analytic Ombudsman;
Thomas Fingar, Deputy Director of National Intelligence for Analysis*

9:15 How Other Fields Are Becoming Evidence-Based: Lessons from Business, Law, and Sports

*Chair: Nancy Bernkopf Tucker, Office of the Director of National Intelligence (ODNI)
Speakers: Cass Sunstein, University of Chicago Law School; Suzanne Nora Johnson, Goldman Sachs*

10:30 Break

11:00 A Perspective on the Psychology of Judgment

*Chair: Kyle Rector, ODNI
Speaker: Daniel Kahneman, Princeton University
Commentator: David Gordon, National Intelligence Council*

12:00 Lunch

1:30 Good Judgment in Intelligence Analysis

*Chair: Scott McCall, ODNI
Speaker: Philip Tetlock, University of California, Berkeley, Haas School of Business
Commentator: Robert Levine, Central Intelligence Agency (CIA)*

For the duration of the conference, the Princeton Room will serve as a lounge area for attendees to relax when not otherwise engaged.

2:30 Concurrent Sessions

What We Have Learned About Communicating Risk (Yorktown Room)

*Chair: Clark S., CIA
Speakers: Baruch Fischhoff, Carnegie-Mellon University; David Mandel, Defense Research and Development Canada
Commentator: Ronald Rice, Office of Naval Intelligence*

Effective Techniques for Generating Ideas and Thinking About Risk (Lexington/Concord Room)

*Chair: Glen Simpers, ODNI
Speakers: Elke Weber, Columbia University; Paul Paulus, University of Texas, Arlington
Commentator: Leonard Reinsfelder, National Security Agency (NSA)*

Promising New Analytic Methods

(Freedom Auditorium)

*Chair: James Marchio, ODNI
Speakers: Richards Heuer, Jr.; Pedro A., CIA; and Mark B., CIA
Commentator: Mark Lowenthal, Intelligence & Security Academy*

3:45 Break

4:15 How Education and Social Policy Are Transforming Practices: Lessons for Intelligence Analysis

*Chair: Rebecca Strode, ODNI
Speaker: Jonathan Baron, Coalition for Evidence-Based Policy
Commentator: Robert Walpole, National Counterproliferation Center*

5:15 Day One Adjourns

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Wednesday, 10 January 2007

8:00 Registration and Coffee

9:00 What Intelligence Analysts Can Learn from Medical Decision Making

Chair: *Jeffrey Stillman, ODNI*

Speaker: *Hal Arkes, Ohio State University*

Commentator: *Carmen Medina, CIA*

10:00 Break

10:15 Panel: Overcoming Organizational Impediments to New Ways of Doing Analysis

Chair: *Roy Wiese, National Counterterrorism Center*

Speakers: *Amy Zegart, University of California, Los Angeles; Jennifer Sims, Georgetown University; Richard Betts, Columbia University*

Commentator: *Robert Cardillo, Defense Intelligence Agency (DIA)*

11:30 Lunch

1:00 Ambassador John D. Negroponte, Director of National Intelligence

1:30 Concurrent Sessions

What We Know About How Analysts Think

(Yorktown Room)

Chair: *Deborah Maklowski, NSA*

Speakers: *Gary Klein, Applied Research Associates, Inc.; Barbara Spellman, University of Virginia*

Commentator: *Eric Benn, National Geospatial-Intelligence Agency*

Managing Uncertainty in Intelligence Analysis

(Freedom Auditorium)

Chair: *Susan Ginsberg, ODNI*

Speakers: *Thomas Wallsten, University of Maryland; Hal G., CIA*

Commentator: *Anthony Olcott, DNI Open Source Center*

Lessons from Introducing New Methods to Analysts

(Lexington/Concord Room)

Chair: *Betsy Witt, National Air and Space Intelligence Center (NASIC)*

Speakers: *Jay Hillmer, DIA; Sean N., CIA; David Armitage, Department of State, Bureau of Intelligence & Research*

2:45 Break

3:15 Future Directions: How Can We Determine Which Analytic Practices Work? Can Analytic Practices Become Evidence-Based?

Chair: *Jane Homeyer, ODNI*

Speakers: *Paul Lehner, MITRE Corporation; Steven Rieber, ODNI; Elisabeth Paté-Cornell, Stanford University*

Commentator: *Matthew Levitt, Department of the Treasury*

4:45 Conference Adjourns

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Ambassador John D. Negroponte—Director of National Intelligence

Ambassador John D. Negroponte was sworn in as the first Director of National Intelligence (DNI) on April 21, 2005. Previously, he had been serving as United States Ambassador to Iraq since June 28, 2004. From September 18, 2001, until his appointment to Iraq, Ambassador Negroponte served as the United States Permanent Representative to the United Nations.

From 1997 to 2001, Ambassador Negroponte was employed in the private sector as Executive Vice President for Global Markets of The McGraw-Hill Companies in New York.

