INSTRUCTORS: Siegfried S. Hecker and William J. Perry

Contact Information:
For contacting Prof. Hecker and for administrative issues related to the course, please see Peter Davis: ped1123@stanford.edu
For contacting Prof. Perry, please see Deborah Gordon: dgcordon@stanford.edu

CAs:
Lauren Cipriano (Head CA): cipriano@stanford.edu
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Matt Daniels: mattpd@stanford.edu
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Gabriel Shields-Estrada: gse@stanford.edu

CLASS TIME: Monday/Wednesday 4:15-5:30PM, Gates B1 Auditorium

OVERVIEW: In this course you will explore the relationship between national security policy and technology from early history to modern day. Much of the course is focused on security challenges since World War II, including current security challenges and the role that technology plays. We will discuss regional security challenges such as those of North Korea and Northeast Asia, Iran and the Middle East, Russia, China and South Asia. We will also cover topical security areas such as nuclear weapons and nuclear proliferation, terrorism, counterinsurgency, intelligence, cyber security and biosecurity. We will look at the most pressing security challenges faced by the Obama administration. Class presentations and discussion will feature the experience of practitioners in national security and/or technology, including several guest lectures by eminent people in key areas.

COURSE REQUIREMENTS: This course is offered to both undergraduate and graduate students. It will have the appropriate standards and assignments. There are no specific prerequisite courses, but an interest in international security and the role of policy and technology is advised. The course is offered on-line to SCPD students. For all other students, attendance at lectures and class participation is necessary since most of the material presented is not available in textbooks. Grading is based on students’ performance on homework assignments, including a policy paper.
**HOMEWORK:** Homework will be assigned to test your comprehension of the lecture material. Homework problems include short questions, sample decision tree construction and a short research paper. Assignment, information as to how students should submit their assignment, and due dates will be posted on the class website for each assignment.

<table>
<thead>
<tr>
<th>Date Assigned</th>
<th>Style of Homework</th>
<th>Due Date (at 3:30 pm)</th>
<th>How to Submit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW 1 Oct 3</td>
<td>Short answer (10 q)</td>
<td>Oct 10</td>
<td>Online; Use the Assignments Tab in Coursework</td>
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<tr>
<td>HW 2 Oct 12</td>
<td>Short answer (10 q)</td>
<td>Oct 19</td>
<td>Online; Use the Assignments Tab in Coursework</td>
</tr>
<tr>
<td>HW 3 Oct 19</td>
<td>Decision tree &amp; executive summary</td>
<td>Oct 26</td>
<td>Paper; Encina Hall, 2nd floor, East Wing</td>
</tr>
<tr>
<td>HW 4 Oct 26</td>
<td>Short Research Paper &amp; Qualitative analysis</td>
<td>Nov 2</td>
<td>Online; Use the Assignments Tab in Coursework</td>
</tr>
<tr>
<td>HW 5 Nov 14</td>
<td>Short answer (5-10 q)</td>
<td>Nov 28</td>
<td>Online; Use the Assignments Tab in Coursework</td>
</tr>
<tr>
<td>HW 6 Nov 30</td>
<td>Short answer (5-10 q)</td>
<td>Dec 7</td>
<td>Online; Use the Assignments Tab in Coursework</td>
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**POLICY PAPER:** During the quarter, students will be asked to write a policy paper (approximately 5 pages long), prepared as a briefing to the President, national security advisor, or equivalent senior official. The topic will be selected from materials covered in class lectures. The policy paper will be graded and returned to the student with suggestions for improving it. The student must re-submit the paper, incorporating suggested changes as appropriate, after which it will be re-graded.

