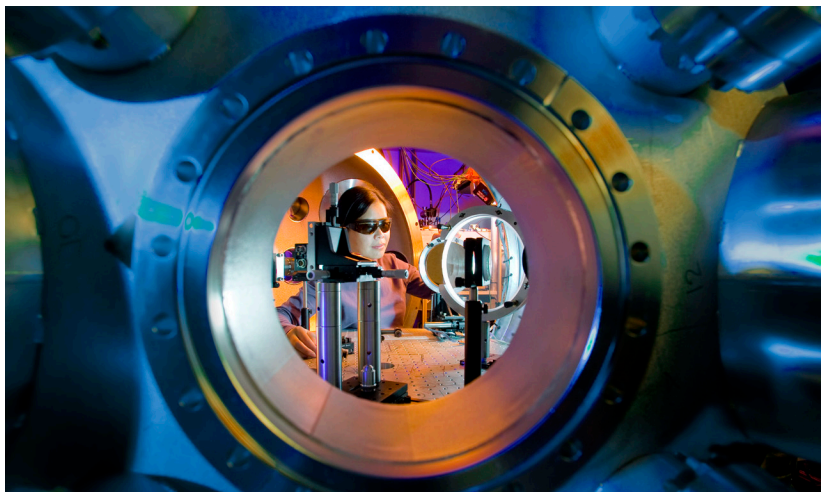
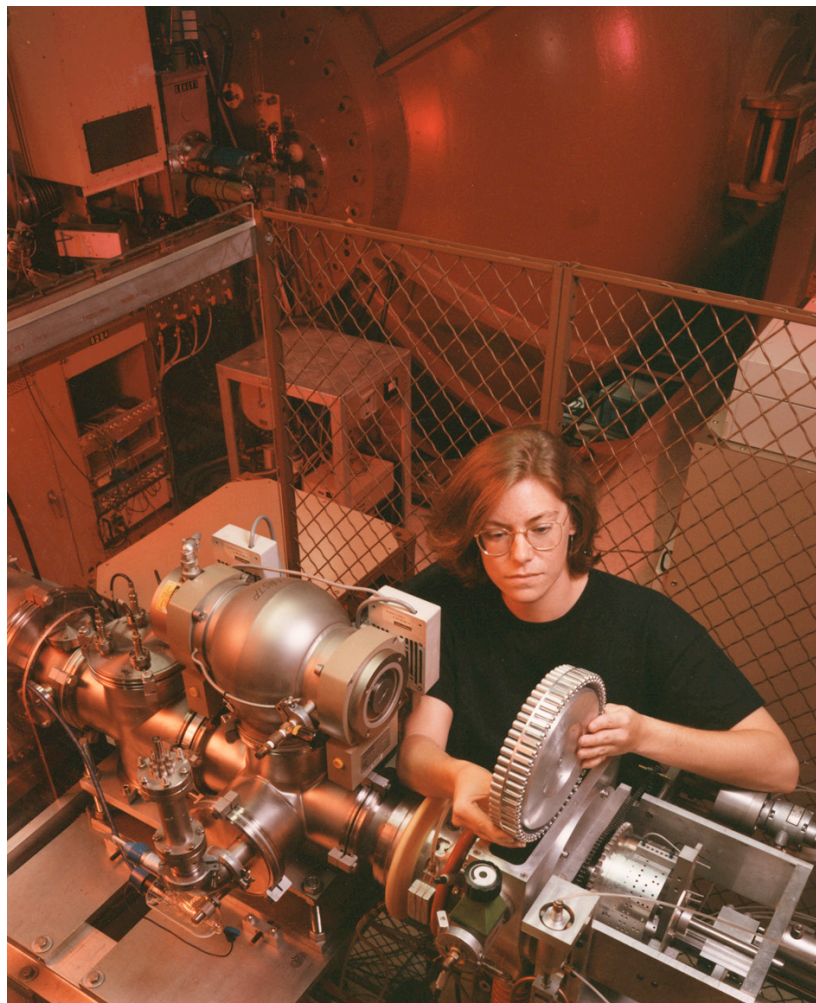


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CENTER FOR STRATEGIC &
INTERNATIONAL STUDIES



Project on

Nuclear Issues

2011 FALL CONFERENCE
SEPTEMBER 8-9, 2011

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INTERNATIONAL STUDIES**

Welcome to the PONI Fall Conference

We are happy to be back at Lawrence Livermore for the first time since our summer conference in 2008, and would like to thank our partners in the Center for Global Security Research for their support in making it happen. It is always a privilege to hold events at the NNSA laboratories, as it affords participants from the east coast with a unique opportunity to learn more about the cutting edge scientific exploration and technology development being carried out to advance national security and address other issues of public concern. It also provides a great opportunity for interdisciplinary exchange between members—particularly young members—of the scientific and policy communities.

As people familiar with the PONI conference series know, each year we host three conferences that lead up to a year-end capstone event held at U.S. Strategic Command in Nebraska. Historically, we have held one of these three regional conferences in the Washington, DC area, one in the western part of the country at one of the NNSA laboratories or in Salt Lake City, and one in the United Kingdom. However, this year we have had the good fortune of being able to make two trips out west. (Our first conference of the year was hosted by the Nevada National Security Site in Las Vegas.) The reason for this is that our colleagues in the United Kingdom, who have been highly active in PONI since its early beginnings, have now established an autonomous UK PONI program to help further the effort to develop their next generation of experts. The UK PONI, housed by the Royal United Services Institute (RUSI), held its inaugural event in June – and it was enormously successful. Now, what was previously a four-part conference series is effectively a five-part series, with the UK PONI running the show for the yearly event on their soil. Not only is this a very positive development for the UK, it will also enable the U.S. PONI conference series to hold an additional conference away from Washington each year.

All of this is to say that we owe our British colleagues a bit of thanks for the opportunity to be here this week. And we are much looking forward to next year's formal launching of a French counterpart, the Forum de Réflexion sur le Nucléaire (FRN), which will be run by the Center for International Security and Arms Control Studies in Paris.

Proximity to top-notch graduate institutions—including Stanford, the Monterey Institute of International Studies, and Naval Postgraduate School to name a few—stands as yet another reason that we are pleased to be in Livermore, and we are happy to have their students and faculty joining us. Hopefully, the experience of meeting and interacting with attendees from Lawrence Livermore, Los Alamos, Sandia and others from across the enterprise will be enriching for everyone.

Lastly, please remember that all proceedings at the conference are strictly off-the-record. Attendees are therefore asked to gain permission before quoting speakers or other participants. Your consideration in abiding by this rule is very much appreciated and will undoubtedly foster more candid and fruitful discussions.

