



Siegfried Hecker

Professor (Research) of Management Science and Engineering and Senior Fellow at the Freeman Spogli Institute for International Studies, Emeritus

CONTACT INFORMATION

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Bio

BIO

Siegfried S. Hecker is a professor (research) in the Department of Management Science and Engineering and a senior fellow at CISAC and FSI. He is also an emeritus director of Los Alamos National Laboratory. He was co-director of CISAC from 2007-2012.

Hecker's research interests include plutonium science, nuclear weapons policy and international security, nuclear security (including nonproliferation and counter terrorism), and cooperative nuclear threat reduction. Over the past 22 years, he has fostered cooperation with the Russian nuclear laboratories to secure and safeguard the vast stockpile of ex-Soviet fissile materials.

His current research activities focus on the challenges of nuclear India, Pakistan, North Korea, and the nuclear aspirations of Iran. Hecker works closely with the Russian Academy of Sciences and is actively involved with the U.S. National Academies.

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.

Among his professional distinctions, Hecker is a member of the National Academy of Engineering; foreign member of the Russian Academy of Sciences; fellow of the TMS, or Minerals, Metallurgy and Materials Society; fellow of the American Society for Metals; fellow of the American Physical Society, honorary member of the American Ceramics Society; and fellow of the American Academy of Arts and Sciences.

His achievements have been recognized with the Presidential Enrico Fermi Award; the National Academy of Engineering Arthur M. Bueche Award; the American Association for the Advancement of Science Award for Science Diplomacy; the American Physical Society's Leo Szilard Lectureship; the American Nuclear Society's Seaborg Medal; the Department of Energy's E.O. Lawrence Award; the Los Alamos National Laboratory Medal; among other awards including the Eugene L. Grant

Undergraduate Teaching Award at Stanford University and the Alumni Association Gold Medal and the Undergraduate Distinguished Alumni Award from Case Western Reserve University, where he earned his bachelor's, master's, and doctoral degrees in metallurgy.

ACADEMIC APPOINTMENTS

- Professor Emeritus, Freeman Spogli Institute for International Studies
- Affiliate, Precourt Institute for Energy

ADMINISTRATIVE APPOINTMENTS

- Co-Director, Center for International Security and Cooperation, (2007-2012)

HONORS AND AWARDS

- Arthur M. Bueche Award, National Academy of Engineering (September 29, 2014)
- Enrico Fermi Award, The President of the United States and the U.S. Department of Energy (January 12, 2010)
- Award for Science Diplomacy, American Association for the Advancement of Science (February 14, 2014)
- Leo Szilard Lectureship Award, American Physical Society (2011)
- Los Alamos National Laboratory Medal, Los Alamos National Laboratory (2008)
- Alumni Association Gold Medal, Case Western Reserve University (2004)
- Seaborg Medal, American Nuclear Society (2004)
- President's Medal, University of California (1997)
- E.O. Lawrence Award, U.S. Department of Energy (1984)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, National Academy of Engineering (1988 - present)
- Member, American Academy of Arts and Sciences (2013 - present)

PROGRAM AFFILIATIONS

- Center for East Asian Studies
- Iranian Studies

PROFESSIONAL EDUCATION

- PhD, Case Western Reserve (1968)

LINKS

- CISAC Page: <http://cisac.stanford.edu/people/siegfriedshecker>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

plutonium science; nuclear weapons stockpile stewardship; cooperative threat reduction

PROJECTS

- Nuclear Risk Reduction (NRR) Project: Russia - Stanford University - The Center for International Security and Cooperation (CISAC)
- Nuclear Risk Reduction (NRR) Project: China - Stanford University - The Center for International Security and Cooperation (CISAC)
- Nuclear Risk Reduction (NRR) Project: The U.S.-Pakistan Nuclear Working Group (NWG) - Stanford University - The Center for International Security and Cooperation (CISAC)
- Nuclear Risk Reduction (NRR) Project: Iran - Stanford University - The Center for International Security and Cooperation (CISAC)

- Nuclear Risk Reduction (NRR) Project: Korean Peninsula - Stanford University - The Center for International Security and Cooperation (CISAC)
- Nuclear Risk Reduction (NRR) Project: India - Stanford University - The Center for International Security and Cooperation (CISAC)
- Nuclear Risk Reduction (NRR) Project: Central Asia - Stanford University - The Center for International Security and Cooperation (CISAC)