Students signed up for either MS&E 193 or 293 will write a policy paper that includes, at a minimum, a baseline quantitative analysis in the form of a decision tree. Graduate students taking MS&E 293 will need to incorporate sensitivity analysis into their paper in addition to the decision tree. We will, of course, expect a more detailed analysis from graduate students than undergraduate students. There will be a tutorial on creating decision trees later in the quarter. Students are highly encouraged to meet with course TAs for one-on-one help if needed (TA office hours will be posted later in the quarter). **Please note that the policy paper final deadline has changed. It is now due Monday, December 5, 2011.**

<table>
<thead>
<tr>
<th>Key Date</th>
<th>Activity</th>
<th>How to Submit?</th>
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<tbody>
<tr>
<td>Oct 31</td>
<td>Policy Paper question will be announced to the class</td>
<td></td>
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<tr>
<td>Nov 14, 3:30 pm</td>
<td><strong>DUE DATE:</strong> First draft of policy paper</td>
<td>Paper copy to Encina Hall, 2nd floor, East Wing Also submit back-up copy to your Drop Box on Coursework</td>
</tr>
<tr>
<td>Nov 28</td>
<td>First drafts will be returned with</td>
<td></td>
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</table>
**Grading:** Your final course grade will be determined by the policy paper (50%) with the homework assignments constituting the other 50% (equally weighted).

**Readings:** There are no required textbooks for the course. Individual reading assignments and suggestions will be posted on the class website on coursework. URLs are also provided for some selections. The reading materials will enhance your background understanding of the subjects and, in some cases, will give you pertinent current status of issues and challenges. Some are quite long and detailed – these are meant for students who have a serious interest in individual subjects.

**Website:** The course will have a website posted on Coursework [https://coursework.stanford.edu/portal/](https://coursework.stanford.edu/portal/). The lectures will be posted on the website the day after they are given in class. Assignments, exam instructions, office hours, and the latest version of the syllabus will all be posted on the website.

**Office Hours:** Professor Hecker and Perry will not be holding office hours. They encourage you, however, to sign up for one of the brown bag lunches being offered (see below). Teaching assistants will begin regular office hours starting the week of October 17. Check coursework for days, times and locations.

**Brown Bag Lunches:** Brown bag lunches offer students the opportunity to follow up on course material or other questions in a smaller setting with Professor Hecker and Professor Perry. They are offered once a week beginning in the second week of classes at Encina Hall – the specific room is listed next to the date below. Lunch will be served. You must RSVP for brown bags as space is limited – RSVPs will be first come first serve. For those brown bags with high demand, priority will be given to students who have not yet attended a brown bag. To RSVP, you may email Peter Davis at ped1123@stanford.edu.

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<thead>
<tr>
<th>Date</th>
<th>Brown Bag Speaker</th>
<th>Location</th>
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<tbody>
<tr>
<td>October 6</td>
<td>Prof. Siegfried Hecker</td>
<td>12:00-1:00pm, CISAC East Conference Room</td>
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<tr>
<td>October 10</td>
<td>Prof. William Perry</td>
<td>12:00-1:00pm, CISAC Central Conference Room</td>
</tr>
<tr>
<td>October 21</td>
<td>Prof. Siegfried Hecker</td>
<td>12:00-1:00pm, Encina Hall Room E008</td>
</tr>
<tr>
<td>October 27</td>
<td>Prof. William Perry</td>
<td>12:00-1:00pm, CISAC East Conference Room</td>
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<tr>
<td>November 3</td>
<td>Prof. Siegfried Hecker</td>
<td>12:00-1:00pm, CISAC East Conference Room</td>
</tr>
<tr>
<td>November 9</td>
<td>Prof. Siegfried Hecker</td>
<td>12:00-1:00pm, CISAC East Conference Room</td>
</tr>
<tr>
<td>November 17</td>
<td>Prof. William Perry</td>
<td>12:00-1:00pm, CISAC East Conference Room</td>
</tr>
<tr>
<td>December 2</td>
<td>Prof. Siegfried Hecker</td>
<td>12:00-1:00pm, CISAC East Conference Room</td>
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</table>
**PROBLEM SESSIONS:** There will be three problem/discussion sections held throughout the quarter. The objective of these sessions will be to assist students with the analytic methods used in the class. In addition there will be a session about how to write a policy paper in which we will discuss the organization and purpose of a policy paper.