Thank you again for joining us. Enjoy the conference!

The PONI Team

Project on

Nuclear Issues

2011 FALL CONFERENCE AGENDA

DAY ONE

Thursday, September 8, 2011

7:30   *Shuttle bus departs from DoubleTree Livermore to Lawrence Livermore National Laboratory*

8:00   CONFERENCE CHECK-IN AND BREAKFAST

8:40   CONFERENCE WELCOME

Dr. Clark Murdock, Senior Adviser and PONI Director, Center for Strategic and International Studies

8:50   OPENING REMARKS

Dr. Parney Albright, Principal Associate Director, Global Security, Lawrence Livermore National Laboratory

9:00   STOCKPILE SUSTAINMENT AND THE FUTURE OF THE NUCLEAR ENTERPRISE

Moderator: Dr. Miriam John, Former Vice President, California Division, Sandia National Laboratories

Stockpile Stewardship and Beyond: Why Science is Important to the U.S. Nuclear Deterrent
Mr. Matt Cowan, Integrated Experiment Team Project Engineer, Lawrence Livermore National Laboratory

Overview of Weapons Enterprise Transformation and Mathematical Assessment Tools
Dr. Carol Meyers, Mathematician, National Security Engineering Division, Lawrence Livermore National Laboratory

An Overview of Nuclear Detonation Safety
Mr. Raymond Wolfgang, Member of Technical Staff, Sandia National Laboratories

10:15   BREAK

10:30 NUCLEAR FORENSICS SCIENCE AND TECHNOLOGY

Moderator: Dr. Jacqueline Kenneally, Program Element Leader, Stockpile Radiochemistry Group, Lawrence Livermore National Laboratory

Multi-actinide Resonance Ionization Mass Spectrometry (RIMS) for Nuclear Forensics Applications and Rapid Response
Dr. Kim Knight, Post-doctoral Fellow, Chemical Sciences Division, Lawrence Livermore National Laboratory

Comparison of Model and Experimental Data for Resonance Ionization Mass Spectrometry of Uranium: Predicting and Guiding the RIMS Method
Dr. Brett Isselhardt, Post-doctoral Fellow, Chemical Sciences Division, Lawrence Livermore National Laboratory

Monte Carlo Modeling of a Cavity Ion Source: Pushing the Frontiers of Isotopic Detection Sensitivity
Mr. Laurence Lewis, Graduate Student Researcher, University of California, Berkeley and Lawrence Livermore National Laboratory

11:45 LUNCH AND SPEAKER

Dr. Ronald Lehman II, Director, Center for Global Security Research, Lawrence Livermore National Laboratory

12:45 IMPROVING NUCLEAR SECURITY WHILE EXPANDING ACCESS TO NUCLEAR ENERGY

Moderator: Dr. Bernard Sitt, Director, Center for International Security and Arms Control Studies

Refining Multilateral Nuclear Approaches to Achieve Nonproliferation and Fuel Assurance Goals
Mr. Peter Hong, Research Analyst, National Security Office, Los Alamos National Laboratory

The Thorium Fuel Cycle: A Proliferation-Resistance Focus Shift for the Future
Mr. Matthew Duchene, M.S. Student, Nuclear Engineering, University of Illinois

Developing a ‘Whole of Government’ Approach to Improving the Global Nuclear Detection Architecture
Ms. Kimberly Proctor, Ph.D. Candidate, University of New Mexico, Technical Intern, Strategic Studies Department, Sandia National Laboratories

Characterization of Uranium Oxyfluoride Particles for Nuclear Safeguards
Dr. Ruth Kips, Research Scientist, Lawrence Livermore National Laboratory

2:15 BREAK

2:30 ENHANCING MONITORING AND ENFORCEMENT TO COUNTER NUCLEAR THREATS

Moderator: Dr. Anne Clunan, Associate Professor, Political Science Department, and Director, Center on Contemporary Conflict, Naval Postgraduate School

The Stigmatization of Nuclear Weapons: Implications for the Potential Transfer of Nuclear Material
Dr. Patricia Shamai, Lecturer in International Relations, University of Portsmouth

The Investigative Authority of the International Atomic Energy Agency to Conduct On-Site Inspections in the Second Nuclear Age
Mr. Kalman Robertson, Ph.D. Candidate, International Political and Strategic Studies, Australian National University

Engaging Dual-Use Technology Manufacturers through Profit-Oriented Export Controls
Mr. Andrew Kurzrok, Research Associate, Pacific Northwest National Laboratory

Assessing the Effectiveness of Covert Action in Counter-Proliferation: The Case of Iran
Mr. David Vielhaber, M.A. Candidate, Nonproliferation and Terrorism Studies, Monterey Institute of International Studies

4:00 BREAK

4:15 ASSESSING LEGISLATIVE POLITICS AND WAYS FORWARD FOR NUCLEAR POLICY

Moderator: Dr. Clark Murdock, Senior Adviser and Project on Nuclear Issues Director, Center for Strategic and International Studies

How to Avoid a Dialogue of the Deaf on Nuclear Deterrence Policy
Dr. Zachary Zwald, Assistant Professor, U.S. Air War College and USAF Counter-proliferation Center

Next Steps in Arms Control: Restoring Consensus on Nuclear Policy
Dr. Tom Karako, Assistant Professor of Political Science, Kenyon College

The Duma-Senate Logjam Revisited: Actions and Reactions in Russian Treaty Ratification Debates
Ms. Anya Loukianova, Ph.D. Candidate, Policy Studies, University of Maryland

Building Budgetary Transparency and Accountability for the U.S. Nuclear Weapons Program
Mr. Stephen Schwartz, Editor, The Nonproliferation Review and WMD Junction, James Martin Center for Nonproliferation Studies, Monterey Institute for International Studies

5:45 END OF DAY ONE PRESENTATIONS

6:00 Shuttle bus departs from Lawrence Livermore National Laboratory to DoubleTree Livermore

6:30 RECEPTION

DoubleTree Livermore
720 Las Flores Road

7:15 DINNER & KEYNOTE ADDRESS

Dr. Bruce Goodwin, Principal Associate Director, Weapons and Complex Integration, Lawrence Livermore National Laboratory

8:45 END OF DAY ONE

DAY TWO
Friday, September 9, 2011

8:00 *Shuttle bus departs from DoubleTree Livermore to Lawrence Livermore National Laboratory*

8:30 COFFEE AND BREAKFAST

9:00 EXPLORING NEW DIMENSIONS OF NUCLEAR STRATEGY

Moderator: Dr. Michael Nacht, Professor of Public Policy, University of California, Berkeley