Teaching

COURSES

2019-20

- Nuclear Weapons, Energy, Proliferation, and Terrorism: MS&E 93Q (Spr)

2018-19

- Nuclear Weapons, Energy, Proliferation, and Terrorism: MS&E 93Q (Spr)

Publications

PUBLICATIONS

- **Lab-to-Lab Cooperative Threat Reduction**

Hecker, S. S., Corden, P., Fainberg, T., Hafemeister, D., Macfarlane, A.
AMER INST PHYSICS.2017

- **Questions for the presidential candidates on nuclear terrorism, proliferation, weapons policy, and energy** *BULLETIN OF THE ATOMIC SCIENTISTS*

Hecker, S. S.
2016; 72 (5): 276-277

- **North Korea's Stockpiles of Fissile Material** *KOREA OBSERVER*

Hecker, S. S., Braun, C., Lawrence, C.
2016; 47 (4): 721-749

- **A Bayesian Model to Assess the Size of North Korea's Uranium Enrichment Program** *SCIENCE & GLOBAL SECURITY*

Bistline, J. E., Blum, D. M., Rinaldi, C., Shields-Estrada, G., Hecker, S. S., Pate-Cornell, M.
2015; 23 (2): 71-100

- **Ending the assassination and oppression of Iranian nuclear scientists** *BULLETIN OF THE ATOMIC SCIENTISTS*

Hecker, S. S., Milani, A.
2015; 71 (1): 46-52

- **Iran's Path to Nuclear Peace** *Op-Ed in The New York Times, Web and Print (Appeared in Print in International New York Times on January 10, 2014).*

Hecker, Siegfried, S., Perry, William, J.
2014

- **Adventures in Scientific Nuclear Diplomacy**

Hecker, S. S., Corden, P. S., Hafemeister, D., Zimmerman, P.
AMER INST PHYSICS.2014: 49-57

- **A nuclear energy program that benefits the Iranian people** *The Bulletin of Atomic Scientists*

Hecker, Siegfried, S., Milani, A.
2014

- **Seoul's Nuclear Weapon is the U.S.** *The New York Times: Room for Debate*

Hecker, Siegfried, S., Sagan, Scott, D.
2013

- **Final Report on Nuclear Energy and Nuclear Security in the Republic of Korea** *CISAC Published Report*

Hecker, Siegfried, S., Braun, C., Davis, P., Forrest et al, R.
2013

- **North Korea reactor restart sets back denuclearization** *The Bulletin of Atomic Scientists*
Hecker, Siegfried, S.
2013
- **Can the North Korean Nuclear Crisis Be Resolved?** in *Northeast Asia's Nuclear Challenges*
Hecker, Siegfried, S.
edited by Lee, S. H.
Published by the Institute for Far Eastern Studies and Kyungnam University, Seoul, South Korea. Chapter 5.2013: 129–161
- **What to expect from a North Korea nuclear test** *Foreign Policy*
Hecker, Siegfried, S.
2013
- **Hecker replies** *PHYSICS TODAY*
Hecker, S. S.
2012; 65 (2): 9-10
- **North Korea in 2011: Countdown to Kim il-Sung's centenary** *BULLETIN OF THE ATOMIC SCIENTISTS*
Hecker, S. S., Carlin, R.
2012; 68 (1): 50-60
- **Testimony in Hearing of the Subcommittee on Strategic Forces Arms Services Committee of the House of Representatives** on "Governance, oversight and management of the Nuclear Security Enterprise to ensure High Quality Science, Engineering and Mission Effectiveness in an Age of Austerity"
Hecker, Siegfried, S.
2012
- **North Korea in 2011: Countdown to Kim il-Sung's centenary** *The Bulletin of Atomic Scientists*
Hecker, Siegfried, S., Carlin, R.
2012
- **A Winning Gambit: Nuclear armed states stand to gain more than they lose from CTBT ratification** in *Spectrum*
Hecker, Siegfried, S.
published by the Preparatory Commission for the Comprehensive Nuclear Test Ban Treaty Organization (CTBTO).2012: 19–23
- **North Korea from 30,000 Feet** *The Bulletin of Atomic Scientists*
Milonopoulos, N., Hecker, Siegfried, S., Carlin, R.
2012
- **Contemplating a third nuclear test in North Korea** *The Bulletin of Atomic Scientists*
Pabian, F., Hecker, Siegfried, S.
2012
- **Nuclear Developments in North Korea**
Hecker, Siegfried, S.
edited by Kang, J.
2012
- **Chapter 14: "Nuclear Nonproliferation"** *Fundamentals of Materials for Energy and Environmental Sustainability*.
Hecker, Siegfried, S., Englert, M., Miller, Michael, C.
edited by Ginley, David, S., Cahen, D.
Cambridge UP.2012: 1
- **Dealing with North Korea's Nuclear Program** *American Academy of the Arts and Sciences Bulletin*
Hecker, Siegfried, S., Bosworth, S., Miller, S.
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- **Adventures in scientific nuclear diplomacy** *PHYSICS TODAY*
Hecker, S. S.
2011; 64 (7): 31-37