From 1960 to 1997, Ambassador Negroponte was a member of the Career Foreign Service. He served at eight different Foreign Service posts in Asia, Europe, and Latin America; and he also held important positions at the State Department and the White House.

Among his assignments, Ambassador Negroponte was Ambassador to Honduras (1981–1985); Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs (1985–1987); Deputy Assistant to the President for National Security Affairs (1987–1989); Ambassador to Mexico (1989–1993); and Ambassador to the Philippines (1993–1996).

Ambassador Negroponte is a Member of the Council on Foreign Relations and the American Academy of Diplomacy. He is a former Chairman of the French-American Foundation. He received his Bachelor of Arts from Yale University in 1960.

Nancy Bernkopf Tucker—ADDNI for Analytic Integrity and Standards and Analytic Ombudsman

Dr. Tucker became Assistant Deputy Director of National Intelligence for Analytic Integrity and Standards and Analytic

Ombudsman on January 17, 2006, taking this post as a temporary assignment while on leave from a tenured position as Professor of History at Georgetown University and at the Georgetown School of Foreign Service. She is an American diplomatic historian specializing in American-East Asian relations, particularly US relations with China, Taiwan, and Hong Kong.

She previously served in the Office of Chinese Affairs in the Department of State and at the US Embassy in Beijing and taught at Colgate University and New York University. She has been a fellow at the Institute for Advanced Study in Princeton, the Woodrow Wilson International Center for Scholars, the United States Institute of Peace, Harvard University, and the Chinese Academy of Social Sciences as well as a Council on Foreign Relations International Affairs Fellow.

Her book, *Strait Talk: US-Taiwan Relations and the Crisis with China*, will be published in 2007. Her edited volume on contemporary problems in US-Taiwan-China relations and Taiwan affairs, *Dangerous Straits*, came out in 2005. She is the author of *Uncertain Friendships: Taiwan, Hong Kong and the United States, 1945–1992*, winner of a 1996 Bernath Book Prize of the Society for Historians of American Foreign Relations, and *Patterns in the Dust*. She also coedited *Lyndon Johnson Confronts the World* and edited and annotated *China Confidential*. Her essays have appeared in various edited books and journals including *Foreign Affairs*, *Survival*, *Political Science Quarterly*, *Journal of American History*, *American Historical Review*, *Diplomatic History*, and *The Washington Quarterly*.

Thomas Fingar—Chairman, National Intelligence Council

Dr. Fingar was Assistant Secretary of the State Department's

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Bureau of Intelligence and Research (INR) from July 2004 until May 2005 when he was named Deputy Director of National Intelligence for Analysis and Chairman, National Intelligence Council. While at the State Department he served as Acting Assistant Secretary for Intelligence and Research (2003–2004 and 2000–2001), Principal Deputy Assistant Secretary (2001–2003), Deputy Assistant Secretary for Analysis (1994–2000), Director of the Office of Analysis for East Asia and the Pacific (1989–1994), and Chief of the China Division (1986–1989).

His intelligence career began in 1970 as the senior German linguist in the Office of the Deputy Chief of Staff for Intelligence, USAREUR and 7th Army in Heidelberg, Germany. Between 1975 and 1986 he held a number of positions at Stanford University, including Senior Research Associate in the Center for International Security and Arms Control, and Director of the University's US-China Relations Program. Other previous positions include assignment to the National Academy of Sciences as Co-Director of the US-China Education Clearinghouse, adviser to the Congressional Office of Technology Assessment, and consultant to numerous US Government agencies and private sector organizations.

Dr. Fingar is a graduate of Cornell University (B.A. in Government and History, 1968), and Stanford University (M.A., 1969 and Ph.D., 1977, both in Political Science). He is a career member of the Senior Executive Service. His principal foreign languages are Chinese and German. Dr. Fingar has published dozens of books and articles, mostly on aspects of Chinese politics and policymaking.

Hal R. Arkes—

Currently, he is a Professor of Psychology, Professor of Health Services, Management and Policy, and a Senior Scholar in the

Center for Health Outcomes, Policy, and Evaluation Studies, all at Ohio State University. He previously was a faculty member at Ohio University, and he served for four years as a program officer in the Program in Decision, Risk, and Management Science at the National Science Foundation. He also served as the President of the Society for Judgment and Decision Making in 1996–1997. He received his bachelor's degree from Carleton College and his master's and doctorates in psychology from the University of Michigan. His research interests are in the areas of economic and medical decision making.

Jon Baron—

Founder of the nonprofit, nonpartisan Coalition for Evidence-Based Policy in fall 2001, he currently serves as its Executive Director. The Coalition is sponsored by the Council for Excellence in Government. Since its founding, the Coalition has built a strong track record of success in working with top Executive Branch and Congressional policymakers to advance evidence-based reforms in major US social programs. A recent independent evaluation of the Coalition's work, conducted for the William T. Grant Foundation, found that the Coalition has been "instrumental in transforming a theoretical advocacy of evidence-based policy among certain (federal) agencies into an operational reality."