Extended Deterrence and a Nuclear Iran: Lessons from the Cold War
Mr. Tim McDonnell, Program Associate, Woodrow Wilson International Center for Scholars, and
M.A. Candidate, Security Policy Studies, George Washington University

The Strategic Effect of Indigenous Nuclear Fuel Cycle Capabilities on Regional Security
Mr. Tristan Volpe, Ph.D. Candidate, Department of Political Science, George Washington University

French Strategic Posture since the Last Livre Blanc
Mr. Emmanuel Nal, Consultant and Junior Lecturer, University of Tours

Benefits of ICBMs to U.S. Nuclear Posture and Global Stability
Mr. Aaron Van Noy, Systems Engineer, Northrop Grumman Aerospace Systems

10:20 BREAK

10:40 LOOKING AHEAD TO FUTURE NUCLEAR FORCE REDUCTIONS

Moderator: Dr. Scott Sagan, Co-Director, Center for International Security and Cooperation and
Caroline S.G. Munro Professor of Political Science, Stanford University

The Question of Nuclear Disarmament and the Enforcement Paradox
Dr. Dane Swango, Lecturer, Department of Political Science, University of California, Los Angeles

Verifying Multilateral Nuclear Reductions: Balancing Verification, Transparency and Information
Security
Ms. Sarah Elizabeth Cross, Graduate Research Intern, Brookhaven National Laboratory

HEU Down-blending and Information Barriers: A Thought Experiment in South Asia
Ms. Jessica Bufford, M.A. Candidate, Conflict Resolution, Monterey Institute of International Studies

Analysis of Nuclear Explosion Debris and Considerations for Verification
Mr. Christopher Ryan, Research Scientist, Lawrence Livermore National Laboratory

12:00 LUNCH AND SPEAKER

Nuclear Forensics: An Emerging and Still Inexact Science
Dr. Ian Hutcheon, Physicist, Chemical Sciences Division, and Deputy Director, Glenn T. Seaborg
Institute, Lawrence Livermore National Laboratory

1:00 TOURS OF LAWRENCE LIVERMORE NATIONAL LABORATORY

Tour includes visits to the National Ignition Facility, Center for Accelerated Mass Spectrometry,
and Terascale Simulation Facility

3:00 *Shuttle bus departs from Lawrence Livermore National Laboratory to Host Hotel*

SPEAKER BIOGRAPHIES

CONFERENCE WELCOME

Dr. Clark Murdock, Senior Adviser and PONI Director, Center for Strategic and International Studies

Clark Murdock is the senior adviser for the U.S. Defense and National Security Group at CSIS and the director of the Project on Nuclear Issues (PONI). Joining CSIS in January 2001, Murdock has completed studies on a wide range of defense and national security issues, including strategic planning, defense policy and governance, and U.S. nuclear weapons strategy and policy. He directed the four-phase study on Defense Department reform, “Beyond Goldwater-Nichols: USG and Defense Reform for a New Strategic Era,” which released reports in March 2004, July 2005, and July 2006 and released several reports in 2008. Murdock is currently leading the U.S.-UK-France trilateral track-2 nuclear dialogue and has recently completed studies on methodological approaches to building force planning constructs and on nuclear posture implications of U.S. extended deterrence and assurance. He is the principal author of *Improving the Practice of National Security Strategy: A New Approach for the Post-Cold War World* (CSIS, 2004) and *The Department of Defense and the Nuclear Mission in the 21st Century* (CSIS, 2008). Murdock coauthored *Revitalizing the U.S. Nuclear Deterrent* (CSIS, 2002) and *Nuclear Weapons in 21st Century U.S. National Security* (AAAS, 2008).

In 2000, Murdock taught military strategy, the national security process, and military innovation at the National War College. From 1995 to 2000, he was deputy director of the Air Force’s headquarters planning function. As deputy special assistant to the chief for long-range planning, he helped define a coherent strategic vision for the 2020 Air Force and institutionalize a new long-range planning process. As deputy director for strategic planning, he helped implement the new planning process and led the development of several new planning products. Before joining the Air Force, he headed the Policy Planning Staff in the Office of the Under Secretary of Defense for Policy. Murdock has served in many roles in the defense world, including as a senior policy adviser to House Armed Services Committee chairman Les Aspin, as an analyst and Africa issues manager in the CIA, and in the Office of the Secretary of Defense. He also taught for 10 years at the State University of New York at Buffalo. He is an honors graduate of Swarthmore College and holds a Ph.D. in political science from the University of Wisconsin at Madison.

OPENING REMARKS

Dr. Parney Albright, Principal Associate Director, Global Security, Lawrence Livermore National Laboratory

Penrose C. “Parney” Albright has more than 20 years of experience in the federal government and the private sector. His focus has been in programs to counter terrorism, protect against weapons of mass destruction, protect borders, and develop and implement intelligence and special operations

technologies. Prior to joining the Laboratory he worked with Civitas Group, a homeland security consultancy in Washington, D.C. He has served as assistant secretary in the Department of Homeland Security (DHS), assistant director in the Office of Science and Technology Policy, senior director in the Office of Homeland Security in the White House, and program manager with the Defense Advanced Research Projects Agency. He has extensive experience with interagency and congressional interactions, and was a spokesperson for both the White House and DHS to the press on issues associated with science, technology, and weapons of mass destruction. Albright holds a Bachelor’s degree in physics and applied mathematics from The George Washington University, and a master’s and Ph.D. in physics from the University of Maryland.

STOCKPILE SUSTAINMENT AND THE FUTURE OF THE NUCLEAR ENTERPRISE

Dr. Miriam John, Former Vice President, California Division, Sandia National Laboratories

Dr. John is the former Vice President of Sandia’s California Division. The principal programs of the division, located in Livermore, CA, include nuclear weapons stewardship, weapons demilitarization, chemical/biological weapons defense, combustion and materials research, advanced lithography development, micro-chemical and remote laser based chemical detection, and distributed, secure advanced computational and information systems. In her previous position as Director of the Center for Exploratory Systems and Development, Dr. John led a multi-disciplinary organization of physical scientists, engineers, mathematicians, and computer scientists whose mission was to undertake major new initiatives for the California Division. Areas of emphasis included WMD non- and counter-proliferation, UAV based measurements to support global climate change studies and nonproliferation applications, computational biochemistry, laser remote sensing and biological based microsensor development, weapons demilitarization systems development, nuclear weapon use control component development, and DOE complex system modeling. Prior to her position as Vice President, Dr. John served in a number of managerial and technical roles for the laboratory, including nuclear weapons development, systems analysis, and thermal analysis/fluid mechanics R&D. Her management assignments built on a technical foundation of research in experimental and theoretical studies in heterogeneous catalysis, thermodynamics, and multi-phase reacting flow, and post-doctoral and initial Sandia assignments in alternative energy concepts analysis and simulation.