<table>
<thead>
<tr>
<th>Date</th>
<th>Session Topic</th>
<th>Location</th>
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<tbody>
<tr>
<td>October 14</td>
<td>Decision Trees</td>
<td>4:15-5:05pm, Gates B01</td>
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<tr>
<td>October 21</td>
<td>Sensitivity Analysis</td>
<td>4:15-5:05pm, Gates B01</td>
</tr>
<tr>
<td>November 4</td>
<td>Tips for writing a policy paper</td>
<td>4:15-5:05pm, Gates B01</td>
</tr>
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**LECTURE SCHEDULE AND DATES OF NOTE:**

**Monday, September 26**

**Prof. William J. Perry: Early History**
- From Crossbow to H-Bomb, Bernard Brodie and Fawn Brodie, Indiana University Press, 1973
  - Chapters 1: Antiquity, Chapter 2: Middle Ages, and Chapter 3: Impact of Gunpowder

**Wednesday, September 28**

**Prof. William J. Perry: United States’ Civil War and World War I**

**Monday, October 3**

**Prof. William J. Perry: World War II**

**Wednesday, October 5**

**Prof. Siegfried S. Hecker: Promise and peril of nuclear energy**
  http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=7960850

Monday, October 10  (Homework 1 due)
Prof. William J. Perry: Cold War and Offset Strategy
• William J. Perry, Desert Storm and Deterrence, Foreign Affairs, 1991
• William J. Perry, Military Technology: an Historical Perspective, Technology in Society, 2004
• X, Sources of Soviet Conduct, Foreign Affairs, 1947
  http://fullaccess.foreignaffairs.org/19470701faessay25403/x/the-sources-of-soviet-conduct.html

Wednesday, October 12  (Homework 2 assigned)
Prof. Siegfried S. Hecker: Cold War, Arms Control, Nuclear Proliferation
• David Holloway, Stalin and the Bomb, Yale University Press, New Haven, Connecticut, 1994 (Great overview of Russian nuclear program history).
• Thomas C. Schelling, Arms and Influence (New Haven: Yale University Press, 1967), ch. 1, pp. 1 34.

Friday, October 14: Last Day to Drop the Class
Friday, October 14
Tutorial Session: How to build a decision tree

Monday, October 17
Dr. Joseph Martz: Nuclear Weapons, Effects and Evolution of U.S. Arsenal
• TBD

Wednesday, October 19  (Homework 2 due, Homework 3 assigned)
Prof. Siegfried S. Hecker: Russia in Transition, New Nuclear Threats, India and Pakistan
Friday, October 21  
Tutorial Session: How to do sensitivity analysis  
(Time and location to be announced on the class website)

Monday, October 24  
Prof. Siegfried S. Hecker: Nuclear Proliferation and Nuclear Terrorism  

Wednesday, October 26  
Prof. Siegfried S. Hecker: North Korea, Iran and Syria  

Thursday, October 27 (4:00pm – 5:30pm)  
Sidney Drell Annual Lecture: “From the Manhattan Project to the Cloud: Arms Control in the Information Age,” Rose Gottemoeller, Assistant Secretary of State for Arms Control, Verification, and Compliance, Located in Tresidder Oak Lounge, Attendance not mandatory

Monday, October 31  
Prof. William J. Perry: Post-Cold War, Nunn-Lugar Program, Modern Security Threats  
- Ashton Carter and William Perry, Preventive Defense, Brookings Institution Press, 1999, Chapter 1, 2, 3, 5

Wednesday, November 2  
Dr. Feroz Khan: Pakistan and Security in South Asia  


Friday, November 4
Tutorial Session: Tips for writing a policy paper
(Time and location to be announced on the class website)

Monday, November 7
Prof. Abbas Milani: Iran’s Nuclear Program: Past Contours, Future Challenges


Wednesday, November 9
Col. Joseph Felter: Insurgency and Counterinsurgency (readings tentative)


