

PUBLIC POLICY
AND
NUCLEAR THREATS

TRAINING THE NEXT GENERATION

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About the Speakers

Marvin L. Adams is the HTRI Professor of Nuclear Engineering and the director of the Institute for National Security Education and Research at Texas A&M University. His research areas include computational transport theory, massively parallel coupled-physics calculations, predictive science and engineering, and nuclear reactor analysis. Adams is a Fellow of the American Nuclear Society. Adams spent five and one-half years in the weapons program at Lawrence Livermore before joining the faculty at Texas A&M in 1992. He has remained involved in the weapons program in various roles. He has been a consultant for the Sandia, Los Alamos, and Lawrence Livermore National Laboratories for many years. He has served on numerous advisory and review committees related to the U.S. nuclear weapons programs and currently chairs the Weapons Science Capability Review Committee at Los Alamos National Laboratory. He received his Ph.D. and M.S.E. in nuclear engineering from the University of Michigan and his B.S. in nuclear engineering from Mississippi State University.

George Anzelon is a physicist in the Lawrence Livermore National Laboratory's Global Security Directorate, where he is acting program leader for nonproliferation, international security, and safeguards. After receiving his Ph.D. in nuclear physics and spending four years as an Air Force Officer with the Air Force Technical Applications Center, Anzelon joined LLNL in 1977 to work on methods for detecting hidden nuclear weapons and weapons fissile materials. Since 1982, he has worked on technical and policy studies on nuclear proliferation, illicit nuclear trafficking, and international safeguards in various capacities from analyst to Associate Division Leader. During 2000–2002, Anzelon worked as a safeguards analyst at IAEA Headquarters in Vienna. He participated in the first nuclear inspections in Iraq after the 1991–1992 Gulf War, verified elimination of Libya's former undeclared nuclear program during 2004, and nuclear disablement monitoring in North Korea during 2008–2009.

Kyle Beardsley is an assistant professor of political science at Emory University. He received his Ph.D. from the University of California, San Diego in 2006 and undergraduate degrees from the University of Maryland in 2001. Dr. Beardsley's research, which has appeared in over a dozen academic journal articles, focuses on the quantitative study of international conflict resolution and nuclear proliferation.

Tom Black is director of the Office of National Technical Nuclear Forensics, where he manages two first responder programs responsible for executing NNSA's mission for nuclear forensics. The disposition program is responsible for disassembling interdicted nuclear devices (INDs) and gathering forensics data, while the post-detonation program supports the collection, analysis, and evaluation of debris following a post detonation event. Black has implemented multiple improvements in operational readiness, technology, and capability improvements since receiving initial funding in 2008. Milestones include the successful execution of end-to-end exercises "Oak Phoenix" and "Marble Challenge 09-02" for the post-detonation and disposition programs respectively.

Black served on the USS Atlanta (SSN-712) from May 1985 to October 1988. He was then assigned to the Naval Operations Intelligence Center from October 1988 to December 1990 where he served as an analyst on an Indications and Warning watch. In December 1990, he resigned his commission in the USN.

Black accepted a position at the Department of Energy within the Office of Defense Programs in 1991 and provided technical leadership and support in the area of emergency management and response for Headquarters and field operations. He provided support to all Defense Programs' offices in the area of emergency management, and was responsible for reviewing emergency preparedness planning and program implementation at Defense Programs' sites and facilities, and for the development and implementation of the Headquarters Defense Programs emergency planning activities.

From 1996 to 2003, Black was assigned to the Office of Emergency Response and provided technical leadership and direction in the development and implementation of short-term and long-range radiological emergency response program plans and strategies, technical integration, procurement of equipment, and organization and training of response teams.

In March 2003 Black became the director of the Office of National Nuclear Security Administration (NNSA) Emergency Management Implementation, responsible for implementing and coordination emergency management policy, preparedness, and response activities affecting NNSA sites and facilities.

Black received a B.S. in mechanical engineering from Texas A&M University in May 1983. While still at Texas A&M, he joined the United States Navy (USN) through the Nuclear Power Officer Candidate Program. Following graduation, he attended Officer Candidate School in Newport, Rhode Island, and received his commission in the USN. In May 1985, he completed Naval Nuclear Propulsion training and the Submarine Officer Basic Course.

Brian Boyer is the Nonproliferation Analysis Team Leader and Project Leader, International Safeguards in the N-4 Group, Safety and Security Systems, of the Nuclear Nonproliferation Division at Los Alamos National Laboratory in Los Alamos, NM.

Boyer has been employed at Los Alamos National Laboratory since 2006 working in the field of nuclear nonproliferation and safeguards specializing in training and education in nuclear safeguards, in the eval-

uation of design and analysis of nuclear safeguards concepts and in creating safeguards approaches for various nuclear facilities including gas centrifuge enrichment plants, light water reactors, uranium conversion plants, and plutonium reprocessing facilities. From 2002 to 2006 he worked at Brookhaven National Laboratory as a nonproliferation and safeguards specialist helping to create a safeguards approach with the International Atomic Energy Agency (IAEA) for the Chernobyl Shelter and building a course for the IAEA at Brookhaven to train IAEA inspectors in the mechanics of doing complementary access activities for the Additional Protocol to the Nuclear Nonproliferation Treaty among other tasks in safeguards. He worked from 1997 to 2002 at the IAEA as a Nuclear Safeguards Inspector doing inspections in the European Union, former Eastern Bloc States, and the Former Soviet Union and as a Nuclear Safeguards Analyst in the Section for System Studies.

Boyer is a member of the American Nuclear Society and served as President and Vice-President of the Long Island American Nuclear Society Chapter. He is also a Senior Member of the Institute of Nuclear Material Management (INMM) serving as Communications Subcommittee Chairman for Publications and is a member of the Executive Committee of the Southwest Chapter of the INMM serving as a Member-at-Large.

Ambassador Linton Brooks is an independent consultant on national security issues, a senior advisor at the Center for Strategic and International Studies, a Distinguished Research Fellow at the National Defense University, and an advisor to two of the Department of Energy weapons laboratories. He served from July 2002 to January 2007 as administrator of the U.S. Department of Energy's National Nuclear Security Administration, where he was responsible for the U.S. nuclear weapons program and for the Department of Energy's international nuclear nonproliferation programs.

