

INTA 8000: Science, Technology, & International Affairs I

SNSP Seminar

Fall 2019



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Associate Professor

Sam Nunn School of International Affairs

3 credits

Thursday 12:00-2:45 PM

Ivan Allen College/Habersham G-17

Office hours: *TBD*

& by appointment

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Overview

The course, as part of the Sam Nunn Security Program (SNSP), will explore and enable better understanding of the interactive roles; the effects of science and technology; and the economic, institutional, policy, and social contexts in which science and technology may be implemented. This will be accomplished through extensive and intensive in-class discussions, guest lectures by experts, individual and group projects, and off-site visits to policy-making and policy-executing organizations, agencies, and institutions.

In this course, we will examine the relation between science and technology and international affairs, with an emphasis on national and international security. Rarely does science or technology (S&T) itself drive foreign or national security policy; the potential security, economic, or other national-level consequences of the application of science to human endeavors is where technology intersects with policy predominantly. Science &

technology can be causal, intervening, or determinant factors. The ability to recognize, communicate, and identify nodes for intervention, change, or influence are strategic requirements for effective use of S&T domestically and internationally.

The ways in which governments act as proponents and sustainers, as well as consumer of S&T, vary significantly. These issues reflect important questions about the relationship between science, technology, and policy. Is scientific and technological development governable, and if so, who is responsible for governance? Is more and better science necessary for policymaking? Who is the best judge of the value of scientific research programs and the validity of scientific findings in policy contexts? Is the furtherance of scientific understanding and technological development always socially benign, and who decides?

Technological changes are anticipated to occur over the ensuing decades in a globalized world characterized by complex security challenges. While emerging technologies promise scientific breakthroughs, they also generate skepticism and controversies. How will these S&T developments impact stability, and what are the potential security threats? How will such emerging technologies affect the overall international security discourse?

This course introduces theories and methodologies for science and technology policy analysis. Students will learn how science and technology policy is made, with specific attention to the roles of government agencies, expert advisory committees, and the public. This analytic toolkit will be drawn from literature in a range of disciplines, including political science, public policy, economics, sociology, and history.

This course will provide:

- Background on the science & technology policy formation, with an emphasis on US systems and security policies
- A multidisciplinary toolkit for thinking about science & technology policy and security, including an understanding of social science methods, theories, and approaches to science & technology policy and security.

Learning Objectives

1. Students will demonstrate the ability to describe the causal and determinant relationships between science and technology (S&T) and security across different topic areas.
2. Students will demonstrate ability to apply concepts and multiple methodologies to explain phenomena in security related to S&T.
3. Students will understand and be able to assess relationships among organizational institutions & structures at the local, national, regional & global level and S&T.
4. Students will become familiar with multiple major governance entities (e.g., international agreements and institutions) relevant to S&T and security.
5. Students will understand and learn about how S&T shaped history, promising S&T developments (such as information and communications technology, cognitive and

- biological sciences, robotics, artificial intelligence, and nanotechnology), and pressing S&T challenges for the future in an international context.
6. Students will practice effective communication skills. Students will be able to express their arguments clearly and effectively both in written reports and in their research and oral presentations.
 7. Students will learn valuable team working skills. Students will be able to work in small groups in a way that demonstrates respect for their colleagues and efficiency in working collaboratively towards projects and goals.

Class Requirements

- 1) Attendance & participation (10%)
- 2) Scientist / engineer in policy (20%)
- 3) International agency/office/agreement (20%)
- 4) Group term project (50%)
 - a. Proposal
 - b. Status report
 - c. Semester document
 - d. Semester presentation

The grading rubric will be discussed during the first week of class.

Attendance and Participation

You are expected to make reasonable efforts to attend all classes and participate actively. I recognize that both anticipated and unanticipated events may overlap with the regularly scheduled class.