Monday, November 14  (First draft of policy paper due and Homework 5 assigned)
Dr. Paul Jackson: Biosecurity Challenges

• TBD

Wednesday, November 16
Dr. Paul Jackson: Biosecurity II

• TBD
Friday, November 18: Change of Grading Basis Deadline

(Thanksgiving Recess)

Monday, November 28  (First draft policy papers returned)
Dr. Frank Pabian: Intelligence and Technology: From Corona to Commercial
(And Prof. Hecker on guidance for re-writing policy papers)

Wednesday, November 30  (Homework 5 due; Homework 6 assigned)
Prof. Martha Crenshaw: Can Nuclear Terrorism be Deterred?
(And Prof. Hecker on guidance for re-writing policy papers)

Monday, December 5  (Policy paper re-write due)
Dr. David Bishop: Cybersecurity
  • TBD

Wednesday, December 7  (Homework 6 due)
William J. Perry and Siegfried S. Hecker: World without nuclear weapons; Nuclear Risk Reduction Project, Course Wrap-up
  • Michael May, The Trouble with Disarmament: Abolishing nuclear weapons is a good idea in theory. In practice, however, it would be impossible to verify and would make the world less safe. The Bulletin of the Atomic Scientists, Vol. 64, No. 5, pp. 20-21. November/December 2009.

Monday, December 12 (FINAL EXAM PERIOD)
Speaker biographies:

Lecturers

Hecker, Siegfried is a professor (research) in the Department of Management Science and Engineering, a senior fellow at the Freeman Spogli Institute (FSI), and co-director of the Center for International Security and Cooperation (CISAC). He is also an emeritus director of Los Alamos National Laboratory. Over the past 15 years, he has fostered cooperation with the Russian nuclear laboratories to secure and safeguard the vast stockpile of ex-Soviet fissile materials. Hecker works closely with the Russian Academy of Sciences and is actively involved with the U.S. National Academies, serving as a member of the National Academies Committee on International Security and Arms Control Nonproliferation Panel. Hecker joined Los Alamos National Laboratory as graduate research assistant and postdoctoral fellow before returning as technical staff member following a tenure at General Motors Research. He led the laboratory’s Materials Science and Technology Division and Center for Materials Science before serving as laboratory director from 1986 through 1997, and senior fellow until July 2005.

Perry, William is the Michael and Barbara Berberian Professor at Stanford University, with a joint appointment at FSI and the School of Engineering. He is a senior fellow at FSI and serves as co-director of the Preventive Defense Project, a research collaboration of Stanford and Harvard Universities. He is an expert in U.S. foreign policy, national security and arms control. He was the co-director of CISAC from 1988 to 1993, during which time he was also a professor (half time) at Stanford. Professor Perry was the 19th secretary of defense for the United States, serving from February 1994 to January 1997. He previously served as deputy secretary of defense (1993-1994) and as under secretary of defense for research and engineering (1977-1981).

Speakers:

Bishop, David is currently the head of the Division of Materials Science and Engineering at Boston University. He most recently served as the CTO/COO of LGS, the wholly-owned subsidiary of Alcatel-Lucent dedicated to serving the U.S. federal government market with advanced R&D solutions. Most recently he was President of Government Research & Security Solutions for Bell Labs, Lucent Technologies. Dr. Bishop is a Bell Labs Fellow and in his previous positions with Lucent he served as Nanotechnology Research VP for Bell Labs, Lucent Technologies; President of the New Jersey Nanotechnology Consortium and the Physical Sciences Research VP. He joined AT&T-Bell Laboratories Bell Labs in 1978 as a postdoctoral member of staff and in 1979 became a Member of the Technical Staff. In 1988 he was made a Distinguished Member of the Technical Staff and later that same year was promoted to Department Head, Bell Laboratories. Dr. Bishop graduated from Syracuse University in 1973 with a B.S. in Physics. In 1977 he received an M.S. in Physics from Cornell University and in 1978 he received a Ph.D. in Physics from Cornell.
Crenshaw, Martha is a senior fellow at CISAC and FSI and a professor of political science by courtesy. She was the Colin and Nancy Campbell Professor of Global Issues and Democratic Thought and professor of government at Wesleyan University in Middletown, Conn., from 1974 to 2007. She is a Lead Investigator with START (the National Center for the Study of Terrorism and Responses to Terrorism), a Center of Excellence established by the Department of Homeland Security. Her current research projects focus on why the U.S. is targeted by terrorism and the effectiveness of counterterrorism policies.