Ambassador Brooks has five decades of experience in national security, much of it associated with nuclear weapons. His government service includes service as deputy administrator for nuclear nonproliferation at the National Nuclear Security Administration, assistant director of the United States Arms Control and Disarmament Agency, chief U.S. negotiator for the Strategic Arms Reduction Treaty, director of defense programs and arms control on the National Security Council staff and a number of Navy and Defense Department assignments as a 30-year career naval officer.

Ambassador Brooks holds degrees in physics from Duke University and in government and politics from the University of Maryland and is a distinguished graduate of the U.S. Naval War College. For the past three years, he has served as an expert in residence for the Public Policy and Nuclear Threats program.

Robert L. Brown is assistant professor of political science at Temple University, where he will teach courses on international relations theory and international security. He received his Ph.D. in political science from UC San Diego in June 2008 after completing his dissertation on why countries use international organizations to cooperate on nuclear and chemical weapons but not for biological weapons. His research interests more broadly include international relations theory, international organizations, international security issues, nuclear deterrence, and sovereignty issues. He has an M.A. in international affairs from the George Washington University's Elliott School, where his studies focused on security

regimes in Northeast and Southeast Asia, and a B.A. in political science with a minor in Japanese studies from the University of California, where his studies focused on Northeast Asian political economy and development. He has also interned at the Center for Strategic and International Studies (CSIS) in Washington, D.C., and worked previously at The Nautilus Institute on nuclear and Northeast Asian security issues.

Dr. Kory Budlong-Sylvester has worked at Los Alamos National Laboratory since 1998. He is presently the Nonproliferation and International Security Program Manager in the Global Security Directorate. Sylvester is responsible for LANL programs in the areas of nuclear nonproliferation and arms control, including international safeguards, treaty verification, export controls and global security engagement. He has served as a senior Technical advisor to the Office of International Regimes & Agreements at the U.S. National Nuclear Security Administration, focusing on the Next Generation Safeguards Initiative. As a fellow on the Senate Appropriations Committee, he spent a year working on nuclear nonproliferation and energy issues. Sylvester also spent a year on the staff of the Prevention of Nuclear and Biological Attack Subcommittee of the House Committee on Homeland Security. He received his Ph.D. in nuclear engineering from the Massachusetts Institute of Technology in 1997.

Susan Burk was sworn in as the Special Representative of the President, with the rank of Ambassador on June 8, 2009. She is responsible for working with other States to strengthen the Nuclear Non-Proliferation Treaty (NPT) and the international nonproliferation regime. Ambassador Burk plays a lead role in preparing for the NPT Review Conference, and through international diplomacy promoting the United States' goal of renewing and reinvigorating the NPT and the global regime.

Burk served as the first Deputy Coordinator for Homeland Security in the State Department's Office of the Coordinator for Counterterrorism. She coordinated the Department's handling of cross-cutting policy issues related to homeland security and counterterrorism. She established and chaired the State Department's Homeland Security Coordinating Committee, and her office served as a point of contact for the Department of Homeland Security and other Federal agencies.

Prior to this assignment, Burk served as Acting Assistant Secretary of State for Nonproliferation where she led the Bureau's efforts to support the Proliferation Security Initiative, and served as chief U.S. negotiator for the Statement of Interdiction Principles. She joined the Bureau of Nonproliferation in June 2002 as the Principal Deputy Assistant Secretary for Nonproliferation Controls. A career civil servant, Mrs. Burk joined the Department of State in April 1999 as the Director of the Office of Regional Affairs.

Ambassador Burk also served in the U.S. Arms Control and Disarmament Agency (ACDA) as Chief of the International Nuclear Affairs Division. While in ACDA, she served as the Chief of the Non-Proliferation Treaty Extension Division leading U.S. preparations for the 1995 NPT Review and Extension Conference.

Burk also served as a staff officer in the Office of the Secretary of Defense. In the Theater Nuclear Forces Policy Division she supported U.S.-Soviet negotiations to reduce intermediate-range nuclear missiles.

She served in the Multilateral Negotiations Division and developed defense policy recommendations on multilateral arms control undertakings at the Geneva-based Conference on Disarmament and the United Nations First Committee.

Burk received her M.A. in government from Georgetown University. She has a B.A. in political science from Trinity College in Washington, D.C., where she was elected to Phi Beta Kappa.

Tai Ming Cheung is associate research scientist at the UC Institute on Global Conflict and Cooperation. He is in charge of the Institute's Minerva project "The Evolving Relationship Between Technology and National Security in China: Innovation, Defense Transformation, and China's Place in the Global Technology Order" and serves as an associate adjunct professor at the School of International Relations and Pacific Studies at UC San Diego. He is a long-time analyst of Chinese and East Asian defense and national security affairs. Cheung was based in Asia from the mid-1980s to 2002 covering political, economic and strategic developments in greater China. He was also a journalist and political and business risk consultant in northeast Asia.

Cheung manages IGCC's Northeast Asia Cooperation Dialogue (NEACD), a Track Two program that brings together senior foreign ministry and defense officials as well as academics from the United States, China, Japan, South Korea, North Korea, and Russia for informed discussions on regional security issues. He is also the program manager of "The Future of Multilateral Security Cooperation in Northeast Asia: Exploring Regional Security Architecture and the Economics-Security Nexus," a research project in collaboration with the University of Tokyo and Yonsei University funded by the John D. and Catherine T. MacArthur Foundation, and of "The Evolving Relationship Between Technology and National Security in China: Innovation, Defense Transformation, and China's Place in the Global Technology Order," a five-year research and training program examining China's efforts to become a world-class science and technology power is funded by the U.S. Department of Defense.

Cheung received his Ph.D. from the War Studies Department at King's College, London University in 2006. His latest book, *Fortifying China: The Struggle to Build a Modern Defense Economy*, was published by Cornell University Press in 2009. He is an associate adjunct professor at the School of International Relations and Pacific Studies (IR/PS) at UC San Diego, where he teaches courses on Asian security, Chinese security and technology, and Chinese politics.