Arriving Late and Departing Early

While I recognize that both anticipated and unanticipated events may overlap with the regularly scheduled class, if you have an ongoing conflict that occurs at the same time as this class, perhaps you should reconsider. Repeated tardiness reflects poorly on you and can disrupt the entire class. If you ask to depart my class early for another event, you are communicating what is your priority. I reserve the right to make attendance a portion of the grade and penalize for lateness if it is a reoccurring problem.

Electronic Devices

They are allowed. My right to rescind is reserved. It has been found that use of electronic devices can hinder learning and impact your grade, see e.g., "Checking phones in lectures can cost students half a grade in exams" and primary data included therein, <https://phys.org/news/2018-07-students-grade-exams.html>. The other problem is rudeness or the unintended perception of rudeness, which is especially bad when/if we have guest speakers. Unfortunately this has been a problem in the past on multiple occasions, so it now gets a section in the syllabus.

Academic Integrity

For all assignments, materials, and exams, you are expected to maintain the highest academic integrity.

While academic integrity takes many forms, one of the most common violations is plagiarism. Per the Georgia Tech Honor Code, plagiarism is an act of academic misconduct. The Georgia Tech Honor Code specifies: “Plagiarism’ is the act of appropriating the literary composition of another, or parts of passages of his or her writings, or language or ideas of the same, and passing them off as the product of one’s own mind. It involves the deliberate use of any outside source without proper acknowledgment.”

Plagiarism ranges from the blatant, such as purchasing a term paper or copying on an exam, to the subtle, e.g., failing to credit another author with the flow of ideas in an argument. Simply changing a few words from the writings of other authors does not alter the fact that you are essentially quoting from them and appropriating their ideas. Paraphrasing of this sort, where you use the words of another almost verbatim without acknowledging your source, is the most common form of plagiarism among students and in general. When you state another author’s viewpoint, theory, or hypothesis – especially when it is original or not generally accepted – you must also include a reference to the originator. In general citations are unnecessary when the information is considered common knowledge or a matter of widespread agreement or controversy.

For more information on the Georgia Tech Honor Code, please see <http://www.honor.gatech.edu>.

In short: just don’t cheat.

*This is one instance when asking forgiveness
rather than permission is **not** a good strategy.*

Accommodations for Students with Disabilities

Per Georgia Tech policy: if you have a significant disability, special arrangements will be made to accommodate documented needs (through the ADAPTS office). Please contact the professor after class or at your earliest convenience.

**THE SYLLABUS IS DYNAMIC &
IS LIKELY TO BE UPDATED
THROUGHOUT THE SEMESTER.**

Course Calendar and Content

Readings will be assigned and distributed in hard copy or via T-Square in a timely manner throughout the semester.

Week 1

22 August

- Introductions
- Introduction to the SNSP
- Semester and academic year scope
- Framing the course, current problems, policy, doctrine, and debate; establishing process
- Subject matter overview and class organization
- Scientists and engineers as policy advisors for national and international leadership
- Discussion of project possibilities
- SNSP Challenge coin

Readings

- John Marburger, “Perspective: Science’s Uncertain Authority in Policy,” *Issues in Science and Technology*, Summer 2010, http://issues.org/26-4/p_marburger/
- DNI Coat’s Statement for the Record of the Worldwide Threat Assessment of the US Intelligence Community, February 2019, <https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR---SSCI.pdf>
- Browse: DNI Clapper’s Statement for the Record of the Worldwide Threat Assessment of the US Intelligence Community, 9 February 2016, especially p 9 on “Genome Editing,” https://www.dni.gov/files/documents/SASC_Unclassified_2016_ATA_SFR_FINAL.pdf
- Army G2, The Future Operational Environment (for the [Presidential] Transition Team), 25 November 2016 (*will be distributed in class*)
- IANS, “Technology Key to Military Preparedness,” *Free Press Journal (India)*, 10 January 2015, <http://freepressjournal.in/technology-key-to-military-preparedness/> (*Will be distributed in class, as link no longer works*)
- Tom Nichols, “The Death of Expertise,” *The War Room* (blog), 11 December 2013, <http://tomnichols.net/blog/2013/12/11/the-death-of-expertise/> (*If interested in further reading, see his 2017 book on the subject, subtitled “The Campaign Against Established Knowledge and Why it Matters,”* <https://global.oup.com/academic/product/the-death-of-expertise-9780190469412?cc=us&lang=en&#>)
- Robert L. Gallucci, “How Scholars Can Improve International Relations,” *Chronicle of Higher Education*, 26 November 2012, <http://chronicle.com/article/How-Scholars-Can-Improve/135898/>
- Andrew Smith, “Technology and International Security,” in *Challenge and Change*, Palgrave MacMillan, 2016, pp 165-193