Based on this work, Mr. Baron was nominated by the President, and confirmed by the Senate in 2004, to serve on the National Board for Education Sciences, which helps set the research priorities and agenda for the US Education Department's Institute of Education Sciences. Prior to establishing the Coalition, Mr. Baron served as the Executive Director of the Presidential Commission on Offsets in International Trade (2000–2001); Program Manager for the Defense Department's Small Business Innovation Research (SBIR) program

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(1995–2000); and Counsel to the House of Representatives’ Committee on Small Business (1989–1994). Mr. Baron holds a law degree from Yale Law School, a master’s degree in public affairs from Princeton University, and a bachelor’s degree from Rice University.

Eric R. Benn—

The Technical Executive of NGA’s Analysis and Production Directorate, Eric Benn serves as the principal advisor to NGA, IC and DoD leadership on the current and future Geospatial Intelligence analytic environment.

Mr. Benn works with organizations that are developing the tools, architectures, and data sources required to meet current and evolving operational needs. He also works with those who frame and invest in the after-next capabilities that will be required to responsively adapt to evolving threats, leverage advances in our technical environment, and effectively employ radically different sources and methods.

Mr. Benn previously served as Research Director for NGA’s Imagery Analysis Office. He coordinated the long-term analytic focus of NGA’s imagery analytic divisions with the National Intelligence Council, the National Intelligence Analysis and Production Board, the national imagery collection requirements process, CIA, DIA, and other customer organizations.

Mr. Benn has been involved in imagery intelligence since joining the US Army in 1976. Following three years working tactical and theater imagery intelligence in Europe, he attended the University of Illinois and received a Masters Degree in Remote Sensing from the Geography Department. Upon graduation in 1983 he joined DIA as an imagery analyst. In 1991 he was promoted to Senior Analyst for DIA’s Office for Imagery Analysis. He attended the National War College at Ft. McNair in 1993-4 and received a Masters Degree in National Security Studies.

Richard K. Betts—

The Arnold A. Saltzman Professor of War and Peace Studies in the political science department, he serves as the Director of the Saltzman Institute of War and Peace Studies, and Director of the International Security Policy program in the School of International and Public Affairs at Columbia University. He was Director of National Security Studies at the Council on Foreign Relations for four years and is now an adjunct Senior Fellow there. Born in 1947, he received his B.A., M.A., and Ph.D. in government from Harvard University. He was a Senior Fellow at the Brookings Institution until 1990 and adjunct lecturer at the Johns Hopkins University’s Paul H. Nitze School of Advanced International Studies.

A former staff member of the original Senate Select Committee on Intelligence (the Church Committee), the National Security Council, and the Mondale Presidential Campaign, Mr. Betts has been an occasional consultant to the National Intelligence Council and Central Intelligence Agency, served for six years on the National Security Advisory Panel for the Director of Central Intelligence, and was a member of the National Commission on Terrorism (the Bremer Commission).

Mr. Betts’ writings have earned five prizes, including the Woodrow Wilson Award of the American Political Science Association for the best book in political science. His first book, *Soldiers, Statesmen, and Cold War Crises* (Harvard University Press, 1977), was issued in a second edition by Columbia University Press in 1991. He is the author of three books published by the Brookings Institution: *Surprise Attack* (1982), *Nuclear Blackmail and Nuclear Balance* (1987), and *Military Readiness* (1995); coauthor and editor of three other Brookings books: *The Irony of Vietnam* (1979), *Nonproliferation and U.S. Foreign Policy* (1980), and *Cruise Missiles: Technology, Strategy,*

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Politics (1981); editor of *Conflict After the Cold War*, revised edition (Longman, 2005); and coeditor of *Paradoxes of Strategic Intelligence* (Cass, 2003). Mr. Betts has published numerous articles on foreign policy, military strategy, intelligence, conventional forces, and other subjects in professional journals. He received the International Studies Association's ISSS Distinguished Scholar Award in 2005.

Baruch Fischhoff—

Dr. Fischhoff is Howard Heinz University Professor in the Department of Social and Decision Sciences and Department of Engineering and Public Policy at Carnegie-Mellon University, where he heads the Decision Sciences major. He holds a B.S. in mathematics and psychology from Wayne State University and an M.A. and Ph.D. in psychology from the Hebrew University of Jerusalem. He is a member of the Institute of Medicine of the National Academy of Sciences. He is a past president of the Society for Judgment and Decision Making and of the Society for Risk Analysis, and recipient of its Distinguished Achievement Award. He is a Fellow of the American Psychological Society and of the American Psychological Association and recipient of its Early Career Awards for Distinguished Scientific Contribution to Psychology and for Contributions to Psychology in the Public Interest. He is a member of the Department of Homeland Security's Science and Technology Advisory Committee; the Environmental Protection Agency Scientific Advisory Board, where he chairs the Homeland Security Advisory Committee; the World Federation of Scientists Permanent Monitoring Panel on Terrorism; and the National Intelligence Council Global Expertise Reserve Program. He was a founding member of the Eugene Commission on the Rights of Women. He has coauthored or edited four books, *Acceptable Risk* (1981), *A Two-State Solution in the Middle East: Prospects and*

Possibilities (1993), *Preference Elicitation* (1999), and *Risk Communication: The Mental Models Approach* (2001).