William B. Daitch is a member of the Senior Executive Service in the Department of Homeland Security. He leads the National Technical Nuclear Forensics Center (NTNFC) in the Domestic Nuclear Detection Office in Washington, D.C. The NTNFC integrates the U.S. Government's nuclear forensics activities, and also develops the capability to perform forensics on nuclear materials. Bill graduated from the United States Naval Academy in 1983, completed nuclear power and submarine training, and served on nuclear missile submarines in a variety of assignments. He entered the Navy Reserve in 1990, served two tours as Commanding Officer of submarine support detachments, and is currently a Captain serving as the Navy Emergency Preparedness Liaison Officer for Naval District Washington as the focal point for "Defense Support of Civil Authorities" in disaster situations. As a federal civilian he served at the Defense

Threat Reduction Agency from 1990 to 2005 as Chief of the Nuclear/Radiological Support Branch and other nuclear-related assignments. In April 2005 he transferred from DoD to DHS upon the creation of the Domestic Nuclear Detection Office.

Elana DeLozier is an intelligence research specialist in the Counterterrorism Bureau of the New York City Police Department (NYPD). As a member of the Terrorism Threat Analysis Group (TTAG), she specializes in radiological and nuclear weapons and proliferation threats and analyzes terrorist tactics and trends in the Arabian Peninsula. She writes weekly reports on each of her specialties, which are distributed throughout the intelligence community, and routinely presents reports on global terrorism developments to law enforcement and private-sector audiences. She has engaged in senior-level discussions about radiological and nuclear threats, which have informed detection and interdiction operations in the City. She previously focused on biological and chemical threats and militant tactics in the East Asia/Pacific region for the NYPD.

DeLozier teaches graduate seminars on "Nuclear Proliferation and Terrorism" and "Governance in the Arabian Peninsula" at New York University. Formerly, she was a senior research assistant in the Foreign Policy Studies Program at the Brookings Institution. She is a summa cum laude graduate of Virginia Tech with an M.A. and a B.A. in political science, where she wrote a thesis on Saudi Arabian foreign policy and co-edited a customized reader entitled Nations & Nationalities (2004).

Massimiliano Fratoni is a postdoctoral staff member at the Lawrence Livermore National Laboratory where he is part of the neutronic design group of the LIFE (Laser Inertial Fusion-based Energy) system. His main research interests reside in the area of reactor design and nuclear fuel cycle, with particular focus on nuclear systems for efficient resource utilization and waste minimization. Fratoni received a Laurea in Nuclear Engineering from University of Rome "La Sapienza" (2004), and a M.Sc. (2007) and a Ph.D. (2008) from UC Berkeley.

Matthew Fuhrmann is a Council on Foreign Relations Nuclear Security Fellow. His research focuses on international security and nuclear proliferation. Much of his current work centers on the causes and consequences of the nuclear energy renaissance. Some of his other research examines topics such as nuclear weapons and coercive threats, military strikes against nuclear facilities, radiological/nuclear terrorism, and regional nuclear weapons free zones.

Dr. Fuhrmann is currently on leave from the University of South Carolina where he has been an assistant professor of political science since January 2009. He is also an Associate at the Project on Managing the Atom at the Harvard Kennedy School. From 2007 to 2008 he served as a research fellow at Harvard University's Belfer Center for Science and International Affairs. Dr. Fuhrmann was previously a research associate at the University of Georgia's Center for International Trade and Security. There he specialized in strategic trade controls and prepared reports for various U.S. government agencies on export control development in foreign countries.

His research has been published in some of the leading journals in the field including *International Security*, *Journal of Conflict Resolution*, *Journal of Peace Research*, *Conflict Management and Peace Science*, and *Foreign Policy Analysis*, among other journals.

Dr. Fuhrmann holds a PhD in political science from the University of Georgia and an MS in international affairs from Georgia Tech.

Matthew Gardner is an experimental nuclear physicist working on the AGEX II (plasma physics) program at the UK Atomic Weapons Establishment (AWE). In this role Gardner carries out experiments at the boundary of nuclear and plasma physics, using the world's most powerful lasers to induce nuclear reactions relevant to weapons physics.

Gardner's work is part of the UK effort to scientifically underwrite nuclear weapons performance in the CTBT era. Gardner also works on AWE's Orion project, and is responsible for design, delivery, testing and commissioning of diagnostic systems for use at the UK's newest high-powered laser facility.

Gardner was educated in the UK at the University of Birmingham where he completed a B.Sc. in biophysics and a Ph.D. in nuclear physics, in which he used lasers to study atomic perturbations to short-lived yttrium nuclei.

Erik Gartzke has held faculty positions at the Pennsylvania State University, Columbia University, and the University of California, San Diego (currently). He received his PhD in Political Science from the University of Iowa in 1997. A recent report by Thompson ISI ("Web of Science") ranked him among the twenty most prolific and widely cited scholars in conflict studies (out of a pool of 5,311 authors).

His work focuses on peace, war, and international institutions. He has written extensively on the liberal determinants of interstate peace, suggesting that the largely forgotten role of markets and economic development – a capitalist peace – is a more decisive factor than representative democracy in making regions less war-prone. A second theme involves the impact of international institutions on warfare and conflict avoidance. These findings develop a middle ground between the contrasting optimism and pessimism of traditional approaches. Certain kinds of intergovernmental organizations have demonstrable, theoretically supportable effects on conflict, though these effects are limited. A final theme focuses more directly on the theoretical causes of war. Published and ongoing research examines how bargains succeed or fail. Rather than relying on human nature, norms, culture, or material forces (power, incentives, constraints), bargaining theory emphasizes actors' beliefs about such factors. His research appears in the *American Political Science Review*, the *American Journal of Political Science*, *International Organization*, *International Studies Quarterly*, the *Journal of Conflict Resolution*, the *Journal of Politics*, *World Politics*, and elsewhere. Professor Gartzke is currently working on a book manuscript tentatively titled *The Futility of War: Capitalism, Democracy, and Peace*.

Patrick M. Grant earned B.S. and Ph.D. degrees in chemistry from the University of California. He worked in radiochemistry and nuclear medicine at Los Alamos National Laboratory for eight years, and

was an associate group leader for medical radioisotope research and production. He has been a staff member at Livermore National Laboratory since 1983, serving as the deputy director and special ops and samples manager of the Forensic Science Center.