Felter, Joseph joined CISAC as a Senior Research Scholar in September 2011. Felter is a colonel in the U.S. Army and a career Army Special Forces officer with distinguished service in a variety of special operations assignments. He has conducted foreign internal defense and security assistance missions across East and Southeast Asia and has participated in operational deployments to Panama, Iraq, and twice to Afghanistan.

He formerly led the International Security and Assistance Force, Counterinsurgency Advisory and Assistance Team (CAAT) in Afghanistan reporting directly to Gen. David Petraeus and advising him on counterinsurgency strategy. Felter also directed the Combating Terrorism Center (CTC) at West Point from 2005-2008 and is a Research Fellow at the Hoover Institution. He has published many scholarly articles on the topic of counterinsurgency and has focused on the study of how to combat the root causes of terrorism.

Jackson, Paul: Paul Jackson received his Bachelor’s of Science degree from the University of Washington and his Ph.D. from the University of Utah in molecular biology. For the past 18 years he has been studying bacterial pathogens, first working to develop DNA-based methods of detecting these microbes and their remnants in environmental and laboratory samples, then developing methods to differentiate among different strains of the same pathogenic species. His methods are currently applied for forensic analysis of samples and aid in identifying the source of disease outbreaks. He contributed to analysis of the Bacillus anthracis present in the 2001 Amerithrax letters and conducted detailed analyses of human tissue samples preserved from the 1979 Sverdlovsk anthrax outbreak, providing evidence that was inconsistent with claims of a natural anthrax outbreak. His current work continues to focus on development of assays that rapidly detect specific signatures including antibiotic resistance in threat agents and other pathogens. More recent efforts are focused on exploiting genetic information about the pathogens that can be used to develop effective new antimicrobial compounds to combat these microbes. Paul spent 24 years as a Technical Staff Member at Los Alamos National Laboratory where he was heavily involved in development of the biological threat reduction efforts there. He was appointed a Laboratory Fellow at Los Alamos in recognition of his efforts. He moved to
Lawrence Livermore National Laboratory in 2005 where he is presently Division Leader of the Biosciences and Biotechnology Division and heads the Host Pathogen Biology Group. In addition to his work at the National Laboratories, he served on the FBI’s Scientific Working Group for Microbial Forensics, on NIH study sections and review panels, and on steering and oversight committees for other federal agencies.

**Khan, Feroz Hassan (Brigadier General retired)** is currently on the faculty of the Department of National Security Affairs in U.S. Naval Postgraduate School, Monterey California. He previously served with the Pakistani Army for 32 years. His last held the post of Director, Arms Control and Disarmament Affairs, within the Strategic Plans Division, Joint Services Headquarters, which is the secretariat of Pakistan’s Nuclear Command Authority. His military career blends with numerous diplomatic and scholarly assignments. He has experienced combat action and command on active fronts on the line of control in Siachin Glacier and Kashmir. He served domestically and abroad in the United States, Europe, and South Asia, in particular assisting Pakistan’s nuclear diplomacy. Among his academic degrees, General Khan holds an M.A. from the Paul Nitze School of Advanced International Studies, The Johns Hopkins University. He has held a series of visiting fellowships at Stanford University; the Woodrow Wilson International Center for Scholars; the Brookings Institution; the Center for Non-Proliferation Studies at the Monterey Institute of International Studies; and the Cooperative Monitoring Center, Sandia National Laboratory. Since mid 1990s, General Khan has been making key contributions in formulating and advocating Pakistan’s security policy on nuclear and conventional arms control and strategic stability in South Asia. He has produced recommendations for the Ministry of Foreign Affairs and represented Pakistan in several multilateral and bilateral arms control negotiations. He has published and participated in several security related national and international conferences and seminars. He has also been teaching as a visiting faculty member at the Department of the Defense and Strategic Studies, Quaid-e-Azam University, Islamabad. General Khan is currently writing a book on the history of Pakistan’s nuclear weapons and U.S. policy, expected publication in 2010.