- **What I found in Yongbyon and Why It Matters** *American Physical Society*
Hecker, S. S.
2011; 40 (2)
- **North Korea's Light Water Reactor Ambitions** *Journal of Nuclear Materials Management, Spring Edition, (this article is a slightly changed version of the Russian-language article in Nuclear Club Journal).*
Hecker, Siegfried, S., Braun, C., Carlin, Robert, L.
2011; XXXIV (3): 18-25
- **Extraordinary Visits: Lessons Learned from Engaging with North Korea** *Nonproliferation Review*
Hecker, Siegfried, S.
2011; 18 (2): 445-455
- **What I found in North Korea and why it matters** *APS News: The Back Page*
Hecker, Siegfried, S.
Publication of the American Physical Society.2011: 8
- **Visiting North Korea: Q&A with Siegfried Hecker** *Physics Today.org Singularities*
Hecker, S.
2011
- **Nuclear non-proliferation** *Fundamentals of Materials for Energy and Environmental Sustainability*
Hecker, S. S., Englert, M., Miller, M. C.
Cambridge University Press .2011: 162-177
- **Nuclear promise or nuclear peril?** *MRS BULLETIN*
Hecker, S. S.
2010; 35 (10): 726-732
- **Lessons learned from the North Korean nuclear crises** *DAEDALUS*
Hecker, S. S.
2010; 139 (1): 44-56
- **What I found in North Korea: Pyongyang's Plutonium Is No Longer the Only Problem.** *Foreign Affairs*
Hecker, Siegfried, S.
2010
- **Redefining denuclearization in North Korea** *The Bulletin of the American Scientists*
Hecker, Siegfried, S.
2010
- **Smart Power** *Nuclear Diplomacy, 'Office of Science & Technology, Embassy of Austria, Bridges Online Magazine*
Hecker, Siegfried, S.
2010; 25
- **North Korea's Choice: Bombs over Electricity** *National Academy of Engineering, The Bridge*
Hecker, Siegfried, S., Lee, S., Braun, C.
2010: 5-12
- **North Korea's Yongbyon Nuclear Complex: A Report by Siegfried S. Hecker** *Center for International Security and Cooperation*
Hecker, Siegfried, S.
2010
- **North Korea's Reactors: Past, Present and Future** *(in Russian language) Nuclear Club Journal*
Hecker, Siegfried, S., Braun, C., Carlin, Robert, L.
2010: 25-33
- **EDWARD TELLER RETURNS TO LOS ALAMOS** *Edward Teller Centennial Symposium*
Hecker, S. S.
WORLD SCIENTIFIC PUBL CO PTE LTD.2010: 4-12