In addition to numerous classified and law-enforcement reports, Grant has authored or co-authored more than 100 refereed publications in the open literature. He has served on three FBI scientific working groups focused on WMD counterterrorism, is a Fellow of the American Academy of Forensic Sciences, and a member of the editorial board of the Journal of Forensic Sciences. His most noteworthy recent accomplishments include co-authorship of the seminal text, Nuclear Forensic Analysis (CRC Press, 2005); reassessment and reinterpretation of the JFK assassination bullet evidence [J. Foren. Sci. 51: 717 (2006)]; and session organizer, chairman, and speaker at the international Global Initiative to Combat Nuclear Terrorism (Jerusalem, Israel 2010).

William Hagan is the Acting Director of the Domestic Nuclear Detection Office (DNDO), a position he has held since December 2009. Prior to this position, Dr. Hagan served as the Acting Deputy Director from January through December 2009. Dr. Hagan was initially appointed to the Senior Executive Service and joined DNDO in 2006 as the Assistant Director for Transformational Research and Development (R&D), where he was responsible for long-term R&D, seeking technologies that can make a significant or dramatic positive impact on the performance, cost, or operational burden of detection components and systems.

Prior to DNDO, Dr. Hagan had a long career with Science Applications International Corporation (SAIC), where he worked from 1977 through 2006. He served in many positions during his tenure with SAIC, culminating with a position as the Senior Vice President and Deputy Business Unit Manager for Operations of the Security and Transportation Technology Business Unit (STTBU). Specifically, STTBU focused on securing the supply chain by applying technologies such as neutron interrogation, gamma- and x-ray imaging, passive radiation detection, ultrasound, radio frequency resonance, and chemical agent detection using data fusion of ion mobility spectrometry and surface acoustic waves. The radiation portal monitors that are currently used to screen 99% of all cargo entering the country were built by STTBU, using technology from a company whose acquisition was led by Dr. Hagan in 2003.

Previous positions with SAIC included work as a senior scientist, operations manager, Group Manager of the Technology Development Group (TDG) of the SAIC's Commercial Business Sector, and Senior Vice President for Technology Commercialization and acting Chief Technical Officer for SAIC's Venture Capital Corporation.

Dr. Hagan earned a Bachelor of Science in Engineering Physics in 1974, Master of Science in Physics in 1975, and Master of Science in Nuclear Engineering in 1977 from the University of Illinois at Urbana. He received his Ph.D. in Physics from the University of California – San Diego in 1986. He holds three patents.

Elaine Jennings is a veteran member of California's Homeland Security team. She currently serves as the Director of Planning, Preparedness and Emerging Threats for the California Emergency Management Agency. Jennings now manages a wide variety of homeland security projects including the Large Stadium Initiative which works to protect special events and stadium venues and the development of CBRNE operational protocols. She now serves as the chair to the Statewide Preventive Radiological/Nuclear Detection Task Force and is the lead executive for on all RAD/NUC prevention and response for the State of California and manages the State's NPP program. Her current projects include working with the White House to develop a program on Executive Leadership and Communication following an IND incident.

Jennings received her bachelor's degree in political science with an emphasis in international relations from California State University, Northridge and attended the Graduate School of International Relations at the University of Denver to study national security and nuclear nonproliferation. She is currently a master's candidate in homeland security and defense at the Naval Post Graduate School in Monterey, California. Her research emphasis is on nuclear terrorism and post-detonation response.

Robert Kelley is a recently retired director of the IAEA. He is a nuclear engineer from the United States who has worked in the U.S. Department of Energy Complex for over 30 years. He has worked in nuclear nonproliferation efforts at Livermore and Los Alamos National Laboratories and was director of the Remote Sensing Laboratory in Las Vegas, Nevada.

Kelley has field experience as the chief inspector for IAEA in Iraq on several occasions, including four years inspecting Iraq's clandestine nuclear weapons program in the 1992 and 2002 time periods. He also participated in the evaluation of South Africa's nuclear weapons in 1993, and the inspections of the vestiges of Libya's nuclear weapons program in 2004. At IAEA headquarters he also served as a senior inspector for countries in South and Southeast Asia and Africa. He has carried out weapons inspections in Libya, Iraq, and South Africa, and normal inspections in Egypt, Turkey, South Korea, Taiwan, Syria, Tanzania, Pakistan, India, and DR Congo, among others.

Kelley's practical laboratory experience includes plutonium metallurgy, gas centrifuge design, weapons engineering, nuclear emergency response and remote sensing.

Retired Brigadier **Feroz Khan** is currently on the faculty in the Department of National Security Affairs in U.S. Naval Postgraduate School, Monterey California. He served with the Pakistani Army for 32 years. His last held the post of Director in the Strategic Plans Division, Joint Services Headquarters, which is the secretariat of Pakistan's Nuclear Command Authority. He held numerous diplomatic and scholarly assignments in his military career, served domestically and abroad in the United States, Europe, and South Asia.

Brig. Khan holds an M.A. in international relations from the Johns Hopkins University, Washington D.C. He has held a series of visiting fellowships in the United States at Stanford University; the Woodrow Wilson International Center for Scholars; the Brookings Institution. Since early 1990s, Brig Khan has been a key contributor in formulating and advocating Pakistan's security policy, nuclear diplomacy especially on

nuclear, conventional arms control and strategic stability issues. He represented Pakistan in several multilateral and bilateral arms control negotiations, has published and participated in security related conferences all over the world. Brig. Khan is currently writing a book on the history of Pakistan's nuclear weapons titled *Eating Grass: Pakistan and the Bomb* expected publication in Spring 2011.