- Matthew Symonds, “The Future of War: The New Battlegrounds,” *The Economist*, 25 January 2018, <https://www.economist.com/special-report/2018/01/25/the-future-of-war>

Further reading

- John Krige and Kai-Henrik Barth, “Science, Technology, and International Affairs,” *Osiris*, v21, 2006, pp 1-21, <https://www.journals.uchicago.edu/doi/10.1086/507133>
- National Research Council, *S&T Strategies of Six Countries*, free full pdf available at http://www.nap.edu/download.php?record_id=12920

Submit bio & photo NLT Tuesday, 27 August 1200.

Week 2

29 August

- IR Theory
- What is policy?
- Technological determinism
 - Or why Pakistan has the bomb and Japan doesn't
- Frameworks for studying science, technology, and policy
 - And why social scientists dislike *[to put it diplomatically]* Jared Diamond's *Guns, Germs, and Steel* ... & it's not the same reason white supremacists dislike like the book either
- Offense-Defense Theory

Readings

- Jack Snyder, “One World, Rival Theories,” *Foreign Policy*, November 2009, <https://foreignpolicy.com/2009/10/26/one-world-rival-theories/>
- Michele Acuto and Parag Khanna, “Nations are No Longer Driving Globalization - Cities Are,” *Quartz*, 3 May 2013, <http://qz.com/80657/the-return-of-the-city-state/>
- James Stavridis, “The Dark Side of Globalization,” *WaPo*, 31 May 2013, http://articles.washingtonpost.com/2013-05-31/opinions/39658000_1_chemical-weapons-mass-destruction-cartels
- CNAS, *Strategic Competition in an Era of Artificial Intelligence*, 25 July 2018, <https://www.cnas.org/publications/reports/strategic-competition-in-an-era-of-artificial-intelligence>

Optional/further reading

- Anne-Marie Slaughter, “International Relations, Principal Theories,” https://www.princeton.edu/~slaught/Articles/722_IntlRelPrincipalTheories_Slaughter_20110509zG.pdf Originally published in R. Wolfrum (Ed.), *Max Planck Encyclopedia of Public International Law*, Oxford University Press, 2011

- Peter Turchina, et al., “War, Space, and the Evolution of Old World Complex Societies,” *Proceedings of the National Academy of Sciences (PNAS)*, 2013, pp 16384–16389, <http://www.pnas.org/content/110/41/16384>
- Etel Solingen, “Domestic structure and the international context: Toward models of state-scientists interaction,” in *Scientists and the States: Domestic Structures and the International Context*, Etel Solingen (ed), 1994, University of Michigan Press, pp 1-31
- Paul Cairney & Tanya Heikkila, “A Comparison of Theories of the Policy Process,” in *Theories of the Policy Process*, 3rd edition, Paul Sabatier & Chris Weible (eds), 2014, Westview Press, pp 363-390
- Matthew C. Nowlin, “Theories of the Policy Process: State of the Research and Emerging Trends,” *Policy Studies Journal*, 2011, v39, pp 41-60
- Michele Acuto, *Global Cities, Governance and Diplomacy: The Urban Link*, Routledge, 2014, 220pp, <https://www.routledge.com/Global-Cities-Governance-and-Diplomacy-The-Urban-Link/Acuto/p/book/9780415660884>

Week 3

5 September

- Discussion of project proposals

Team and individual project proposals due electronically NLT 10AM directly to MEK with cc to class list serv.