Concurrent with her Sandia assignments, Dr. John has been recruited for a number of defense community efforts. She is a member of the Department of Defense’s Threat Reduction Advisory Committee (for which she chairs the Nuclear Deterrent Transformation Panel), the National Research Council’s Naval Studies Board and Board on Army Science and Technology. She is a recent past member of the Air Force Scientific Advisory Board and DOE’s National Commission on Science and Security. She is a National Associate of the National Academies of Science and Engineering.

Dr. John received a B.S. in Chemistry from Rice University, an M.S. in Chemical Engineering from Tulane University, and a Ph.D. in Chemical Engineering from Princeton University.

Mr. Matt Cowan, Integrated Experiment Team Project Engineer, Lawrence Livermore National Laboratory

Matt Cowan joined the Defense Technologies Engineering Division (DTED) at Lawrence Livermore National Laboratory (LLNL) in 1996 and is currently the Project Engineer for the Material Dynamics Integrated Experiment Team. Previous experience at LLNL included the Deputy Program Manager for the LLNL Nuclear Counterterrorism Program, group leader for the B Advanced Development (BAD) Pu Studies group, leading engineers to build experiments to gather material equation of state data under strong shock conditions, building hydrodynamic experiments, and working on several life extension programs for US systems. Matt earned a BSME from California Polytechnic State University, San Luis Obispo in 1996 and a MSME from Stanford University in 2000.

Dr. Carol Meyers, Mathematician, National Security Engineering Division, Lawrence Livermore National Laboratory

Carol has worked as a mathematician at Lawrence Livermore National Laboratory since receiving her Ph.D. in operations research from MIT in 2006. Her expertise is in the areas of integer and linear programming optimization, agent-based modeling, discrete event simulation, and decision theory. She has been involved in nuclear enterprise modeling since 2007, and as part of this work she was a partial participant on the Sandia Weapons Intern program in 2009. She is the principal architect of the Stockpile Transformation Optimization Requirements Model (STORM), which has been used to evaluate potential courses of action for NNSA stockpile planning and which is the topic of her talk today. When she is not working on stockpile matters, she spends her time playing with supercomputers and trying to use them to solve large-scale planning problems in the energy arena.

Mr. Raymond Wolfgang, Member of Technical Staff, Sandia National Laboratories

Mr. Wolfgang currently lives in Albuquerque, New Mexico, USA, and is originally from the Philadelphia area. He has a B.S. in Electrical Engineering and an M.S. in Mechanical Engineering from Penn State University (1993). Later he earned an M.S. in Electrical Engineering from Purdue (2002), specializing in signal and image processing, multimedia security and digital watermarking. From Purdue he joined the Space and Naval Warfare (SPAWAR) Systems Center, located in San Diego, CA, where he acted as a systems engineer on software and information assurance projects. In 2006 he worked in SPAWAR's Program Management Office 160, part of the Program Executive Office for Command, Control, Communications, Computers and Intelligence (PEO/C4I). There he managed programmatic risk for Assistant Program Managers with regards to C4I installations. After a brief period supporting software architecture compliance inspections, Raymond joined Sandia National Laboratories as a video engineer in the second half of 2007, where he currently contributes to US Department of Energy and U.S. Department of Defense systems as a lead surety engineer.

NUCLEAR FORENSICS SCIENCE AND TECHNOLOGY

Dr. Jacqueline Kenneally, Program Element Leader, Stockpile Radiochemistry Group, Lawrence Livermore National Laboratory

Jacqueline Kenneally has worked at Lawrence Livermore National Laboratory since 1991. She began her career investigating underground radionuclide migration, which included fieldwork at the Nevada Test Site (now Nevada Nuclear Security Site). Her interests and career broadened when she was selected as a National Expert by the IAEA Action Team for inspections in Iraq and participation in P-2 and P-3 discussions on the Fissile Material Cutoff Treaty (FMCT). She is currently the Program Element Leader for the Stockpile Radiochemistry Group, which focuses on diagnosing nuclear explosions for the Stockpile Stewardship Program and Nuclear Forensics.

Kim Knight, Post-doctoral Fellow, Chemical Sciences Division, Lawrence Livermore National Laboratory

Kim graduated with a Ph.D. in Earth and Planetary Sciences from the University of California, Berkeley (2006), moving to The University of Chicago for a post-doc in the field of cosmochemistry (the characterization of stellar dust and early solar system materials to understand stellar histories and solar system evolution), before coming to LLNL as a post-doctoral researcher in 2009 in the chemical sciences division. Kim's main research is in the field of nuclear forensics, studying the characteristics of materials from the nuclear fuel cycle, as well as materials from historical nuclear tests. Knight is also involved in the development of new technologies for materials characterization, and in international engagement through nuclear forensics.

Dr. Brett Isselhardt, Post-doctoral Fellow, Chemical Sciences Division, Lawrence Livermore National Laboratory

Brett Isselhardt is a Post-doctoral Researcher at Lawrence Livermore National Laboratory. He earned his Ph.D. in Nuclear Engineering from the University of California at Berkeley. His research interests revolve around the security of nuclear materials with a focus on advanced mass spectrometry methods. He is also interested in the implications of these interests on national security policy. Before starting at Berkeley, Isselhardt received his B.S. in Physics with Honors from Westmont College and spent a year in industry developing technology for lithium ion batteries and fuel cell catalysts.

Mr. Laurence Lewis, Graduate Student Researcher, University of California, Berkeley and Lawrence Livermore National Laboratory

Laurence Lewis is a second-year graduate student in the Department of Nuclear Engineering at the University of California, Berkeley. He has been researching nuclear forensics at Lawrence Livermore National Laboratory since 2009. His main work to date has focused on modeling a novel ion source that can improve detection limits and sensitivity in mass spectrometric analyses. Other work includes characterizing the homogeneity of fissile material in nuclear fallout debris using secondary ion mass spectrometry.