Hans M. Kristensen is director of the Nuclear Information Project at the Federation of American Scientists in Washington, D.C., where he researches and writes about the status and operations of nuclear forces of the nine nuclear weapon states. Kristensen is co-author of the bi-monthly Nuclear Notebook column in the *Bulletin of the Atomic Scientists* and the World Nuclear Forces overview in the *SIPRI Yearbook*. Recent publications include *Obama and the Nuclear War Plan* (FAS, February 2010), *From Counterforce to Minimal Deterrence: A New Nuclear Policy on the Path Toward Eliminating Nuclear Weapons* (FAS/NRDC, April 2009), *Chinese Nuclear Forces and U.S. Nuclear War Planning* (FAS/NRDC, November 2006); and *U.S. Nuclear Weapons in Europe: A Review of Post-Cold War Policy, Force Levels, and War Planning* (NRDC, February 2005). Kristensen disclosed the withdrawal of U.S. nuclear weapons from Lakenheath airbase in United Kingdom and Ramstein airbase in Germany, obtained the first official confirmation of U.S. nuclear withdrawal from Greece, and discovered incorporation of preemptive nuclear strike scenarios into U.S. Joint Nuclear Doctrine. Prior to his current position, Kristensen was a consultant to the nuclear program at the Natural Resources Defense Council in Washington, D.C. (2003–2005), and program officer at the Nautilus Institute in Berkeley, California (1998–2002). Kristensen is a frequent advisor to the news media and institutes on the status of nuclear forces and policy.

Matthew Kroenig is an assistant professor in the Department of Government at Georgetown University and a research affiliate with The Project on Managing the Atom at Harvard University.

He is the author of *Exporting the Bomb: Technology Transfer and the Spread of Nuclear Weapons* (Cornell University Press, 2010) and co-author of *The Handbook of National Legislatures* (Cambridge University Press, 2009). His writings on international politics have appeared in such publications as *American Political Science Review*, *Democratization*, *Foreign Affairs*, *Foreign Policy*, *Journal of Conflict Resolution*, *Perspectives on Politics*, *Security Studies*, *The New Republic*, *USA Today*, and the *Washington Post*.

He has held fellowships from the Council on Foreign Relations, the National Science Foundation, the Belfer Center for Science and International Affairs at Harvard University, the Center for International Security and Cooperation at Stanford University, and the Institute on Global Conflict and Cooperation at the University of California.

Kroenig has also served as a strategist on the policy planning staff in the Office of the Secretary of Defense where he authored the first-ever U.S. government-wide strategy for deterring terrorist networks. For his work, Kroenig received the Office of the Secretary of Defense's Award for Outstanding Achievement. He is a term member of the Council on Foreign Relations.

James A. (Jim) Larrimore currently serves as a consultant on international nuclear safeguards for the International Atomic Energy Agency (IAEA) and Los Alamos National Laboratory. He first worked at IAEA

in Vienna, Austria, from 1976–78, on a leave of absence from General Atomics in San Diego, serving as head of the Advanced Nuclear Technology Section in the Division of Nuclear Power. In 1985 he returned to IAEA in Vienna in the Department of Safeguards, where he served through 1998 as a senior technical expert in international safeguards primarily in the office of two IAEA Deputy Director Generals for Safeguards. From 1994–98, the period of strengthening IAEA safeguards following the first Iraq war and the development of the Model Additional Protocol to safeguards agreements, he was senior technical advisor to the Deputy Director General for Safeguards Bruno Pellaud, advising and assisting in technical management, interdepartmental liaison, deliberations of the IAEA Board of Governors and external interfaces. In 1998 the IAEA honored him with a Distinguished Service award. Returning to Del Mar in 1999, he has traveled frequently to Vienna as a U.S. government-supported consultant to IAEA, providing assistance on a wide range of initiatives to further develop international safeguards, most recently in March-April and again in June 2010.

Larrimore is active in the professional association Institute for Nuclear Materials Management (INMM), where since 2001 he has chaired the International Safeguards Division, responsible for technical programs at annual meetings and workshops. He is a Fellow of INMM and has received its Distinguished Service Award.

Larrimore has a Ph.D. in nuclear engineering from M.I.T. and a bachelor and master of engineering physics from Cornell University. He has authored 50 publications and conference papers, most recently addressing international safeguards evolution, and safeguards compliance and transparency issues.

Jeffrey A. Larsen is a senior scientist with Science Applications International Corporation (SAIC) and president of Larsen Consulting Group LLC in Colorado Springs, Colorado. He also serves as adjunct professor in the Josef Korbel School of International Studies, University of Denver; adjunct professor at Northwestern University; president of the International Security and Arms Control section of the American Political Science Association; Governing Council member of the International Security Studies Section of the International Studies Association; and member of the editorial boards for book series on international security at Palgrave Macmillan and McGraw Hill publishers. He is a research associate with the Air Force Institute for National Security Studies, the Center for Contemporary Conflict at the Naval Postgraduate School, the Air Force Counterproliferation Center at Air University, and the Center for the Study of Weapons of Mass Destruction at National Defense University. Larsen has held a Fulbright NATO Research Fellowship, was NATO's Manfred Wörner Fellow (2005-06), has twice won SAIC's annual publication prize, and was runner-up for the 2005 Navy War College publication prize. He has served as a consultant to Los Alamos and Sandia National Laboratories and the University of New Mexico.

Larsen is a retired Air Force Lt Colonel who served as a command pilot in Strategic Air Command, associate professor of political science, and instructor pilot at the Air Force Academy, and first director of the Air Force Institute for National Security Studies. Since joining SAIC he spent nearly four years as Senior Editor of the USAF Chief of Staff's studies of Air Force lessons learned in the campaigns over Kosovo, Afghanistan, and Iraq. In addition, he led the team that developed the first strategic vision for U.S. Northern Command; wrote U.S. Space Command's theater strategy; and supported Air Force Headquar-

ters in arms control policy issues and the 2001 Nuclear Posture Review. He has led studies for the Defense Threat Reduction Agency on foreign perspectives of U.S. nuclear policy, the use of strategic culture as a methodology for explaining WMD decision making, the role of tailored deterrence in NATO strategy, and an assessment of the knowledge base of the loose nukes problem. He has also co-authored a study of the evolution of U.S. nuclear targeting strategy for U.S. Strategic Command.

