INTA 8000: Science, Technology & International Affairs I
SNSP Seminar
Fall 2015

Dr. Margaret E. Kosal
Sam Nunn School of International Affairs

3 credits
TuTh 1:35-2:55 PM
Ivan Allen College/Habersham 136

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& 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 effect of science and technology; and the economic, institutional, policy, and social contexts in which science and technology may 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? 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, 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, including field trip to CDC
2) Individual short PTI
3) Individual or pair PTI term project
    a. Proposal
    b. Status report
    c. Final paper
    d. Final 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.

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 AND 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

18 & 20 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

Readings

- John Krige and Kai-Henrik Barth, "Science, Technology, and International Affairs," *Osiris,* 2006, 21, pp 1-21
- John Marburger, "Perspective: Science's Uncertain Authority in Policy," *Issues in Science and Technology,* v 26, no 4, Summer 2010, http://issues.org/26-4/p_marburger/
- 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
- Andrew Holland, "14 Challenges in the Secretary of Defense's Inbox on Day 1," 26 November 2014, http://www.americansecurityproject.org/14-challenges-in-the-secretary-of-defenses-inbox-on-day-1/
- Mamoe Joeveer, "Estonia's Rise As A High-Tech Leader Boils Down To One Notion: Think Globally From The Start," *Forbes,* 31 December 2014, http://www.forbes.com/sites/mamiejoeveer/2014/12/31/estonias-rise-as-a-high-tech-leader-boils-down-to-one-notion-think-globally-from-the-start/
- IANS, "Technology Key to Military Preparedness," *Free Press Journal (India),* 10 January 2015, http://freepressjournal.in/technology-key-to-military-preparedness/

Optional Readings

- 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
- National Research Council, *S&T Strategies of Six Countries,* free full pdf available at http://www.nap.edu/download.php?record_id=12920
- Tom Nichols, "The Death of Expertise," *The War Room* (blog), 11 December 2013, http://tomnichols.net/blog/2013/12/11/the-death-of-expertise/
- Michele Acuto and Parag Khanna, "Nations are No Longer Driving Globalization - Cities Are," *Quartz,* 03 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

Week 2

25 & 27 August

- Introduction to the "Policy, Technology, Implementation" (PTI) framework and other models for S&T and policy interaction
- Discussion of the PTI framework for studying science, technology, policy, and policy implementation dimensions in their broader political, social, economic, institutional, and historic contexts
- Paths travelled from S&T conception to world-changing impact
- Discussion of project possibilities

Reading

- Stephen J. Lukasik, "Technology and Public Policy: A Currently Empirical Process," CISTP, 19 pages, April 2011

Optional Readings

- Stephen J. Lukasik, "Technology and Public Policy," A set of slides prepared for INTA 8000, 22 January 2011
- David H. Guston, "Innovation Policy: Not Just a Jumbo Shrimp," *Nature*, 21 August 2008, pp 940-941, http://www.nature.com/nature/journal/v454/n7207/pdf/454940a.pdf
- 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, Vol 39, S1, pp 41-60

Assignment

- Choose a PTI (Policy, Technology, and Implementation) topic and write a short analysis (no more than 5 pages) of a topic of your choice
- Due 8 September

Week 3

1 & 3 September

- US Defense establishment
- How S&T research programming and funding is done within the US federal government, the connections to strategy, and budget processes

Reading
- 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

Optional Reading
- 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
- *Science the Endless Frontier,* A Report to the President by Vannevar Bush, Director of the Office of Scientific Research and Development, July 1945, https://www.nsf.gov/od/lpa/nsf50/vbush1945.htm

Week 4

8 & 10 September
- Submit and discuss the short individual PTI exercises

Optional: Iran Nuclear Agreement Panel, 9 September 4-6PM, Clough Common Auditorium

Week 5

15 & 17 September
- Innovation
- Revolutionary versus evolutionary technology development

Readings
- Regina Dugam & Kaigham J. Gabriel, "'Special Forces' Innovation: How DARPA Attacks Problems." *Harvard Business Review,* October 2013, pp 75-84, https://hbr.org/2013/10/special-forces-innovation-how-darpa-attacks-problems

Optional Readings
- J. Rogers Hollingsworth, "High Cognitive Complexity and the Making of Major Scientific Discoveries," in *Knowledge, Communication, and Creativity*, Arnaud Sales and Marcel Fournier (eds), 2007, Sage Publications, pp 129-155
- Lynne G. Zucker & Michael R. Darby, "Star Scientists and Institutional Transformation: Patterns of Invention and Innovation in the Formation of the Biotechnology Industry," *PNAS,* November 1996, pp 12709-12716, http://www.pnas.org/content/93/23/12709.full

Assignment
Submit individual/pair PTI term topics proposals NLT Thursday, 17 September

Week 6

22 & 24 September

- WMD
- Nonproliferation, arms control, and disarmament
- International institutions