LUNCH SPEAKER

Dr. Ronald Lehman II, Director, Center for Global Security Research, Lawrence Livermore National Laboratory

Ronald F. Lehman II is the Director of the Center for Global Security Research (CGSR) at Lawrence Livermore National Laboratory (LLNL) and also is the Chairman of the Governing Board of the International Science and Technology Center (ISTC), an inter-governmental organization headquartered in Moscow. He serves on the U.S. Department of Defense Threat Reduction Advisory Committee (TRAC). Dr. Lehman had been Director of the U.S. Arms Control and Disarmament Agency from 1989 to 1993. Previously, Ron served in the Defense Department as Assistant Secretary for International Security Policy, in the State Department as Ambassador and U.S. Chief Negotiator on Strategic Offensive Arms (START I), and in the White House as Deputy Assistant to the President for National Security Affairs. He has also served on the National Security Council staff as a Senior Director, in the Pentagon as Deputy Assistant Secretary, on the Senior Professional Staff of the U.S. Senate Armed Services Committee, and as a district adviser in Vietnam commissioned in the United States Army Military Intelligence Branch.

IMPROVING NUCLEAR SECURITY WHILE EXPANDING ACCESS TO NUCLEAR ENERGY

Dr. Bernard Sitt, Director, Center for International Security and Arms Control Studies

Bernard Sitt has been the Director of the Centre d'Etudes de Sécurité Internationale et de Maîtrise des armements (the Center of International Security and Arms Control Studies or CESIM) since its creation in 1999. His work and publications focus on the analysis of politico-strategic nuclear issues and of proliferation crises and scenarios, the emergence of new trends in arms control regimes, and the analysis of new proliferation issues and instruments involving weapons of mass destruction and international terrorism. He was Director for International Security Affairs at CEA (French Atomic Energy Commission) from 1998 to 2004. He has also been, from 1991 until 2004, a professor in international relations at the University of Marne-la-Vallée near Paris, where he was in charge of a Master's teaching program on International Security, Arms control and Disarmament. From 1993 to mid-1998, he was at the French Ministry of Defense as a Technical Adviser for Nuclear Affairs in the Directorate for Strategic Affairs, under the Minister's Office. He is a member of the Administration Board and Board of Editors of the Annual Review AFRI (Annuaire Français de Relations Internationales).

Mr. Peter Hong, Research Analyst, National Security Office, Los Alamos National Laboratory

Peter Hong is currently a research analyst with the National Security Office at the Los Alamos National Laboratory. Previously he served as an intern at the US Department of State, as a policy intern at Google, and as a research assistant with the Center for International Security and Cooperation (CISAC) at Stanford. His past work includes topics ranging from nuclear terrorism,

to export controls, to the NPT, and to the institutional implications of the nuclear fuel cycle. He will graduate in 2012 with a B.A. in political science from Stanford University.

Mr. Matthew Duchene, M.S. Student, Nuclear Engineering, University of Illinois

Matthew Duchene is presently working toward his M.S. in nuclear engineering at the University of Illinois, where he also earned his B.S. with a Certificate in Global Security in 2010. Matthew continues to work and study in nonproliferation and safeguards both through his research and as a teaching assistant for a course on nuclear weapons and arms control. He has also conducted nonproliferation-based research for Argonne and Savannah River National Laboratories.

Ms. Kimberly Proctor, Ph.D. Candidate, University of New Mexico, Technical Intern, Strategic Studies Department, Sandia National Laboratories

Kim Proctor is a Technical Intern in the Strategic Studies Department at Sandia National Laboratories. While at Sandia, she has worked on policy analysis regarding nuclear architecture and other national security issues. She is also pursuing a Ph.D. in Political Science from the University of New Mexico. She received her M.A. in Political Science from the University of New Mexico, with concentrations in International Relations and Research Design/Methodology. She received her B.A. with Honors in Political Science from Washington College. Prior to graduate school, she was a member of the Maryland Air National Guard for six years.

Dr. Ruth Kips, Research Scientist, Lawrence Livermore National Laboratory

Ruth Kips has a Master's degree in Nuclear Engineering and obtained her Ph.D. in Chemistry in 2008 from the University of Antwerp in Belgium. She started her career as a nuclear engineer at one of the Belgian nuclear power plants before moving to the area of nuclear safeguards at the Joint Research Centre of the European Commission. At the Institute for Reference Materials and Measurements (IRMM) she worked on the production and analysis of uranium particles from UF₆ hydrolysis. In 2008, she joined the Lawrence Livermore National Lab where she has been involved in nuclear forensics, nuclear safeguards and the environmental transport of actinides.

ENHANCING MONITORING AND ENFORCEMENT TO COUNTER NUCLEAR THREATS

Dr. Anne Clunan, Associate Professor, Political Science Department, and Director, Center on Contemporary Conflict, Naval Postgraduate School

Anne L. Clunan is Associate Professor of National Security and Director of the Center on Contemporary Conflict Affairs at the Naval Postgraduate School in Monterey, CA. She earned her Ph.D. in political science at the University of California, Berkeley. Her research and teaching interests focus on how states define and respond to emerging national security threats, and on the implications of globalization for state sovereignty and governance. Her research has focused on ungoverned spaces, biological weapons attribution, Russian national security policy regarding nuclear weapons and NATO, threat financing, and globalization and non-state actors.

She is co-editor, with Harold Trinkunas, of *Ungoverned Spaces? Alternatives to State Authority in an Era of Softened Sovereignty* (Stanford University Press, 2010), which explores the dangers “ungoverned spaces”—ranging from the Afghan-Pakistan border to cyberspace—pose to states. Her most recent monograph is *The Social Construction of Russia’s Resurgence: Aspirations, Identity and Security Interests* (Johns Hopkins University Press, 2009). She is co-editor, with Peter R. Lavoy and Susan B. Martin, of *Terrorism, War or Disease? Unraveling the Use of Biological Weapons* (Stanford University Press, 2008). Other recent publications include “The Fight Against Terrorist Financing” in *Political Science Quarterly* (Winter 2006/2007), and contributions to *Global Politics of Defense Reform* (Palgrave MacMillan, 2008), and *Terrorist Attacks And Nuclear Proliferation: Strategies For Overlapping Dangers* (Academy of Political Science, 2007).

Clunan has twenty years of experience directing international educational non-profit organizations. Prior to her academic career, she founded and led the Civic Education Project, Inc., an international non-governmental organization dedicated to promoting civil society and educational development in twenty-six former communist countries. Clunan has worked in the United States Senate, the U.S. Department of State, and the British Houses of Parliament. In 1999 she received the Velvet Revolution Award from the Czech and Slovak governments for her work promoting democracy and friendship between the peoples of the Czech and Slovak Republics and the United States of America. She received her undergraduate degree from Georgetown University’s School of Foreign Service.