David Gordon—

Dr. Gordon was named Vice Chairman of the National Intelligence Council in June 2004. Previously, he served as Director of CIA's Office of Transnational Issues (OTI), an office that covers a broad array of critical national security issues, including global energy and economic security, corruption and illicit financial activity, foreign denial and deception programs, and societal and humanitarian conflicts.

Dr. Gordon joined CIA in May 1998, when he was appointed National Intelligence Officer for Economics and Global Issues on the NIC. He directed major analytic projects on country-level economic and financial crises, emerging infectious disease risks, global demographic trends, and the changing geopolitics of energy, as well as provided leadership for the NIC's seminal Global Trends 2015 report.

Prior to his earlier service on the NIC, Dr. Gordon was Senior Fellow and Director of the US Policy Program at the Overseas Development Council. He also served as a senior staff member on the International Relations Committee of the US House of Representatives and as the regional economic policy adviser for the US Agency for International Development.

In the 1980s, Dr. Gordon pursued an academic career with a joint appointment at the University of Michigan and Michigan State University. Currently, Dr. Gordon is an adjunct professor at the School of Foreign Service at Georgetown University. He has also taught at the College of William and Mary, Princeton University, and the University of Nairobi.

Dr. Gordon is a graduate of Bowdoin College and undertook graduate studies in both political science and economics at the University of Michigan, where he received his Ph.D. in 1981.

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Richards J. Heuer, Jr.—

A consultant to the Department of Defense Personnel Security Research Center in Monterey, California. Mr. Heuer is also now a consultant to the Central Intelligence Agency to help develop a Web-based version of his Analysis of Competing Hypotheses software and other tools for use in a virtual collaborative environment. Previously, he consulted with the Palo Alto Research Center on development of the current Analysis of Competing Hypotheses software program. Mr. Heuer has an M.A. in international relations from the University of Southern California and a B.A. in philosophy from Williams College. Mr. Heuer retired from the Central Intelligence Agency in 1979 after a long and successful career in the Directorate of Operations and the Directorate of Intelligence. Since leaving the agency, he has continued to serve the government for many years as an independent contractor working on ways to improve intelligence analysis and on research to improve the personnel security system. He is the author of *Psychology of Intelligence Analysis* and many journal articles dealing with intelligence analysis, deception, and counterintelligence.

Jay Hillmer—

Mr. Hillmer serves as the Defense Intelligence Agency's first officially designated Devil's Advocate. In that position, his primary task is to challenge key assumptions on important topics for the Agency. In addition, he reviews Agency performance on selected topics for the Director and acts as the Agency's analyst ombudsman. Mr. Hillmer is a critical thinking and tradecraft subject matter expert and teaches those subjects as an adjunct instructor to the Joint Military Intelligence Training Center.

Mr. Hillmer earned a Bachelor of Fine Arts degree in Theatre

from the Art Institute of Chicago, and a Master of Arts degree in Personnel Management and Supervision from Central Michigan University. He has also received professional training from the Defense Intelligence College, the State Department Language Institute, and the Joint Military Intelligence Training Center. Mr. Hillmer is a retired US Army officer in the Armor and Aviation Branches. He was introduced to intelligence serving as the youngest military attaché in the Defense attaché system in Zaire. His military education includes the US Army Armor, Field Artillery, Air Defense, and Infantry Advanced Courses, the US Army Command and General Staff College, the US Marine Corps Command and General Staff College, and the Armed Forces Staff College. Mr. Hillmer became the Senior Intelligence Officer for the DCI Underground Facility Analysis Center and led the substantive effort through OPERATION ENDURING FREEDOM and OPERATION IRAQI FREEDOM.

Mr. Hillmer's awards include the Purple Heart, Distinguished Flying Cross, Bronze Star with V device, Joint Meritorious Service Medal, Humanitarian Service Medal, and various campaign medals. He has received the DIA Award for Meritorious Civilian Service for his work in developing the Department of Defense Intelligence Production Program.

Suzanne Nora Johnson—

Mr. Johnson serves as vice chair of The Goldman Sachs Group, Inc. Also, as chair of the Global Markets Institute, she is responsible for the firm's Global Investment Research Division and she is a member of the firm's Management Committee. Previously she served as head of the firm's global healthcare business in the Investment Banking Division. Before joining the firm in 1985 and becoming a partner in 1992, Ms. Johnson was an attorney with Simpson, Thacher & Bartlett and worked as a law clerk on the US Court of Appeals.

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Ms. Johnson currently serves on the boards of the Brookings Institution, the Carnegie Institution of Washington, Children NOW, the Council for Excellence in Government, the Goldman Sachs Foundation, Markle Foundation, RAND Health, TechnoServe, the United Nations Advisors Group on Inclusive Financial Sectors, the United Nations Global Compact, the University of Southern California, and Women's World Banking.