**Martz, Joseph** has had a 20+ year career focused on issues surrounding nuclear security and nuclear weapons. The majority of his career has focused on nuclear weapons and materials, and he has led a variety of national and international projects related to nuclear weapon design and maintenance, plutonium storage and disposition, stockpile life extension and plutonium aging, nuclear operations, and nuclear intelligence analysis. Dr. Martz is a 25 yr. employee of the Los Alamos National Laboratory in which he has served in a variety of research, leadership and management positions. In addition to his research at Los Alamos, he has led national project teams including the recent reliable-replacement warhead design competition and several complex nuclear material experiments. Dr. Martz is the author of over 50 papers and invited presentations in these areas.
Milani, Abbas is the Hamid and Christina Moghadam Director of Iranian Studies at Stanford University and a visiting professor in the department of political science. In addition, Dr. Milani is a research fellow and co-director of the Iran Democracy Project at the Hoover Institution. His expertise is U.S./Iran relations, Iranian cultural, political, and security issues.

Milani was a professor of history and political science and chair of the department at Notre Dame de Namur University and a research fellow at the Institute of International Studies at the University of California at Berkeley. Milani was an assistant professor in the faculty of law and political science at Tehran University and a member of the board of directors of Tehran University’s Center for International Studies from 1979 to 1987. He was a research fellow at the Iranian Center for Social Research from 1977 to 1978 and an assistant professor at the National University of Iran from 1975 to 1977.

Dr. Milani is the author of Eminent Persians: Men and Women Who Made Modern Iran, 1941-1979, (Syracuse University Press, Syracuse, NY, 2 volumes, November, 2008); King of Shadows: Essays on Iran’s Encounter with Modernity, Persian text published in the U.S. (Ketab Corp., Spring 2005); Lost Wisdom: Rethinking Persian Modernity in Iran, (Mage 2004); The Persian Sphinx: Amir Abbas Hoveyda and the Riddle of the Iranian Revolution (Mage, 2000); Modernity and Its Foes in Iran (Gardon Press, 1998); Tales of Two Cities: A Persian Memoir (Mage 1996); On Democracy and Socialism, a collection of articles coauthored with Faramarz Tabrizi (Pars Press, 1987); and Malraux and the Tragic Vision (Agah Press, 1982). Milani has also translated numerous books and articles into Persian and English.


He is a member of the American Association of Political Science, member of the board of directors for ISG (Iranian Studies Group at MIT), and the Association of Iranian Studies.

Milani received his BA in political science and economics from the University of California at Berkeley in 1970 and his PhD in political science from the University of Hawaii in 1974.
Pabian, Frank is a senior nonproliferation infrastructure analyst at Los Alamos National Laboratory, has over 37 years experience in the nuclear nonproliferation field including six years with the Office of Imagery Analysis and 18 years with Lawrence Livermore National Laboratory’s “Z” Division. Frank also served as a Chief Inspector for the International Atomic Energy Agency during United Nations inspections in Iraq from 1996-1998 focusing on “Capable Sites.” In December 2002, Frank served as one of the first US nuclear inspectors back in Iraq with UN/IAEA. While at Los Alamos National Laboratory, Frank has developed and presented commercial satellite imagery based briefings on foreign clandestine nuclear facilities to the International Nuclear Suppliers Group (NSG), the International Atomic Energy Agency (IAEA), and the North Atlantic Treaty Organization (NATO), and the Foreign Ministries of China and India on behalf of the NNSA and STATE.