Larsen is the author or editor of 80 books, journal articles, chapters, and monographs on current issues in national security, nuclear weapons and strategy, WMD proliferation, arms control, aerospace power, NATO, European politics, and strategic culture. His most recent book is *Arms Control and Cooperative Security* with James Wirtz (Lynne Rienner Press, 2009). He is a graduate of the Air Force Academy (B.S., international affairs), the Naval Postgraduate School (M.A., national security affairs), the Defense Language Institute (German), and Princeton University (M.A. and Ph.D., politics, 1991). He holds current TS/SBI and NATO secret clearances, as well as an FAA Airline Transport Pilot rating with over 3,700 flying hours.

Michael May is professor emeritus (research) in the Stanford University School of Engineering and a senior fellow with the Freeman-Spogli Institute for International Studies at Stanford University. He is the former co-director of Stanford University's Center for International Security and Cooperation, having served seven years in that capacity through January 2000.

Dr. May is director emeritus of the Lawrence Livermore National Laboratory. He has held a number of government advisory positions, was a member of the U.S. delegation to the Strategic Arms Limitations Talks, and is a fellow of the American Physical Society and the American Association for the Advancement of Science.

May received the Distinguished Public Service and Distinguished Civilian Service Medals from the Department of Defense, and the Ernest Orlando Lawrence Award from the Atomic Energy Commission, as well as other awards.

May's current research interests are in nuclear security, energy, environment and terrorism, and the relation of nuclear weapons and foreign policy. He has recently written on nuclear forensics, on the stability of deterrence at low numbers or zero nuclear weapons, on nuclear postures in the nuclear weapon states, and on the prospects for nuclear power. He currently co-heads a project on the possible game changers in the nuclear power area.

Franklin C. Miller is an independent consultant. He is a Distinguished Fellow at the Center for Naval Analysis, and a senior advisor at the Center for Strategic and International Studies. In addition, he serves on several corporate boards. He dealt extensively with nuclear policy issues during his 31 year government career, which included senior positions in the Defense Department and on the NSC staff. He was directly in charge of US nuclear deterrence and targeting policy from 1985 to 2001 and chaired NATO's senior nuclear policy committee, the High Level Group, from 1997 to 2001. He is a member of the Defense Policy Board, the Strategic Command Advisory Board, and the US European Command Advisory

Board. He served on the 2008 Secretary of Defense Task Force on DoD Nuclear Weapons Management. He is the recipient of many high-level US government awards and has also received awards from the French and Norwegian governments. In 2006 Mr. Miller was awarded an honorary knighthood by Queen Elizabeth II in recognition of his contributions to US-UK relations.

Robert Powell is Robson Professor of Political Science at UC Berkeley and previously taught at the University of Michigan and Harvard. He specializes in the use of game theory to study international conflict and political conflict more generally. He is the author of *Nuclear Deterrence Theory: The Search for Credibility* (Cambridge University Press, 1990); *In the Shadow of Power: States and Strategies in International Politics* (Princeton University Press, 1999); "Nuclear Deterrence Theory, Nuclear Proliferation, and National Missile Defense" (*International Security*, 2003); and "The Inefficient Use of Power: Costly Conflict with Complete Information" (*American Political Science Review*, 2004). More recently he has focused on the problem of allocating defensive resources against strategic attackers like terrorist groups, and has written "Defending Against Terrorist Attacks with Limited Resources" (*American Political Science Review*, 2007). He holds a B.S. in mathematics from Harvey Mudd College; an M.Phil in international relations from Cambridge University; and a Ph.D. in economics from UC Berkeley. He has been a Fulbright Scholar to the United Kingdom and is a member of the American Academy of Arts and Sciences (2004).

Daryl Press is an associate professor in the government department at Dartmouth College, and Coordinator of War and Peace Studies at Dartmouth. He received his bachelor's degree from the University of Chicago, and his Ph.D. in political science from the Massachusetts Institute of Technology. Dr. Press has published on a wide range of topics including credibility and deterrence, technology and conventional warfare, energy security, and most recently on nuclear weapons and strategy. His first book, *Calculating Credibility: How Leaders Assess Military Threats* was published by Cornell University Press. He is currently writing a book that uses archival evidence from the Cold War to test theories of deterrence, and builds on these findings to assess the role of nuclear weapons in the 21st century. Dr. Press has published his work in academic and popular outlets, including the journals *International Security*, *Security Studies*, the *New York Times*, *Foreign Affairs*, and the *Atlantic Monthly*. He is a research associate at the Security Studies Program at MIT, and a consultant at the RAND Corporation.

Ambassador Charles L. Pritchard is the president of the Korea Economic Institute (KEI) in Washington, D.C. Prior to joining KEI, he was a visiting fellow at the Brookings Institution in Washington, D.C., from September 2003 until February 2006. He is the author of *Failed Diplomacy: The Tragic Story of How North Korea Got the Bomb* (Brookings, 2007).

Pritchard served as ambassador and special envoy for negotiations with the Democratic People's Republic of Korea and United States representative to the Korean Peninsula Energy Development Organization in the administration of President George W. Bush from April 2001 until September 2003. Previously, he served as Special Assistant to the President for National Security Affairs and Senior Director for Asian Affairs in the administration of President William J. Clinton.

Pritchard obtained his B.A. in political science from Mercer University in Georgia and his M.A. in international studies from the University of Hawaii. He is also a graduate of the Japan National Institute for Defense Studies, Class 40. Pritchard retired from the U.S. Army as a colonel after 28 years of service. He is the recipient of the Defense Distinguished Service Medal.

Marcie Berman Ries is a senior foreign service officer with thirty-two years of experience in Europe, the Caribbean and the Middle East. A specialist in national security and political-military matters, she has experience dealing with NATO, strategic and theater arms control, the Balkans and Iraq. She was Chief of Mission in Kosovo and the United States Ambassador to Albania. She has also served for a year as a Pearson Fellow in the Office of the Chairman of the House International Relations Committee. Currently, as Deputy Assistant Secretary in the Verification, Compliance and Implementation Bureau, she is responsible for the management of the offices of Nuclear Affairs (NA), Strategic Issues (SI) and the Nuclear Risk Reduction Center (NRRC), and has successfully completed work as the Deputy START Follow-On Negotiator.

Ries' experience abroad also includes four years as counselor at the U.S. Embassy in London, four years as deputy political counselor at the U.S. Mission to the European Union in Brussels, and tours in Turkey and the Dominican Republic. Languages include Turkish, Spanish, and French.