She is on the Advisory Board of Councilors at Harvard Medical School and also is an advisory board member to the Initiative on Financial Security at the Aspen Institute. She served as Chair of the Visiting Committee for the Institute for Innovations at Southwestern Medical School at the University of Texas (2003, 2004) and as a member of the Visiting Committee at the Department of Embryology at the Carnegie Institution of Washington (2000, 2004) and Harvard Law School (2006).

Ms. Johnson earned her J.D. from Harvard Law School and her B.A. from the University of Southern California.

Daniel Kahneman—

Dr. Kahneman is Eugene Higgins Professor of Psychology and Professor of Public Affairs at Princeton University. During his extensive research career he has been involved in many fields of psychology, ranging from vision and attention to the study of juror behavior and the measurement of well-being. He is best known for his contributions to the psychology of judgment and decision making. This work earned him the Nobel Prize in Economics in 2002 and many other honors, including the 2006 Thomas Schelling Award given by the Kennedy School at Harvard “to an individual whose remarkable intellectual work has had a transformative impact on public policy.” He was instrumental in establishing the teaching of psychology as a

core discipline in the Woodrow Wilson School for Public and International Affairs at Princeton.

Gary Klein—

Dr. Klein serves as Chief Scientist of Klein Associates, a group he formed in 1978 to better understand how to improve decision making in individuals and teams. The Klein Associates Division (now part of Applied Research Associates, Inc.) has more than 50 employees working on projects for government and commercial clients. Dr. Klein is one of the founders of the field of naturalistic decision making. His work on recognition decision making has influenced the design of new systems and interfaces, and decision training programs. He has extended his work on decision making to describe problem detection, option generation, sense making, planning, and replanning. To perform research on decision making in field settings, Dr. Klein and his colleagues have developed new methods of cognitive task analysis.

Dr. Klein received his Ph.D. in experimental psychology from the University of Pittsburgh in 1969. He was an Assistant Professor of Psychology at Oakland University and worked as a research psychologist for the US Air Force. He has written more than 70 papers and has authored three books: *Sources of Power: How People Make Decisions* (1998); *The Power of Intuition* (2004); and *Working Minds: A Practitioner's Guide to Cognitive Task Analysis* (2006).

Paul E. Lehner—

Dr. Lehner is currently a Consulting Scientist in the MITRE Corporation Center for Integrated Intelligence Systems. His research and work are focused on supporting judgment and decision making across a broad spectrum of intelligence problems, including bio-surveillance, all-source analysis, technical data analysis, and counter-deception analysis.

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Previously within MITRE, Dr. Lehner was the Chief Engineer of the Center for Enterprise Modernization (1999–2001) and the Chief Scientist of the Information Systems and Technology Division (1996–1999). Before joining MITRE, Dr. Lehner was an Associate Professor of Systems Engineering at George Mason University (1987–1996) and the Technical Director of the Decision Systems group at PAR Technology Corporation (1982–1986). Dr. Lehner has a Ph.D. in mathematical psychology and master's degrees in both mathematics and psychology from the University of Michigan.

Matthew Levitt—

Dr. Levitt currently serves as the Deputy Assistant Secretary for Intelligence and Analysis at the US Department of the Treasury. Before joining the Treasury, Dr. Levitt served as director of terrorism studies and senior fellow at The Washington Institute and was an adjunct professor at the School of Advanced International Studies at Johns Hopkins University. Dr. Levitt has also served as an FBI analyst providing tactical and strategic analysis in support of counterterrorism operations. Dr. Levitt holds an M.A. and Ph.D. in law and diplomacy from Tufts University's Fletcher School of Law and Diplomacy and is the author of *HAMAS: Politics, Charity and Terrorism in the Service of Jihad* (Yale University Press).

Mark M. Lowenthal—

An internationally recognized expert on intelligence, Dr. Lowenthal is the President and CEO of the Intelligence and Security Academy, LLC, a national security education, training, and consulting company. Dr. Lowenthal served as the Assistant Director of Central Intelligence for Analysis and Production and also as the Vice Chairman for Evaluation on the National Intelligence Council (2002–2005). Prior to those duties, he

served as Counselor to the Director of Central Intelligence.

Dr. Lowenthal was the staff director of the House Permanent Select Committee on Intelligence for the 104th Congress (1995–1997), where he directed the committee's study on the future of the Intelligence Community, *IC21: The Intelligence Community in the 21st Century*. He has also served in the State Department's Bureau of Intelligence and Research, as both an office director and as a Deputy Assistant Secretary of State.

Dr. Lowenthal has written extensively on intelligence and national security issues, including five books and over 90 articles or studies. His most recent book, *Intelligence: From Secrets to Policy* (2005), has become the standard college and graduate school textbook on the subject.

Dr. Lowenthal received his B.A. from Brooklyn College and his Ph.D. in history from Harvard University. He is an Adjunct Professor at the School of International and Public Affairs, Columbia University. He is also the Executive Director of the International Association for Intelligence Education, a member of the Joint Military Intelligence College Foundation board, and a Chairman Emeritus of the Intelligence Committee for AFCEA.