Dr. Patricia Shamai, Lecturer in International Relations at the University Portsmouth

Patricia Shamai was recently appointed as a Lecturer in International Relations for the University of Portsmouth (UK). Prior to this, she completed a Ph.D. at The University of Southampton (UK), with a dissertation entitled “The Stigmatisation of Certain Contemporary Weapons of War: Its Origins, Evolution and Development.” Her main areas of interest are US and UK national security and foreign policy, focusing on nuclear terrorism and counter proliferation, nuclear non-proliferation and arms control and energy security issues. She has presented her research to a variety of academic, scientific, military and governmental representatives within the UK and the United States, and has attended the University of California Institute on Global Conflict and Cooperation (IGCC) Public Policy and Nuclear Threats Training Program (PPNT), and the subsequent IGCC, PPNT Winter Conference. Outside of academia, she has also worked for over eight years for the UK National Health Service and as an Intern for The British American Security Information Council. She has an MSc from the University of Southampton in International Relations and Security Studies and a Bachelors degree in International Relations and Strategic Studies from Lancaster University (UK).

Mr. Kalman Robertson, Ph.D. Candidate, Strategic and Defence Studies Centre, Australian National University

Kalman Robertson joined the SDSC as a Ph.D. candidate in February 2011. His thesis will examine the operation of international organizations tasked with verifying state compliance with multilateral WMD treaties. He is investigating the effectiveness of international nuclear safeguards in detecting and deterring nuclear proliferation in non-nuclear weapon states in light

of contemporary trends in the nuclear industry. Kalman recently received Bachelor’s degrees with First Class Honors from ANU in Law and Physics. In 2010, Kalman worked as an intern for the International Law Office of the Commonwealth Attorney-General’s Department in counter-terrorism, nuclear non-proliferation, and civil aviation security. Kalman has worked part-time on studies of nuclear structure with the ANU Department of Nuclear Physics since 2008. He is particularly interested in developing the theories of internal electron-positron pair formation, atomic radiations, and nuclear fission yields.

Mr. Andrew Kurzrok, Research Associate, Pacific Northwest National Laboratory

Andrew Kurzrok is a Research Associate at the Pacific Northwest National Laboratory in Seattle, WA, where he focuses on safeguards policy and industry engagement. He has previously worked on non-proliferation and disarmament issues for the Department of State at the U.S. Mission to the International Atomic Energy Agency in Vienna, Austria. He also researched U.N. Security Council Resolution 1540 issues for the Managing Across Borders Program the Stimson Center in Washington, D.C. Andrew graduated from Yale University with a B.A. in Political Science. His senior thesis investigated supply-side factors in proliferation.

Mr. David Vielhaber, M.A. Candidate, Nonproliferation and Terrorism Studies, Monterey Institute of International Studies

David Vielhaber is a second-year graduate student in the nonproliferation & terrorism studies program at the Monterey Institute of International Studies. He also works as a graduate research assistant at the James Martin Center for Nonproliferation Studies. His research interests include security and nonproliferation issues in the Middle East, WMD terrorism, and counter-proliferation. He recently completed his Master’s thesis on the effectiveness of covert action in counter-proliferation. In the fall of 2010, he served as a junior political officer in the WMD branch at the United Nations Office for Disarmament Affairs in New York. Originally from Germany, Vielhaber earned his B.A. First Class Honors in international relations and security studies from the University of Bradford, United Kingdom, in 2009.

ASSESSING LEGISLATIVE POLITICS AND WAYS FORWARD FOR NUCLEAR POLICY

Dr. Zachary Zwald, Assistant Professor, U.S. Air War College and the USAF Counter-proliferation Center

Zachary Zwald is an Assistant Professor appointed in the U.S. Air War College and the USAF Counter-proliferation Center. He received his PhD from the Department of Political Science at the University of California at Berkeley, with a focus on International Relations. Since then, he was a Post-Doctoral Fellow at the Mershon Center for International Security Studies at the Ohio State University and taught in the Department of Politics at the University of California at Santa Cruz. Zwald’s research is on the psychological aspects of judgment and decision-making on issues at the intersection of technology and international security. Currently, his research examines the thinking behind U.S. policymakers’ positions on ballistic missile defense as well as on nuclear doctrine and force structure

Dr. Tom Karako, Assistant Professor of Political Science, Kenyon College

Tom Karako is an Assistant Professor of Political Science at Kenyon College and the Interim Director of Kenyon's Center for the Study of American Democracy. Karako received his Ph.D. in Politics and Policy from Claremont Graduate University. Before joining Kenyon, he previously taught national security policy, American government, and constitutional law at Claremont McKenna College and California State University, San Bernardino. For the 2010-11 academic year, he was selected to be an American Political Science Association Congressional Fellow, during which time he worked with the professional staff of the House Armed Services Committee on U.S. strategic forces policy, nonproliferation, and NATO. Dr. Karako has published on U.S. defense policy, state politics, and executive-congressional relations. He is currently writing on ballistic missile proliferation and on the independent constitutional authority of the president to enter into international agreements.

Ms. Anya Loukianova, Ph.D. Candidate, Policy Studies, University of Maryland

Anya Loukianova is a doctoral student at the University of Maryland's School of Public Policy and a graduate assistant at the Center for International and Security Studies at Maryland (CISSM). From 2007-2009 and in the summer of 2011, she was a research associate at the Monterey Institute's James Martin Center for Nonproliferation Studies (CNS) in Monterey, CA and Washington, DC. Anya's research is focused on transparency and CSBMs in the U.S.-Russian and NATO-Russian relationships. Her dissertation deals with U.S. efforts during the past two decades to develop a cooperative airspace security structure through the networking and integration of military and civilian air traffic control systems in Central and Eastern Europe. Anya holds an MPIA from the University of Pittsburgh's Graduate School of Public and International Affairs (GSPIA).

Mr. Stephen Schwartz, Editor, The Nonproliferation Review and WMD Junction, James Martin Center for Nonproliferation Studies, Monterey Institute for International Studies

Stephen I. Schwartz is editor of The Nonproliferation Review and its new online companion, WMD Junction, both published by the James Martin Center for Nonproliferation Studies at the Monterey Institute of International Studies (MIIS). He is also an adjunct professor at MIIS and the author, most recently, of *Nuclear Security Spending: Assessing Costs, Examining Priorities* (Carnegie Endowment for International Peace, 2009). From 1998 to 2005, Mr. Schwartz served as publisher and executive director of the Bulletin of the Atomic Scientists. From 1994 to 1998, he was a guest scholar with the Foreign Policy Studies Program at the Brookings Institution, where he directed the U.S. Nuclear Weapons Cost Study Project and edited and co-authored the award-winning book, *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940*. Before working at Brookings, he was the Washington representative for the Alliance for Nuclear Accountability (1992-1994), a national network of more than 30 organizations addressing safety, security, and environmental issues at the Department of Energy's nuclear weapons production complex, and the first legislative director for nuclear campaigns at Greenpeace USA (1988-1992).