She is a graduate of the State Department's Senior Seminar, a recipient of the Presidential Rank Award, the U.S. Army's Distinguished Civilian Service Medal and three Department of State Superior Honor Awards.

Bradley H. Roberts is Deputy Assistant Secretary of Defense for Nuclear and Missile Defense Policy, responsible for providing policy advice and support to the Secretary of Defense and other senior Department of Defense (DoD) leaders by formulating, recommending, integrating, and implementing policies and strategies to improve U.S. strategic and conventional strike capabilities, defenses, arms control and related matters. This encompasses DoD policy relating to requirements, capability development, operations, declaratory policy, employment, and international cooperation or agreements (including arms control agreements) in the areas of missile defense, nuclear forces and global strike.

From 1995 until assuming his current responsibilities, Roberts served as a member of the research staff at the Institute for Defense Analyses in Alexandria, Virginia. Roberts also served from 2003 to 2009 as a member of DoD's Threat Reduction Advisory Committee and as chair of its panel on DoD implementation of the National Strategy to Combat WMD. He is an associate professorial lecturer at George Washington University, currently on leave from this responsibility. He has also served as special advisor to the STRATCOM Strategic Advisory Group, as vice chairman of the board of the U.S. Committee of the Council for Security Cooperation in The Asia-Pacific, as chairman of the research advisory council of the Chemical and Biological Arms Control Institute, and as member and founding chairman of the Threat Reduction Program Review Committee of Los Alamos National Laboratories.

From 1986 to 1996 Roberts was editor of the Washington Quarterly and a research fellow at the Center for Strategic and International Studies (CSIS). His publications include articles in Foreign Affairs, International Security, and other leading journals. His most recent IDA publication is "Asia's Major Powers and the Emerging Challenges to Nuclear Stability Among Them." Roberts holds a bachelor's degree from Stanford University, a master's degree from the London School of Economics and Political Science, and a doctorate from Erasmus University, Rotterdam.

Laura Rockwood is the section head for non-proliferation and policy making in the Office of Legal Affairs of the IAEA, where she has served since 1985. She has been involved in all aspects of the negotiation, interpretation, and implementation of IAEA safeguards agreements for more than 20 years (notably, those of Iraq, Iran, DPRK, South Africa, Argentina/Brazil), and was the principal author of the document that became the Model Additional Protocol. She has participated, inter alia, in: the Director General's Expert Group on Multilateral Approaches to the Nuclear Fuel Cycle; three NPT Review Conferences; and trilateral negotiations between the IAEA, Russia, and the United States on an agreement for the verification of materials released from weapons programs (the Trilateral Initiative).

Prior to working for the IAEA, Rockwood was employed by the U.S. Department of Energy as a trial attorney principally in radiation injury cases, and as counsel in general legal matters.

Rockwood received her B.A. from UC Berkeley in 1973, and her J.D. from the University of California's Hastings College of the Law in San Francisco in 1976. She is a member of the State Bar of California and of the Washington, D.C., Bar Association.

Scott Sagan is the Caroline S.G. Munro Professor of Political Science and co-director of Stanford's Center for International Security and Cooperation. He also serves as the co-chair of the American Academy of Arts and Science's Global Nuclear Future Initiative. Before joining the Stanford faculty, Sagan was a lecturer in the Department of Government at Harvard University and served as a special assistant to the director of the Organization of the Joint Chiefs of Staff in the Pentagon. He has served as a consultant to the office of the Secretary of Defense and at the Sandia National Laboratory and the Los Alamos National Laboratory.

Sagan is the author of *Moving Targets: Nuclear Strategy and National Security* (Princeton University Press, 1989), *The Limits of Safety: Organizations, Accidents, and Nuclear Weapons* (Princeton University Press, 1993), and with co-author Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate Renewed* (W.W. Norton, 2002). He is the co-editor of Peter R. Lavoy, Scott D. Sagan, and James L. Wirtz, *Planning the Unthinkable* (Cornell University Press, 2000) and the editor of *Inside Nuclear South Asia* (Stanford University Press, 2009). His most recent publications include "Shared Responsibility for Nuclear Disarmament" in the fall 2009 issue of *Daedalus* and "The Case for No-First Use" in the June 2009 issue of *Survival*.

Mark Schanfein joined the Idaho National Laboratory in September 2008 as their senior nonproliferation advisor, after a 20-year career at Los Alamos National Laboratory where, in his last role, he served

as the program manager for Nonproliferation and Security Technology. He spent 10 years as the team leader for all non-destructive assay measurements at the LANL plutonium facility and at the Chemistry and Material Research Facility covering more than 100 instruments. He has eight years of experience working at the International Atomic Energy Agency, located in Vienna, Austria, in the Department of Safeguards Division where he served four years as a safeguards inspector and as Inspection Group Leader in Operations C, and four years as the Unit Head for Unattended Monitoring Systems (UMS) in Technical Support. With over 30 years of experience in international and domestic safeguards, his current focus is on leveraging INL technology, facilities, and nuclear material to build an international safeguards program. This includes R&D to develop the foundations for effective safeguards on pyroprocessing facilities (including the installation of authorized IAEA UMS) and the acquisition of a suite of IAEA UMS and attended systems for use in both R&D and training.

John Scott is currently a scientific staff member at Los Alamos National Laboratory. He has been at the laboratory for 11 years with roughly 10 years of experience in nuclear weapon design. Scott has been a physics point of contact for two weapon systems and he was the LANL lead secondary designer for the RRW competition. His background is in nuclear engineering and received both his B.S. and Ph. D. from UC Berkeley. Currently, he is a project leader in the Advanced Certification Science Campaign leading an effort to understand how and why a nuclear weapons physics design may fail.

Susan Shirk is director of the UC Institute on Global Conflict and Cooperation and Ho Miu Lam Professor of China and Pacific Relations at the School of International Relations and Pacific Studies at UC San Diego. Shirk first traveled to China in 1971 and has been doing research there ever since. During 1997-2000, Shirk served as Deputy Assistant Secretary of State in the Bureau of East Asia and Pacific Affairs, with responsibility for China, Taiwan, Hong Kong and Mongolia. She founded in 1993 and continues to lead the Northeast Asia Cooperation Dialogue (NEACD), an unofficial "track-two" forum for discussions of security issues among defense and foreign ministry officials and academics from the United States, Japan, China, Russia, and the Koreas.