Week 4

12 September

- US Defense establishment
- Strategy, operations, and tactics

Readings

- The US National Security Strategy, December 2017, <https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf>
- The US National Defense Strategy, January 2018, <https://www.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf>
- Mara Karlin, “How to Read the 2018 National Defense Strategy,” 21 January 2018, <https://www.brookings.edu/blog/order-from-chaos/2018/01/21/how-to-read-the-2018-national-defense-strategy/>
- H.R. McMaster, “The Pipe Dream of Easy War,” *NY Times*, 20 July 2013, <http://www.nytimes.com/2013/07/21/opinion/sunday/the-pipe-dream-of-easy-war.html>

Optional/further reading

- The US National Security Strategy, 2015, https://obamawhitehouse.archives.gov/sites/default/files/docs/2015_national_security_strategy_2.pdf
- Thomas Wright, “Interpreting the National Security Strategy,” February 2015, <https://www.brookings.edu/blog/up-front/2015/02/06/interpreting-the-national-security-strategy/>
- Harry R. Yarger, “Toward A Theory Of Strategy: Art Lykke and the Army War College Strategy Model,” Chapter 8 in *Guide to National Security Policy and Strategy*, 2nd edition. U.S. Army War College, June 2006, pp 107-113, <http://marshallcenterciss.contentdm.oclc.org/cdm/ref/collection/p16378coll5/id/417>
- U.S. Army War College, *Guide to National Security Policy and Strategy*, 2nd Edition, J. Boone Bartholomees, Jr. (editor), June 2006, <https://ssi.armywarcollege.edu/pdffiles/PUB708.pdf>
- Dale C. Eikmeier, “A Logical Method for Center-of-Gravity Analysis,” *Military Review*, September-October 2007, pp 62-66, http://www.armyupress.army.mil/Portals/7/military-review/Archives/English/MilitaryReview_20071031_art009.pdf
- Matthew E. Doyle, “Knowing the Center of Gravity is Not Enough: Critical Factors Analysis in the Operational Environment,” 23 April 2008, <http://www.dtic.mil/dtic/tr/fulltext/u2/a484350.pdf>
- Richard A. Bitzinger, “Why China Should Fear the US Military's Third Offset Strategy,” *The National Interest*, 28 August 2016, <http://nationalinterest.org/blog/the-buzz/why-china-should-fear-the-us-militarys-third-offset-strategy-17505>
- Robert Martinage, “Toward a New Offset Strategy: Exploiting U.S. Long-Term Advantages to Restore U.S. Global Power Projection Capability,” 27 October 2014, <http://csbaonline.org/research/publications/toward-a-new-offset-strategy-exploiting-u-s-long-term-advantages-to-restore>
- Yuna Huh Wong, “Approaching Future Offsets,” 21 December 2016, <https://www.rand.org/blog/2016/12/approaching-future-offsets.html>
- Michael J. Mazarr, “Land Power and a Third Offset Through a Wide-Angle Lens,” 21 May 2015, <https://www.rand.org/blog/2015/05/land-power-and-a-third-offset-through-a-wide-angle.html>

Week 5

19 September

- Guest lecture on “IR Methods” by Professor Anjali Thomas.
- Group work on year-long project proposal

Readings

- “The Method of Structured, Focused Comparison,” Chapter 3 in *Case Studies and Theory Development in the Social Sciences* by AL George & Bennett, MIT Press, 2004, <https://www.alnap.org/help-library/chapter-3-the-method-of-structured-focused-comparison-case-studies-and-theory>

Further Reading

- Stephen Meyer, *The Dynamics of Nuclear Proliferation*, University of Chicago Press, 1984, 246 pp.