A widely published analyst and regular commentator on nuclear policy issues, Mr. Schwartz received a B.A. in sociology (summa cum laude and college honors) with a minor in politics from the University of California, Santa Cruz.

KEYNOTE & DINNER ADDRESS

Dr. Bruce Goodwin, Principal Associate Director, Weapons and Complex Integration, Lawrence Livermore National Laboratory

Bruce Goodwin is the principal associate director for Weapons and Complex Integration at Lawrence Livermore and has lead the nuclear weapons program at LLNL since 2001. He has been a key player in the success of the nuclear weapons program since 1981, first at Los Alamos National Laboratory and then at LLNL since 1985. He led the process to certify LLNL nuclear weapons and was responsible for establishing priorities, developing strategies and designing and maintaining LLNL's nuclear weapons; for the past ten years he has been responsible for leading the Stockpile Stewardship Program. Goodwin lead the development of innovative reuse methods to extend stockpile lifetimes and streamline manufacturing. He champions cutting edge high performance computing for national security and broad national competitiveness. He won the Department of Energy's E.O. Lawrence Award for innovative weapons science for demonstrating that plutonium behaves in a fundamentally different way than previously thought -- now the basis for understanding weapons performance. Goodwin received his doctorate and Master's degree in aeronautical and astronautical engineering from the University of Illinois, and a Bachelor's degree in physics from City College of New York. He is a member of the American Physical Society, a recipient of many awards and the author of numerous publications. As one of the world's leading theoretical experts in plutonium and implosion dynamics, he often presents weapons physics to the community, officials and members of Congress.

EXPLORING NEW DIMENSIONS OF NUCLEAR STRATEGY

Dr. Michael Nacht, Professor of Public Policy, University of California, Berkeley

Michael Nacht has had three tours of government service and stepped down in mid-2010 after serving as Assistant Secretary of Defense for Global Strategic Affairs for more than a year. He also served a three-year term as a member of the U.S. Department of Defense Threat Reduction Advisory Committee, for which he chaired panels on counter terrorism and counter proliferation of weapons of mass destruction, reporting to the deputy secretary of defense. He continues to consult with Los Alamos and Lawrence Livermore national laboratories on national security and homeland defense. From 1994-1997, Nacht was assistant director for Strategic and Eurasian Affairs at the Arms Control and Disarmament Agency, leading its work on nuclear arms reduction negotiations with Russia and initiating nuclear arms control talks with China. He participated in five summit meetings with President Clinton — four with Russian President Boris Yeltsin and one with Chinese President Jiang Zemin. Nacht has testified before Congress on subjects ranging from arms control to the supply and demand for scientists in the workplace.

Mr. Tim McDonnell, Program Associate, Woodrow Wilson International Center for Scholars, and M.A. Candidate, Security Policy Studies, George Washington University

Tim McDonnell is a program associate with the Wilson Center’s Nuclear Proliferation International History Project, and an M.A. candidate in security policy studies at the George Washington University. He earned his B.A. from Wheaton College in Massachusetts with majors in political science and Russian studies. At the Wilson Center his work centers around Cold War history and the international history of nuclear weapons issues. His particular interests include nuclear strategy, proliferation, and strategic command and control.

Mr. Tristan Volpe, Ph.D. Candidate, Department of Political Science, George Washington University

Tristan Volpe is a Ph.D. Candidate in Political Science at the George Washington University, with an emphasis in international relations theory, security studies, and quantitative methodology. He is currently working on a dissertation that examines why states choose specific nuclear fuel-cycle postures, and how spatial-temporal variation in these postures impacts regional security outcomes.

Tristan received additional professional training in game theory from the University of Michigan and nuclear non-proliferation policy from Brookhaven National Laboratory. He holds a university fellowship to conduct archival research on the early history of nuclear weapons use and control. Prior to graduate school, Tristan studied comparative politics at the University of California, Los Angeles (UCLA) and political theory at the University of Edinburgh.

Mr. Emmanuel Nal, Consultant – Junior Lecturer, University of Tours

Emmanuel Nal is a consultant for the French ministry of Defense, and teaches at the French universities of Tours and Poitiers. He worked for four years as a research fellow at the Center for Strategic Research at the Ecole Militaire, French Ministry of Defence, specializing in nuclear deterrence, nuclear and ballistic proliferation, antimissile ballistic defense, arms control and crisis management. He holds a Master’s degree in philosophy and politics from the University of Paris-I Sorbonne, and another Master’s degree in international mediation and crisis management. He is a Ph.D. candidate at Paris-VIII, and his dissertation topic is titled “Kairos: time and opportunity in strategy.”

Mr. Aaron Van Noy, Systems Engineer, Northrop Grumman Aerospace Systems

Aaron Van Noy is a Northrop Grumman systems engineer for the U.S. Air Force’s Intercontinental Ballistic Missile Prime Integration Contract. Upon joining Northrop Grumman (formerly TRW) in 2002, Mr. Van Noy began work in test and integration for the Minuteman III (MMIII). He was a member of the team that integrated GPS into the MMIII ICMB flight test program. Mr. Van Noy has extensive experience in instrumentation, flight test and component qualification testing, and also has worked in flight assessment, fabrication, test planning/execution/evaluation, and RF testing. He has managed several programs and currently works in the Reentry System Reentry Vehicle test and assessment group. After graduating from Cairo American College in Egypt, Mr.

Van Noy received his B.S. in Electrical Engineering from Brigham Young University, Provo, Utah. Mr. Van Noy lives with his wife, two daughters and two sons in northern Utah. Needless to say, he is a Star Trek Fan.

LOOKING AHEAD TO FUTURE NUCLEAR FORCE REDUCTIONS

Dr. Scott Sagan, Co-Director, Center for International Security and Cooperation and Caroline S.G. Munro Professor of Political Science, Stanford University

Scott D. Sagan is the Caroline S.G. Munro Professor of Political Science, co-director of Stanford’s Center for International Security and Cooperation, and a senior fellow at the Freeman Spogli Institute. 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), the editor of *Inside Nuclear South Asia* (Stanford University Press, 2009), and co-editor with Steven E. Miller of a two-volume special issue of *Daedalus*, *On the Global Nuclear Future* (Fall 2009 and Winter 2010). 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*. In addition, he co-edited with Jane Vaynman a special section of *The Nonproliferation Review* on the international impact of the 2010 U.S. Nuclear Posture Review, also co-authoring the introduction and conclusion pieces.