Readings

- Gregory D. Koblentz, "Pathogens as Weapons: The International Security Implications of Biological Warfare," *International Security*, Winter 2003/04, Vol 28, No 3, 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, Vol 21 No 3, pp 54-86, http://www.mitpressjournals.org/doi/abs/10.1162/isec.21.3.54

Optional

- OTA, *Technologies Underlying Weapons of Mass Destruction* (Washington, DC: OTA 1993), http://www.fas.org/spp/starwars/ota/934406.pdf
- Joseph Cirincione, Jon Wolfsthal, Miriam Rajkumar, *Deadly Arsenals: 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

Week 7

29 September & 1 October
- WMD Terrorism

Reading
- 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

Optional
- 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
- H. J. Jansen, F. J. Breeveld, C. Stijnis, and M. P. Grobusch, "Biological Warfare, Bioterrorism, and Biocrime," *Clinical Microbiology and Infection*, Volume 20, Issue 6, pp. 488-496, June 2014, 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

Browse
- 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

Week 8

6 & 8 October
- Emerging technologies
- PTI project status reports

Optional Readings
- David Resnik, "Neuroethics, National Security, and Secrecy," *American Journal of Bioethics*, May 2007, Vol 7, No 5, pp 15-14
- Ben Fitzgerald, Kelley Sayler, & Shawn Brimley, *Game Changers: Disruptive Technology and U.S. Defense Strategy,* CNAS Report, 27 September 2013, http://www.cnas.org/sites/default/files/publications-pdf/CNAS_Gamechangers_BrimleyFitzGeraldSayler.pdf
- Laurie Garrett, "Biology's Brave New World: The Promise and Perils of the Synbio Revolution," *Foreign Affairs,* Nov-Dec 2013, http://www.foreignaffairs.com/articles/140156/laurie-garrett/biologys-brave-new-world

- Kavita M. Berger & Jennifer Roderick, *National and Transnational Security Implications of Big Data in the Life Sciences*, AAAS Report, November 2014, http://www.aaas.org/report/national-and-transnational-security-implications-big-data-life-sciences
- Noah Shachtman, "How Technology Almost Lost the War: In Iraq, the Critical Networks Are Social - Not Electronic," *Wired,* 27 November 2007, Vol 15, http://www.wired.com/politics/security/magazine/15-12/ff_futurewar

Week 9

13 October
- NO CLASS: Fall recess

15 October
- Public Health

Watch
- Dr. Hans Rosling's 31 October 2012 Mountain Lecture at CDC: "An Evidenced Based View of Public Health," http://www.youtube.com/watch?v=iL8tl6jWCK0

Week 10

20 & 23 October
- Current global public health issues.
- CDC visit overview and final detail coordination

Readings
- Michelle Gayer, et al., "Conflict and Emerging Infectious Diseases," *Emerging Infectious Diseases*, January 2008, pp 88-94
- "Disease and Intelligence: Mens sana in corpore sano," *The Economist,* 1 Jul 2010, http://www.economist.com/node/16479286

Optional Readings
- David P. Fidler, "Influenza Virus Samples, International Law, and Global Health Diplomacy," *Emerging Infectious Diseases*, January 2008, pp 88-94, http://wwwnc.cdc.gov/eid/article/14/1/07-0700_article
- COL (Ret.) Jose L. Sanchez, MD MPH, DoD Global Emerging Infections Surveillance & Response System (DoD GEIS) Global Influenza Surveillance Efforts 19 December 2006, http://www.iom.edu/~/media/files/activity%20files/publichealth/dodgeisflu/9sanchezdodgeisinfluenzasurveillanceeffortsiompresentationdrsanchez19dec06.pdf
- Jennifer Brower, Peter Chalk, "The Global Threat of New and Reemerging Infectious Diseases: Reconciling U.S. National Security and Public Health Policy."

Available at
http://www.rand.org/pubs/monograph_reports/MR1602/index.html
- Institute of Medicine, Board on Global Health, *Microbial Threats to Health: Emergence, Detection, and Response* (Washington, DC: National Academy Press, 2003), http://books.nap.edu/books/030908864X/html/23.html#pagetop

Browse
- Centers for Disease Control (CDC) and Prevention website, http://www.cdc.gov/
- HHS Public Health Emergency website, http://www.phe.gov/preparedness/Pages/default.aspx
- WHO website, http://www.who.int/en/

Week 11

26-30 October – specific date TBD
- Class visit to CDC (the field trip will take the entire day starting at 08:30AM)

Week 12

3 & 5 November
- Student Presentations

Week 13

10 & 12 November
- Student Presentations

Week 14

17 & 19 November
- Student Presentations

All written papers are due on Friday, 20 November

Week 15

24 November
- Student Presentations

26 November
- NO CLASS: Thanksgiving recess

Week 16

1 & 3 December

- Semester wrap-up and synthesis of topics covered
- Discussion of next semester

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.

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