Week 6

26 September

- Discussion of scientists and engineers involved in policy creation, implementation, and execution

Readings

- *Browse* - Vannevar Bush, “Science: The Endless Frontier,” 1945 (may be found online in multiple places, e.g., in html at the NSF web site, <https://www.nsf.gov/od/lpa/nsf50/vbush1945.htm> or pdf scan of the original document, <https://ia600408.us.archive.org/18/items/scienceendlessfr00unit/scienceendlessfr00unit.pdf>)
- Ash Carter, “What I Learned from the People Who Built the Atom Bomb: Technologists want their creations to do good for the world. We should make it easier for them to accomplish that,” *MIT Technology Review*, January-February 2018, pp 8-9, <https://www.technologyreview.com/s/609557/what-i-learned-from-the-people-who-built-the-nuclear-bomb/>
- Margaret E. Kosal, *On the Role of Science Diplomacy in the 21st Century*, Remarks prepared for the 2nd Annual Neuriter Roundtable on Science Diplomacy, 18 December 2013, Washington DC (*to be distributed in class*)
- Bharat Bhushan, “Perspective: Science and Technology Policy – What is at Stake and Why Should Scientists Participate?” *Science and Public Policy*, 2015, pp 1-14, <http://spp.oxfordjournals.org/content/early/2015/03/04/scipol.scv005.abstract>
- James A. (Sandy) Winnefeld Jr., Christopher Kirchhoff, David M. Upton, “Cybersecurity’s Human Factor: Lessons from the Pentagon,” *Harvard Business Review*, September 2015, <https://hbr.org/2015/09/cybersecuritys-human-factor-lessons-from-the-pentagon>
- James A. (Sandy) Winnefeld Jr., “What the U.S. Military Has Learned About Thwarting Cyberattacks,” *Harvard Business Review* (blog), August 2015, <https://hbr.org/2015/08/what-the-u-s-military-has-learned-about-thwarting-cyberattacks>
- Jacquelyn Schneider, “Digitally-Enabled Warfare: The Capability-Vulnerability Paradox,” August 2016, <https://www.cnas.org/publications/reports/digitally-enabled-warfare-the-capability-vulnerability-paradox>

- Rebecca Slayton, "Why Cyber Operations Do Not Always Favor the Offense," February 2017, <https://www.belfercenter.org/publication/why-cyber-operations-do-not-always-favor-offense> [For further reading see her article, "What Is the Cyber Offense-Defense Balance? Concepts, Causes, and Assessment," *International Security*, Winter 2016/17, pp 71-209, https://www.mitpressjournals.org/doi/10.1162/ISEC_a_00267]

Week 7

3 October

- How S&T research programming and funding is done within the US federal government, the connections to strategy, and the budget processes
- Other parts of the USG (besides DoD) important for national security
 - o State
 - o IC
 - o Everybody else

Readings

- Bill Heniff Jr., "Overview of the Authorization-Appropriations Process," Congressional Research Service, 26 November 2012, <https://www.senate.gov/CRSpubs/d2b1dc6f-4ed2-46ae-83ae-1e13b3e24150.pdf>
- OMB Memo on "FY 2020 Administration Research and Development Budget Priorities," 31 July 2018, <https://www.whitehouse.gov/wp-content/uploads/2018/07/M-18-22.pdf>
- Jonathan Behrens, FY20 Budget Request: DOD Science and Technology, 28 March 2019, <https://www.aip.org/fyi/2019/fy20-budget-request-dod-science-and-technology>
- John F. Sargent Jr., "Defense Science and Technology Funding," CRS, 21 February 2018, <https://fas.org/sgp/crs/natsec/R45110.pdf>
- "Department of Defense Research, Development, Test, and Evaluation (RDT&E): Appropriations Structure," CRS, 25 June 2018, <https://fas.org/sgp/crs/natsec/R44711.pdf>
- Browse: AAAS FY 2020 R&D Appropriations Dashboard, <https://www.aaas.org/page/fy-2020-rd-appropriations-dashboard>
- Browse: DoD Budget Request, USD(Comptroller), <https://comptroller.defense.gov/Budget-Materials/>
 - o FY2020 PBR Research Development, Test & Evaluation Programs (R-1), Budget Appendix Display (R-1), March 2019, https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020_r1.pdf (There's also an MS Excel sheet you can download)
 - o FY2020 Program Acquisition Costs by Weapons System, March 2019, https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2020/fy2020_Weapons.pdf