In 2005, Dr. Lowenthal was awarded the National Intelligence Distinguished Service Medal, the Intelligence Community's highest award. In 2006, he received AFCEA's Distinguished Service Award for service to the Intelligence Community. In 1988, Dr. Lowenthal was the Grand Champion on *Jeopardy!*, the television quiz show.

David Mandel—

Dr. Mandel is a Defence Scientist in the Representation and Influence of Adversaries Section at the Toronto lab of Defence Research and Development Canada, an agency of the Canadian Department of National Defence. Dr. Mandel, an experimental psychologist, is also Adjunct Professor of Psychology at the

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University of Toronto. His research interests focus on aspects of human judgment and decision making. Dr. Mandel currently represents Canada on the NATO Technical Team HFM-140/RTG on Psychosocial, Organizational, and Cultural Aspects of Terrorism and is the Principal Investigator of a Technology Investment Fund Project on model development for estimative and warning intelligence for the Canadian Forces.

Carmen Medina—

Appointed Deputy Director for Intelligence, Directorate of Intelligence, on 4 January 2005, Ms. Medina is a member of the three-person executive team that leads the nation's preeminent group of all-source intelligence analysts.

Ms. Medina has served with the Central Intelligence Agency since 1978, holding positions of increasing responsibility to include Chief of the Strategic Assessments Group in the Office of Transnational Issues, Directorate of Intelligence. She has led analysts working on southern Africa and Central America, and helped design the Global Coverage Program and to innovate new production methods to support policymakers. In the early 1990s, she served overseas in the United Kingdom.

Ms. Medina graduated from Catholic University, *Summa Cum Laude* and Phi Beta Kappa, in the District of Columbia in 1977 with a B.A. in comparative government. She also pursued graduate studies at Georgetown's School of Foreign Service, but her coursework was interrupted by the offer of full-time employment at the Agency. She represents the Directorate of Intelligence on the Editorial Board of Studies of Intelligence.

Ms. Medina has received more than a dozen exceptional performance awards over her career and has been recognized three times for her significant contributions to the literature of intelligence. Most recently she received a DCI Galileo honorable mention for her paper exploring innovative ideas for US intelligence.

Paul B. Paulus—

The Dean of Science and Professor of Psychology at University of Texas at Arlington, Dr. Paulus has also served as Associate Dean of the College of Science and was Chair of the Department of Psychology for five years. He received his Ph.D. in social psychology from the University of Iowa and his undergraduate degree in psychology from Otterbein College.

His areas of specialization are social and environmental psychology. For 20 years he was involved in extensive field research on the impact of living environments on health and well-being. For more than 35 years he has also been involved in laboratory and field research on group influence and productivity. In the past 15 years he and his colleagues have examined ideational creativity, innovation, and decision making in groups.

Dr. Paulus has been a Visiting Scholar at the National Institute of Justice, the Uniformed Services University of the Health Sciences, University of Sydney, University of Pittsburgh, and Carnegie-Mellon University. He has served on review panels for the National Science Foundation and NASA. He has been an editorial consultant for more than 40 journals and is past editor of *Basic and Applied Social Psychology*. He has published eight books and more than 100 refereed papers and chapters. His latest book, *Group Creativity; Innovation through Collaboration*, was published by Oxford in 2003.

Steven Rieber—

Dr. Rieber works as an analytic methodologist in the Office of Analytic Integrity and Standards within the Office of the Director of National Intelligence. Prior to coming to ODNI, he served as Scholar-in-Residence at the Kent Center for Analytic Tradecraft. He recently coauthored an article in Studies in Intelligence, "Creation of a National Institute for Analytic

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Methods.” Before joining the Intelligence Community, Dr. Rieber was a philosophy professor at Georgia State University. He received his Ph.D. from Princeton University.

Jennifer Sims—

Currently a Visiting Professor in the Security Studies Program at Georgetown University’s Walsh School of Foreign Service, Dr. Sims also is a consultant on intelligence and homeland security for private corporations and the US Government. Prior to this, Dr. Sims served as Deputy Assistant Secretary of State for Intelligence Coordination (1994–1998) and Intelligence Advisor to the Under Secretary for Management and Coordinator for Intelligence Resources and Planning at the US Department of State (1998–2001). In the latter position, she helped coordinate the State Department budget and programs with other federal agencies involved in national security. Dr. Sims has also been a Professional Staff Member of the Senate Select Committee on Intelligence (1991–1994) and legislative assistant to Senator John Danforth on foreign and defense policy (1990–1993). In the academic domain, Dr. Sims was the US Coordinator of the multinational Nuclear History Program (1988–1990), taught as a Research Professor at Johns Hopkins University School of Advanced International Studies (2001–2003), and served as a research associate with both the L’Istituto per gli Studi di Politica Internazionale in Milan and the Institute for Strategic Studies in London. Dr. Sims received her M.A. in 1979 and her Ph.D. in 1986 from Johns Hopkins University’s School of Advanced International Studies. In 1998, Dr. Sims received the Intelligence Community’s highest civilian award, the National Distinguished Service Medal. Dr. Sims has published numerous articles on intelligence theory and reform. Her publications on defense technology and arms control include *Icarus Restrained: An Intellectual History of*

Nuclear Arms Control in the United States from 1945 to 1960, (1985), and “The American Approach to Nuclear Arms Control: A Retrospective” *Daedalus* (Winter, 1991). Current research interests include intelligence support to counterterrorism, counterproliferation, and homeland security; the application of advanced technologies to intelligence missions; Civil War intelligence; and intelligence theory.