Shirk's publications include her books, *China: Fragile Superpower*; *How China Opened Its Door: The Political Success of the PRC's Foreign Trade and Investment Reforms*; *The Political Logic of Economic Reform in China*; and *Competitive Comrades: Career Incentives and Student Strategies in China*. Shirk served as a member of the U.S. Defense Policy Board, the Board of Governors for the East-West Center (Hawaii), the Board of Trustees of the U.S.-Japan Foundation, and the Board of Directors of the National Committee on United States-China Relations. She is a member of the Council on Foreign Relations, and an emeritus member of the Aspen Strategy Group. As Senior Adviser to The Albright Group, Shirk also advises private sector clients on China and East Asia.

Prior to joining the Federation of American Scientists, **Jacqueline Shire** was a senior analyst at the Institute for Science and International Security (ISIS) providing research and analysis on Iran's nuclear program as well as proliferation challenges posed by North Korea and other countries. She spent eight years in the State Department's Bureau of Political Military Affairs working on defense trade, proliferation, and weapons of mass destruction. Her assignments included tours of duty at the United Nations Special

Commission on Iraq, the U.S. Mission to the United Nations in New York, and at the U.N.'s Conference on Disarmament in Geneva. She was a member of the U.S. delegation negotiating with North Korea in 1993 and 1994. Shire worked as a consultant on nuclear proliferation and arms control to ABC News from 2003 to 2007 and as a technical advisor to season two of the Showtime series *Sleeper Cell*.

Shire holds an M.I.A. from Columbia University's School of International and Public Affairs with a focus on security policy and Middle Eastern studies, and a B.A. from Columbia College.

Michael Singh is the Ira Weiner fellow of the Washington Institute and former senior director for Middle East affairs at the National Security Council (NSC).

At the White House, Singh was responsible for devising and implementing strategies on a wide range of Middle East issues, from the Arab-Israeli peace process, to supporting Lebanon's Cedar Revolution, to the efforts to prevent Iran's acquisition of nuclear weapons capability. He served in the NSC for three years, as senior director for Middle East affairs and as director for Iran and for Lebanon, Syria, Egypt, and North Africa. Previously, Singh served as special assistant to Secretaries of State Condoleezza Rice and Colin Powell and was staff assistant to then Ambassador Daniel Kurtzer at the U.S. embassy in Tel Aviv. After more than eight years in the foreign service, Singh left government in August 2008.

Singh has written extensively on Iran, the Israeli-Palestinian conflict, and U.S. national security strategy and management. His articles have appeared in *World Affairs*, *The American Interest*, *The Economist*, and other publications. He is a regular contributor to *Foreign Policy's* blog, *Shadow Government*, and appears frequently in national and global media outlets such as CBS, Fox News, and the BBC. Singh has taught economics at Harvard University and directed the Iran Working Group at Harvard's Kennedy School of Government. He is a term member of the Council on Foreign Relations.

Singh holds an M.B.A. from Harvard University and a B.A. from Princeton University.

Etel Solingen is Chancellor's Professor of Political Science at the University of California, Irvine. Her most recent book, *Nuclear Logics: Contrasting Paths in East Asia and the Middle East* (Princeton University Press), was the recipient of the 2008 Woodrow Wilson Foundation Award by the American Political Science Association for the best book on government, politics, or international affairs, and the 2008 Robert Jervis and Paul Schroeder Award for the Best Book on International History and Politics. She was awarded a MacArthur Foundation Research and Writing Award on Peace and International Cooperation, a Social Science Research Council-MacArthur Foundation Fellowship on Peace and Security in a Changing World, and a Japan Foundation/SSRC Abe Fellowship, among others. She has also authored *Regional Orders at Century's Dawn: Global and Domestic Influences on Grand Strategy* (Princeton University Press) and *Industrial Policy, Technology, and International Bargaining: Nuclear programs in Argentina and Brazil* (Stanford University Press) and edited *Scientists and the State: Domestic Structures and the International Context* (University of Michigan Press).

Solingen served as chair of the steering committee of the University of California's system-wide Institute on Global Conflict and Cooperation, vice-president of the International Studies Association, president of the International Political Economy Section of ISA, executive council member of the APSA's Qualitative and Multi-methods section, and a member of the APSA's Task Force on U.S. Standing in World Affairs. She has also participated in various Track Two meetings on conflict resolution throughout the Middle East, East Asia, Europe, and Latin America. She currently serves as review essay editor of the journal *International Organization*.

Jay Zucca is a physicist at the Lawrence Livermore National Laboratory in Livermore, California, where he is the program director for nonproliferation within the Global Security Principal Directorate. Zucca is responsible for the external interfaces of the Livermore program which supports the National Nuclear Security Administration's Office of Defense Nuclear Nonproliferation. The program's activities include development of advanced technologies for detecting nuclear proliferation activities, securing nuclear materials in the former Soviet Union, and developing advanced, proliferation resistant nuclear fuel cycles. Zucca came to Livermore in 1984 after completing post-doctoral positions at the U.S. Geological Survey in Menlo Park and the University of Karlsruhe in Germany.

Before joining NP Division, Zucca worked primarily on nuclear test monitoring concentrating on seismic instrumentation development, on-site inspection, and regional seismology. He was a member of the U.S. Delegation to the Nuclear Testing Talks (Threshold Test Ban Treaty), a member of the U.S. Delegation to the Conference on Disarmament for the Comprehensive Test Ban Treaty, and a member of the U.S. Delegation to the Preparatory Commission for the CTBT. In his early work at LLNL, he focused on the Geothermal Energy program where he developed techniques for geophysically detecting steam in geothermal reservoirs.

Dr. Zucca received his Ph.D. in geophysics from Stanford University in 1981. His thesis was on the crustal structure of Kilauea and Mauna Loa volcanoes, Hawaii, from seismic refraction and gravity data. He also earned an M.S. in geophysics from Stanford University in 1977 and a B.A. in geology and mathematics from UC Santa Barbara in 1976.