Week 8

10 October

- Project updates

Week 9

17 October

- TBD

Week 10

24 October

- Discussion of international S&T treaty, agreement, organization, or agency

Week 11

31 October

- Weapons of Mass Destructions (WMD), i.e., nuclear, chemical, and biological agents and weapons
- Nonproliferation, arms control, and disarmament
- International institutions – the NPT, CWC, & BWC +
- Deterrence, coercion, and compellence

Readings

- Ernest J. Moniz And Sam Nunn, “The Return of Doomsday: The New Nuclear Arms Race and How Washington and Moscow Can Stop It,” *Foreign Affairs*, 6 August 2019, <https://www.foreignaffairs.com/articles/russian-federation/2019-08-06/return-doomsday>
- George Shultz, William Perry, Henry Kissinger, & Sam Nunn, “Next Steps in Reducing Nuclear Risks,” *WSJ*, 5 March 2013, <http://online.wsj.com/article/SB10001424127887324338604578325912939001772.html> or <http://www.nti.org/analysis/opinions/next-steps-reducing-nuclear-risks-pace-nonproliferation-work-today-doesnt-match-urgency-threat/>
- Keir A. Lieber & Daryl G. Press, “The New Era of Counterforce: Technological Change and the Future of Nuclear Deterrence,” *International Security*, Spring 2017, pp 9-49, <https://www.belfercenter.org/publication/new-era-counterforce-technological-change-and-future-nuclear-deterrence>
- John Mueller, “The Essential Irrelevance of Nuclear Weapons: Stability in the Postwar World,” *International Security*, Fall, 1988, pp 55-79, <https://politicalscience.osu.edu/faculty/jmueller/ISESSIRR.PDF>
- Browse: *Prism* special issue on Countering WMD, May 2018, <http://cco.ndu.edu/PRISM-7-3/>

- GAO, “Chemical and Biological Defense: DOD Has Identified an Infrastructure Manager and Is Developing the Position's Roles and Responsibilities,” GAO-17-522R, 7 July 2017, <https://www.gao.gov/products/GAO-17-522R>
- Matthew Harries, “The Real Problem With a Nuclear Ban Treaty,” Carnegie Endowment for International Peace, 15 March 2017, <http://carnegieendowment.org/2017/03/15/real-problem-with-nuclear-ban-treaty-pub-68286>
- Max Fisher, “European Nuclear Weapons Program Would Be Legal, German Review Finds,” *New York Times*, 5 July 2017, <https://www.nytimes.com/2017/07/05/world/europe/germany-nuclear-weapons.html>
- Browse: Tracking the German Nuclear Debate, Carnegie Endowment for International Peace, 15 August 2018, <https://carnegieendowment.org/2017/09/07/tracking-german-nuclear-debate-pub-72884>
- M.E. Kosal, “Chemical Weapons Destruction and the Public Response,” in *Towards the Elimination of the Chemical Weapons*, Haru, E. and Thakur, R. eds., UN University Press, Netherlands, 2006, pp 118-149 (*distributed in class/electronically*)

Optional/further readings

- OTA, *Technologies Underlying Weapons of Mass Destruction* (Washington, DC: OTA 1993), <http://www.fas.org/spp/starwars/ota/934406.pdf>
- Nuclear Posture Review (NPR), 2018, <https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF>
- Robert Gates, “Nuclear Weapons and Deterrence in the 21st Century,” Remarks at the Carnegie Endowment for International Peace, 28 October 2008, http://carnegieendowment.org/files/1028_transcrip_gates_checked.pdf
- Sharon Squassoni, *Disarming Libya: Weapons of Mass Destruction*, Congressional Research Service, 22 September 2006, <http://www.dtic.mil/dtic/tr/fulltext/u2/a475032.pdf>
- Albert J. Mauroni, “Eliminating Syria's Chemical Weapons,” U.S. Air Force, Center for Unconventional Weapons Studies, Future Warfare Series. No. 58. June 2017, <http://www.au.af.mil/au/cpc/pub/pdfs/monographs/58MauroniElimSyriaCW.pdf>
- John Hart, “The Smoking Gun of Non-Compliance,” *CBRNe World*, December 2015, pp 17-20, http://www.cbrneworld.com/uploads/download_magazines/Syrias_Review_2015.pdf
- Sam Nunn, “Away from a World of Peril,” *Survival*, February-March 2012, pp 234-244, <http://www.tandfonline.com/doi/abs/10.1080/00396338.2012.657556>
- Rich Kelly, “The Nunn-Lugar Act: A Wasteful and Dangerous Illusion,” CATO Institute Foreign Policy Briefing, 18 March 1996, <http://www.cato.org/publications/foreign-policy-briefing/nunnlugar-act-wasteful-dangerous-illusion>