Barbara A. Spellman—

Associate Professor of Psychology at the University of Virginia, Dr. Spellman has a J.D. (1982) from New York University School of Law and a Ph.D. (1993) in cognitive psychology from the University of California–Los Angeles. Her basic research focuses on higher order cognition, in particular on various types of reasoning (e.g., causal, counterfactual, inductive, and analogical) that “make people smart.” Her research has increasingly found applications in social psychology and the legal system. She currently has a grant from the Intelligence Technology Innovation Center Analyst of the Future Advanced Research Program. The purpose of the grant is to design ways to study and improve intelligence analysis; the initial research has concentrated on how people evaluate information when it comes from sources that may be deceptive, unreliable, or questionable. She has presented her findings at the Sherman Kent School and at Central Intelligence Agency Headquarters.

Cass R. Sunstein—

The Karl N. Llewellyn Distinguished Service Professor of Law at the University of Chicago Law School and Department of Political Science, Mr. Sunstein is now serving as the John H. Watson, Jr. Visiting Professor of Law at Harvard Law School. His publications include *Worst-Case Scenarios* (forthcoming 2007), *Infotopia: How Many Minds Produce Knowledge*

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(2006), *Laws of Fear* (2006), and *Why Societies Need Dissent* (2003). A former law clerk to Supreme Court Justice Thurgood Marshall and an attorney-advisor in the Department of Justice, he has testified before many congressional committees and advised executive branch officials on numerous topics, including separation of powers, free speech, and regulatory policy.

Philip E. Tetlock—

Dr. Tetlock received his Ph.D from Yale University in 1979 and has served on the faculty at the University of California, Berkeley as well as at The Ohio State University, the Center for Advanced Study in the Behavioral Sciences at Stanford University, and the Russell Sage foundation in New York City (where he is currently on sabbatical). He is currently the Mitchell Professor in the Haas School of Business at the University of California Berkeley, with cross affiliations to psychology and political science. He has received numerous awards from professional and scientific organizations, including the American Psychological Association, the American Political Science Association, the American Association for the Advancement of Science, the International Society of Political Psychology, and the National Academy of Sciences. He has published more than 150 articles in peer-refereed journals and edited or written 9 books. He has special research interests in the following topics: (1) problems and paradoxes in how people think about possible pasts (counterfactual reasoning) and possible futures (conditional forecasts); (2) common errors and biases in human judgment and the design of institutions and incentives to check these errors and biases. His most recent books are: *Expert Political Judgment: How Good is it? How Can We know?* (2005) and *Unmaking the West: What-if Scenarios That Rewrite World History* (2006).

Thomas S. Wallsten—

Dr. Wallsten is a professor in the Department of Psychology and in the Program in Cognitive Science and Neuroscience at the University of Maryland—College Park. He received his Ph.D. from the University of Pennsylvania in 1969, did a postdoctoral fellowship at the University of Michigan in 1970, and then joined the faculty at the University of North Carolina—Chapel Hill. He was professor of psychology and director of the Cognitive Science Program when he left UNC-CH in 2000 for the University of Maryland. Over the past 35 years, his research support has come primarily from National Science Foundation (NSF) grants with additional support from other agencies including the Department of Defense. Among his advisory roles, he was editor of the *Journal of Mathematical Psychology*, associate editor of *Psychometrika* and of the *Journal of Experimental Psychology: Learning, Memory, and Cognition*, and on numerous editorial boards. He served in various advisory roles for NSF, including on the review panel for the Methodology, Measurement, and Statistics Program, as a member of the Committee of Visitors for two different directorates, that for Social, Behavioral, and Economic Sciences and that for the Behavioral and Cognitive Sciences.

Elke U. Weber—

The Jerome A. Chazen Professor of International Business in the Management Division of Columbia Business School, Dr. Weber is also Professor of Psychology at Columbia University. Her M.A. and Ph.D. (1984) are from Harvard University. She has held academic positions in the United States and Europe. She has been a fellow at the Center for Advanced Studies in the Behavioral Sciences at Stanford (1992/93) and at the Wissenschaftskolleg (Center for Advanced Study) in Berlin

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(2002). Her expertise are behavioral models of judgment and decision making under risk and uncertainty, with a focus on the cognitive and affective underpinnings of preference construction and on psychologically appropriate ways to measure and model individual and cultural differences in risk taking, specifically in risky financial situations and environmental decision making and policy. Dr. Weber is past president of the Society for Mathematical Psychology and the Society for Judgment and Decision Making. She has edited three major decision journals and serves on the editorial boards of six other journals, including *Psychological Review* and *Psychological Science*. She has served on several committees of the National Academy of Sciences related to human dimensions in global change and the communication of probabilistic weather and climate information. At Columbia, she founded and codirects the Center for the Decision Sciences and the Center for Research on Environmental Decisions.