Dr. Dane Swango, Lecturer, Department of Political Science, University of California, Los Angeles

Dane Swango is a Lecturer in the Department of Political Science at the University of California, Los Angeles. His research examines how the Nuclear Nonproliferation Treaty operates to limit nuclear proliferation. He also has significant experience in East Asian security issues, a secondary research interest. He received his doctorate in political science from UCLA, with undergraduate degrees in economics and physics from Duke University.

Ms. Sarah Elizabeth Cross, Graduate Research Intern, Brookhaven National Laboratory

Sarah began a Graduate Research Fellowship at Brookhaven National Laboratory (BNL) in June of 2011. As part of her Fellowship she is compiling two reports for the U.S. Department of Energy which will explore the mechanisms by which the International Atomic Energy Agency is both funded and staffed and address the political, institutional and legal barriers to improving both systems as the Agency copes with current and future resource challenges. Prior to joining BNL she worked as an Arms Control Research Assistant at Ploughshares Fund. Sarah completed her Master's degree in Nonproliferation and International Security at King's College London in August 2010. Currently, her primary research interest concerns how previous and current nonproliferation and arms control regimes have struck a balance, if at all, between the need for transparency, verification and the protection of proprietary and national security information. She has a degree in International Relations from the University of St Andrews in Scotland.

Ms. Jessica Bufford, M.A. Candidate in Nonproliferation and Terrorism Studies, Monterey Institute of International Studies

Jessica Bufford is a M.A. candidate in Non-Proliferation and Terrorism Studies with a Certificate in Conflict Resolution at the Monterey Institute of International Studies (MIIS). She received her B.A. in Political Science and French, graduating with honors for a thesis on the process of European integration. Interested in the challenges of disarmament and the art of diplomacy, she has combined the two areas through her studies at MIIS and her work at the James Martin Center for Nonproliferation Studies as a Graduate Research Assistant. This summer she was an intern at the Lawrence Livermore National Laboratory where she developed the ideas in her presentation and participated in the 2011 Institute of Nuclear Materials Management conference. She has returned to MIIS for her third semester of studies this fall.

Mr. Christopher Ryan, Research Scientist, Lawrence Livermore National Laboratory

Christopher Ryan received a B.S. in nuclear engineering from Texas A&M University (College Station, TX) in May 2007. Following the completion of his undergraduate degree, he worked as a reactor inspector and project engineer for the United States Nuclear Regulatory Commission's Region IV office in Arlington, TX. He returned to Texas A&M in August of 2009 and earned his M.A. in nuclear engineering in May 2011. His Master's thesis was titled "Determining the Impact of Concrete Roadways on Gamma Ray Background Readings for Radiation Portal Monitoring Systems." He is currently a research scientist in the Stockpile Radiochemistry Group at Lawrence Livermore National Laboratory in Livermore, CA.

LUNCH SPEAKER

Dr. Ian Hutcheon, Physicist, Chemical Sciences Division, and Deputy Director, Glenn T. Seaborg Institute

Ian Hutcheon is the Deputy Director of the Glenn Seaborg Institute and group leader for Chemical and Isotopic Signatures in the Chemical Sciences Division at the Lawrence Livermore National Laboratory. He is also the co-lead for nonproliferation nuclear forensics at LLNL. Prior to joining LLNL in 1994, Hutcheon was Senior Research Associate in the Division of Geological Sciences, California Institute of Technology in Pasadena, CA. His technical training is in physics and geochemistry; he received a B.A. (physics) at Occidental College, Los Angeles in 1969 and a Ph.D. in physics from the University of California at Berkeley in 1975. He then spent two years as a post-doctoral fellow and five years as a senior research associate in the Enrico Fermi Institute at the University of Chicago.

Hutcheon has authored over 160 publications in peer-reviewed journals in the areas of secondary ion mass spectrometry, the early history of the solar system, metabolic processes in microbial organisms and nuclear forensic analysis. He also serves on the review panels of NASA Cosmochemistry Program, the NASA Laboratory Analysis of Returned Samples Program and the Deutsche Forschungsgemeinschaft. He is a member of the American Geophysical Union and a Fellow of the Meteoritical Society.

About CSIS

At a time of new global opportunities and challenges, the Center for Strategic and International Studies (CSIS) provides strategic insights and bipartisan policy solutions to decisionmakers in government, international institutions, the private sector, and civil society. A bipartisan, nonprofit organization headquartered in Washington, DC, CSIS conducts research and analysis and develops policy initiatives that look into the future and anticipate change. Founded by David M. Abshire and Admiral Arleigh Burke at the height of the Cold War, CSIS was dedicated to finding ways for America to sustain its prominence and prosperity as a force for good in the world.

Since 1962, CSIS has grown to become one of the world's preeminent international policy institutions, with more than 220 full-time staff and a large network of affiliated scholars focused on defense and security, regional stability, and transnational challenges ranging from energy and climate to global development and economic integration.

Former U.S. senator Sam Nunn became chairman of the CSIS Board of Trustees in 1999, and John J. Hamre has led CSIS as its president and chief executive officer since April 2000.

About the Project on Nuclear Issues

The role of nuclear weapons in international security has changed since the end of the Cold War, but the need to maintain technical and policy expertise to deal with nuclear challenges remains the same. For a host of reasons, including the declining emphasis on nuclear weapons in the post-Cold War international security environment, expertise on nuclear issues became an acute challenge, particularly among younger generations. For this reason, CSIS launched the Project on Nuclear Issues (PONI) in 2003 to develop the next generation of nuclear experts. Since that time PONI has grown tremendously, from a small club involving a few dozen people to a large, multi-faceted program with over 1,100 members. The project has three primary objectives. First, PONI aims to build and sustain a networked community of young nuclear experts from across the nuclear enterprise, including in the laboratories, military, industry, academia, and policy world. Second, the project seeks to help develop the next generation of leaders with both the necessary subject matter expertise and the professional skills to be effective in shaping and implementing policy. Third, PONI works to mobilize the wide-ranging nuclear expertise within its membership ranks to generate new ideas and advance the public debate on all issues concerning nuclear weapons.

To that end, PONI maintains an enterprise-wide membership base, hosts four major conferences and several smaller events each year, maintains an online blog, holds live debates on critical nuclear weapons issues, runs a six-month academic program for young experts, organizes bilateral exchanges involving young experts from the U.S. and abroad, oversees a working group of top young professionals, and distributes bi-weekly news and event announcements to members. In all that it does, PONI seeks to create forums for knowledge transfer between generations and between sectors, as sustaining these interactions will be crucial to the development and implementation of effective nuclear policy, both now and in the future.



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