- **Where is North Korea's Nuclear Program Heading?** *Physics & Society*
Hecker, S. S.
2010; 40 (2)
- **North Korea's Choice: Bombs Over Electricity** *The Bridge*
Hecker, S. S., Lee, S., Braun, C.
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- **The risks of North Korea's nuclear restart** *Bulletin of the Atomic Scientists*
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2009
- **From Pyongyang to Tehran, with Nukes** *Foreign Policy*
Hecker, Siegfried, S.
2009
- **Senator Domenici's Nuclear Non-Proliferation Legacy**
Hecker, Siegfried, S.
2009
- **Nuclear Non-Proliferation**
Hecker, Siegfried, S.
2009
- **National Research Council of the National Academies, NRC Committee on Counterterrorism Challenges for Russia and the United States** *Countering Terrorism: Biological Agents, Transportation Networks, and Energy Systems- Summary of the workshop.*
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- **Plutonium - an element never at equilibrium** *Symposium on Materials Behavior - Far from Equilibrium*
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- **Plutonium: An element never at equilibrium** *Metallurgical and Materials Transactions A*
Hecker, Siegfried, S.
2008; 39 (7): 1585-1592
- **The Right Path with North Korea** *Op-ed, Washington Post*
Siegfried, William, S., Hecker
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- **Chapter 21 in Nuclear Safeguards, Security and Nonproliferation: Achieving Security with Technology and Policy** *Why We Need a Comprehensive Safeguards System to Keep Fissile Materials Out of the Hands of Terrorists*
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- **Preventing Nuclear Weapon Proliferation as Nuclear Power Expands** *MRS Bulletin*

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- **Dangerous Dealings: North Korea's Nuclear Capabilities and the Threat of Export to Iran** *Arms Control Today*
Hecker, S. S., Liou, W.
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- **Dangerous Dealings: North Korea's Nuclear Capabilities and the Threat of Export to Iran** *Arms Control Today*
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- **Toward a comprehensive safeguards system: Keeping fissile out materials of terrorists' hands** *ANNALS OF THE AMERICAN ACADEMY OF POLITICAL AND SOCIAL SCIENCE*
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- **National Research Council of the National Academies, NRC Committee on Counterterrorism Challenges for Russia and the United States** *Countering Urban Terrorism in Russia and the United States- Proceedings of a workshop.*
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- **Mechanical behavior of delta-phase plutonium alloys. Part II: Model verification and application** *J. Nucl. Mater*
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- **Countering Urban Terrorism in Russia and the United States- Proceedings of a workshop.**
Hecker et al., Siegfried, S.
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- **Toward a Comprehensive Safeguards System: Keeping Fissile Materials Out of Terrorists' Hands** *The Annals of the American Academy of Political and Social Science*
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- **Chapter 7, Plutonium** in *The Chemistry of the Actinides and Transactinides*
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- **A Tribute to Terence E. Mitchell** *Metallurgical and Materials Transactions*
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- **Atoms for Peace** *Issues in Science and Technology, Forum Section.*
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- **Comment on "Improving U.S. - Russia Nuclear Cooperation** *Issues in Science and Technology, the Forum Section*
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- **The Magic of Plutonium: 5f Electrons and Phase Stability** *Metallurgical and Materials Transactions*
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- **The Nuclear Crisis in North Korea** *The Bridge, National Academy of Engineering*
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- **The Nuclear Crisis in North Korea** *MRS Bulletin*
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- **Nuclear Terrorism**
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- **A Tribute to Zachary Fisk** *Physica B*
Hecker, S., S.
2002; 318: 57-60
- **High-Impact Terrorism: Proceedings of a Russian-American Workshop**
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- **National Research Council of the National Academies, NRC Committee on Confronting Terrorism in Russia** *High-Impact Terrorism: Proceedings of a Russian-American Workshop*.
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- **High-Impact Terrorism: Proceedings of a Russian-American Workshop** *National Research Council of the National Academies*
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Hecker, S., S.
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- **Thoughts about an Integrated Strategy for Nuclear Cooperation with Russia** *The Nonproliferation Review*
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- **Plutonium and Its Alloys: From Atoms to Microstructure** *Los Alamos Science*
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- **ESSAYS ON THE FUTURE: IN HONOR OF NICK METROPOLIS**
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- **The Plastic Flow Characteristics of Uranium-Niobium Alloys as a Function of Strain Rate and Temperature** in *Constitutive and Damage Modeling of Inelastic Deformation and Phase Transformation*
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- **Factors Affecting Plastic Instability and Sheet Formability** in *Mechanical Behavior of Materials-IV*
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- **Plasticity of Metals at Finite Strain: Theory, Computation and Experiment** *Experiments on Plastic Deformation AtFinite Strains*
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