- Gregory D. Koblenz, “Pathogens as Weapons: The International Security Implications of Biological Warfare,” *International Security*, Winter 2003/04, pp 84-122,
http://belfercenter.ksg.harvard.edu/publication/346/pathogens_as_weapons.html
- Scott D. Sagan, “Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb,” *International Security*, Winter 1996/97, pp 54-86,
<http://www.mitpressjournals.org/doi/abs/10.1162/isec.21.3.54>
- Joseph Cirincione, Jon Wolfsthal, Miriam Rajkumar, *Deadly Arsenal: Nuclear, Biological, and Chemical Threats*, Second Edition Revised and Expanded, 2005
- *Globalization, Biosecurity, and the Future of the Life Sciences*, National Academies Press, Washington DC, free full pdf available at
http://www.nap.edu/catalog.php?record_id=11567
- *Life Sciences and Related Fields: Trends Relevant to the Biological Weapons Convention*, 2011, National Academies Press, Washington DC,
http://www.nap.edu/catalog.php?record_id=13130
- Richard G. Lugar, “Nunn-Lugar: Science Cooperation Essential for Nonproliferation Efforts,” *Science & Diplomacy*, March 2012,
<http://www.sciencediplomacy.org/perspective/2012/nunn-lugar>
- Ann M. Becker, “Smallpox in Washington’s Army: Strategic Implications of the Disease During the American Revolutionary War,” *The Journal of Military History*, April 2004, pp 381-430;
<http://muse.jhu.edu/journals/jmh/summary/v068/68.2becker.html>
- Central Intelligence Agency, Directorate of Intelligence, “The Darker Bioweapons Future,” OTI SF 2003-108, 3 November 2003,
<http://www.fas.org/irp/cia/product/bw1103.pdf>
- Mary Beth D. Nikitin, “The Nuclear Ban Treaty: An Overview,” Congressional Research Service, 10 July 2017, <https://fas.org/sgp/crs/nuke/IN10731.pdf>
- Podcast: MIT Technology and Culture Forum with Joe Cirincione on “Bomb Scare: The History and Future of Nuclear Weapons,” 13 December 2011,
<http://techtv.mit.edu/videos/16218-bomb-scare-the-history-and-future-of-nuclear-weapons>

Week 12

7 November

- WMD (*continued*)
- WMD Terrorism

Readings

- James J.F. Forest, “Framework for Analyzing the Future Threat of WMD Terrorism,” *Journal of Strategic Security*, Winter 2012, pp 51-68,
<http://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=1193&context=jss>
- Rolf Mowatt-Larssen, “Al Qaeda Weapons of Mass Destruction Threat: Hype or Reality?” January 2010, <http://belfercenter.ksg.harvard.edu/files/al-qaeda-wmd-threat.pdf>

- Jenna Jordan, “When Heads Roll: Assessing the Effectiveness of Leadership Decapitation,” *Security Studies*, 2009, pp 719-755, <https://www.tandfonline.com/doi/abs/10.1080/09636410903369068>