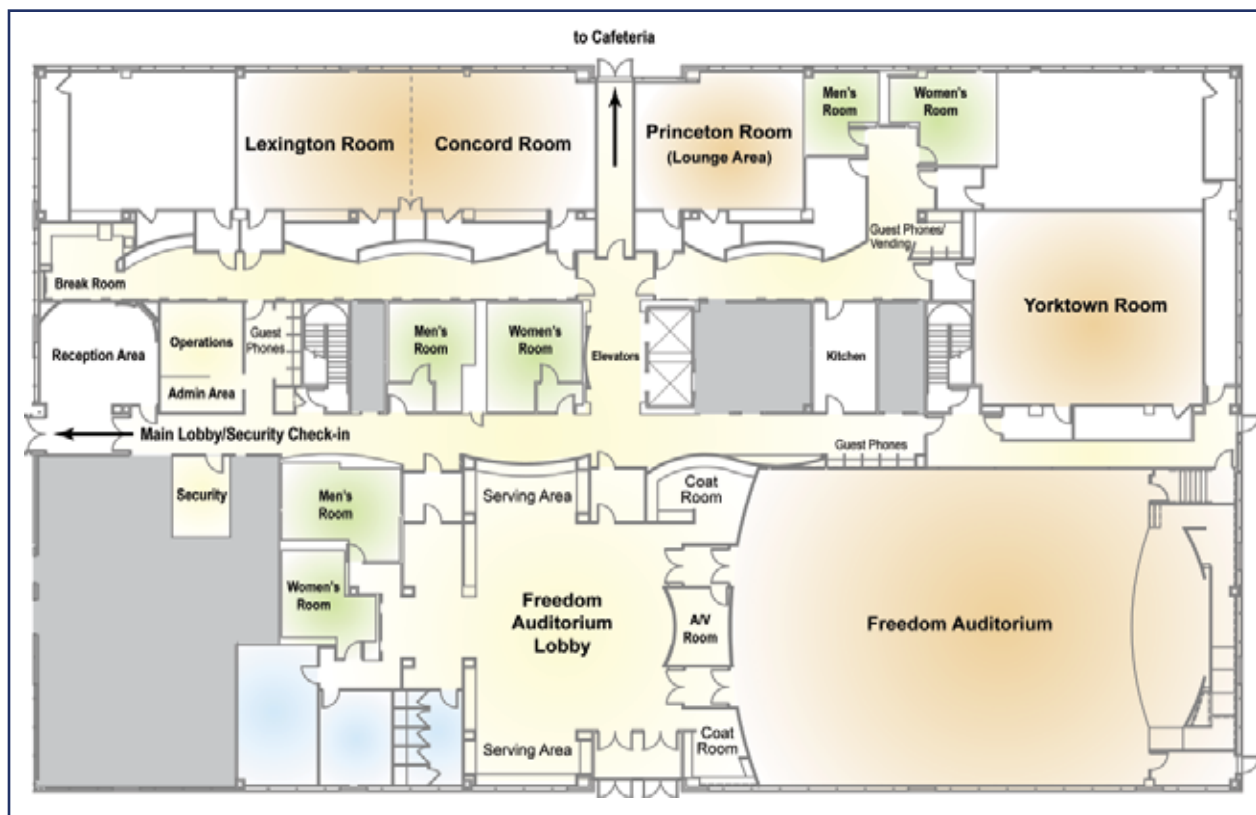
Amy Zegart—

An Associate Professor at UCLA's School of Public Affairs, Dr. Zegart served on the Clinton Administration's National Security Council staff in 1993, as a foreign policy advisor to the Bush-Cheney 2000 presidential campaign, and has been featured by *The National Journal* as one of the leading experts on intelligence reform.

Her research examines the design problems of US national security agencies. Her first book, *Flawed by Design: the Evolution of the CIA, JCS and NSC* (1999), won the highest national dissertation award in political science. Her second book, *Failure and Consequence: Understanding U.S. Intelligence and the Origins of 9/11*, analyzes why the CIA and FBI adapted poorly to the rise of terrorism after the Cold War and will be published by Princeton University Press in 2007.

Before pursuing an academic career, Dr. Zegart spent three years at McKinsey & Company, where she advised senior management in Fortune 100 companies about strategy and organizational effectiveness. A former Fulbright Scholar, she received an A.B. in East Asian studies from Harvard and a Ph.D. in political science from Stanford University, where she studied under Condoleezza Rice.

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