Optional/further reading

- H. J. Jansen, F. J. Breeveld, C. Stijnis, and M. P. Grobusch, “Biological Warfare, Bioterrorism, and Biocrime,” *Clinical Microbiology and Infection*, June 2014, pp. 488-496, <http://onlinelibrary.wiley.com/doi/10.1111/1469-0691.12699/pdf>
- Jonathan Tucker (editor), *Toxic Terror: Assessing Terrorist Use of Chemical and Biological Weapons*, MIT Press, 2000
- CDC | Bioterrorism - Emergency Preparedness and Response Webpages, <http://www.bt.cdc.gov/bioterrorism/>
- *Biotechnology Research in an Age of Terrorism*, 2004, National Academies Press, Washington DC, http://www.nap.edu/catalog.php?record_id=10827

General resources and more readings on terrorism

- Bruce Hoffman, *Inside Terrorism* (2006 edition)
- Marc Sageman, *Leaderless Jihad*
- Jessica Stern, *Terror in the Name of God: Why Religious Militants Kill*
- Michael Scheuer (previously “Anonymous”), *Through Our Enemies' Eyes: Osama bin Laden, Radical Islam, and the Future of America*, (2006 edition)
- Audrey Kurth Cronin, “How al-Qaida Ends: The Decline and Demise of Terrorist Groups,” *International Security*, Summer 2006, 31, pp 7-48
- F. Gregory Gause III, “Can Democracy Stop Terrorism?” *Foreign Affairs*, September/October 2005, 84, pp 62-76
- Max Abrahms, “Why Terrorism Does Not Work,” *International Security*, Fall 2006, 31, pp 42-78
- Robert F. Trager and Dessislava P. Zagorcheva, “Deterring Terrorism: It Can Be Done,” *International Security*, Winter 2006/07, pp 87-123

We'll continue discussing issues related to WMD throughout Spring 2020.

Week 13

14 November

- Guest lecture, General Phil Breedlove, USAF (ret)
Short bio: <https://www.af.mil/About-Us/Biographies/Display/Article/104769/general-philip-m-breedlove/>

Briefing book pages due to MEK NLT Sunday, 10 November at noon.

Week 14

21 November

- Feedback on presentations

- Semester wrap-up and synthesis of topics covered
- Spring Break DC Trip Planning
- Discussion of next semester

Week 15

28 November

- No Class, Thanksgiving Recess

The CISTP conference room/library in 307 Habersham is available to members of this seminar for small group meetings, etc. The material in that room may be borrowed on an honor system basis for any purpose that interests you.

Final paper due 29 November; late papers accepted without penalty until noon 12 December.

No Final Exam

One More Thought

Collaboration, sharing ideas, etc.

“Talk about your ideas. Help your colleagues work out their problems. Pay attention to what other people are doing, and see if you can learn something, or if you can contribute.

“Other than the mundane goal of getting your degree, you are in school to push back the frontiers of knowledge. You do this by generating and exploring new ideas. There is no way that you will ever be able to explore all of the ideas that you generate, but some of those ideas that you discard might be just what some of your colleagues are looking for.

“Human nature tends to make us want to hoard our own ideas. You have to fight against that. Human nature also tends to make us treat other people's ideas with disrespect. The closer the idea to our own area of research, the more likely some part of our brain will try to find fault with it. Fight against that even harder.

“You will find many people in academia who give in to the dark side. These Stealth Researchers never discuss what they are working on, except in vague and deceptive terms. They are experts at finding fault with the work of their colleagues. The Stealth Researcher writes papers that make very grand claims, but you can never quite figure out what they've accomplished and what they haven't. He is a master at omitting the key detail of the design or process that would enable others to follow his work. The Stealth Researcher is a knowledge diode, a roach motel for information. He has replaced the fundamental goal of discovery and publication with the twin evils of ego and empire.

“Be open about what you are working on. Be honest about what you've done, and even more honest about what you haven't. Don't ever hide an idea for fear that someone will steal it, even if you are talking to a Stealth Researcher. With patience, maybe we can cure them.”

*Prof Kristofer S.J. Pister
Electrical Engineering and Computer Science, UC Berkeley*