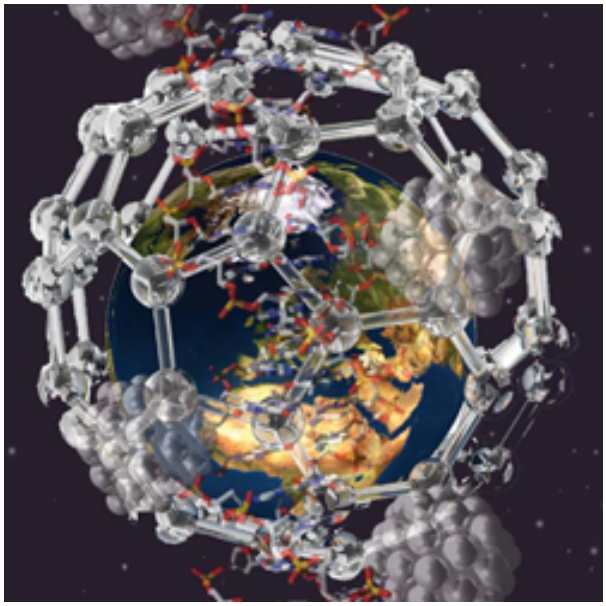
INTA 2040

SCIENCE, TECHNOLOGY, & INTERNATIONAL AFFAIRS

Fall 2011



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

3 credits
MWF 8:05 - 8:55
IC 105

Office hours: TBD
& by appointment
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Overview

This course is an overview of science and technology as a determinant in the development and functioning of states and societies worldwide and the international context for the development of science and technology. How has science and technology impacted war, power, development, and institutions? This course will explore how science and technology affect diplomacy and international relations, especially in the areas of security, environment, energy, health, business, development, privacy, and ethics. Rapid 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 nascent science and technological developments impact stability, and what are the potential international impacts? The goal of the course is to equip students with the tools needed to understand the complex problems at the intersection of scientific and technical issues and international affairs.

All course materials were chosen to reflect a wide scope of interests and debates. The readings and the course are designed to be self-contained and assume no prerequisite knowledge beyond basic high school science.

18 August 2011

Course Materials

Four texts are required:

1) Jared Diamond, *Guns, Germs, and Steel*
2) Joe Cirincione, *Bomb Scare*
3) Nayef Al-Rodhan, *The Politics of Emerging Strategic Technologies: Implications for Geopolitics, Human Enhancement and Human Destiny*
4) Graeme A. Hodge, Diana M. Bowman and Karinne Ludlow, *New Global Frontiers in Regulation: The Age of Nanotechnology* (Edward Elgar Publishing 2009 paperback edition)

All texts will be available at Engineer's Bookstore on Marietta Ave, NW.

Other short articles will be required reading; these will be announced in class and posted on the T-square course website (https://t-square.gatech.edu).

Class Requirements

1) 1st Mid-term exam (30%)
2) 2nd Mid-term exam (30%)
3) Final exam (30%)
4) Attendance (5%)
5) Participation (5%)

Attendance and Participation

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

Grade Change Policy

Appeals for grade changes should be reasonable both in argument and submission time, i.e., within two weeks of return. Specific detailed information on grade change will be distributed upon return of assignments.

Extra Credit Options

*Choose up to 2 from *different* categories*

- Book review, fiction or non-fiction, relevant to the course topic. Minimum 2 pages.
- Synopsis and analysis of television episode, movie or other non-print media relevant to the course topic. Critique perception and portrayal of science & technology issues to/in the general public. Minimum 2 pages.
- Summary and commentary on University seminar or colloquia related to science, technology, and international affairs. A variety of opportunities will be made available throughout the semester. Minimum 2 pages.
- Outside interview (University faculty and staff exempt) with someone involved a science, technology, and international affairs. Best way to build connections is to appeal to someone's ego by being interested in their work. Ask meaningful questions. Minimum 2 pages.

Each extra credit submission is worth up to 5% of the grade. Two submissions maximum.

Academic Integrity

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

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 – purchasing a term paper or copying on an exam – to the subtle – 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. 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 undergraduate students and academics. 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.

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 me after class or at your earliest convenience.

THE SYLLABUS IS DYNAMIC AND IS LIKELY TO BE UPDATED THROUGHOUT THE SEMESTER.

Course Calendar and Content

WEEK 1

22-24 August: Overview of the class, syllabus, and class requirements.
Introduction to the impact of technology on national and international security
Introduction to science and technology
Positivism and the scientific process
Doomsday scenarios

PODCAST: **"**Doomsday Scenarios: What to Believe?" KCRW's *To the Point,* 31 December 2007**,** *Starts at ~7:30 min into the podcast*

"When the Soviet Union developed nuclear weapons, the magazine Bulletin of the Atomic Scientists created the Doomsday Clock. As the prospect of nuclear war gets more likely, the minute hand gets closer to midnight. In January, when this program first aired, the hand was moved from seven minutes until midnight to five—the closest it's been since the Cold War. But there's a new twist: global warming has been added as an imminent threat to human kind."

http://www.kcrw.com/news/programs/tp/tp071231doomday_scenarios_wh

Required Reading: Linda Rothstein, Catherine Auer, Jonas Siegel "Rethinking Doomsday," *Bulletin of the Atomic Scientists*, November/December 2004, vol 60, pp 36-73.

Bulletin of the Atomic Scientists Doomsday Clock
Overview: http://www.thebulletin.org/content/doomsday-clock/overview

Jonas Siegel, "The Doomsday Clock - Tracking the Course of Global Security Since 1947," *Bulletin of the Atomic Scientists*, 2005, vol 61, pp 40-43.

Jean D. Reed, "Department of Defense Investment in Technology and Capability to Meet Emerging Security Threats," Testimony to the Emerging Threats and Capabilities Subcommittee, Committee on the Armed Services, U.S. House of Representatives, 24 July 2011.

26 August: Jared Diamond, *Guns, Germs, and Steel*, *Prologue & Part 1*
The research question: causes of disparity in human societies and development

WEEK 2

29 August – 2 September: Diamond, *Guns, Germs, and Steel*, *Part 2*
Flora and Fauna – Agriculture and the Rise of Civilizations
Geography

Jean-Pierre Bocquet-Appel, "When the World's Population Took Off: The Springboard of the Neolithic Demographic Transition," *Science,* 29 July 2011, pp 560-561.

WEEK 3

5 September: *No class – Labor Day*

7-9 September: Diamond, *Guns, Germs, and Steel*, *Part 3, Chapter 11*
Germs

WEEK 4

12-14 September: Diamond, *Guns, Germs, and Steel, Part 3, Chapters 12 & 13*
Writing & Inventing

LISTEN TO PODCAST: "The Gun Heard Round the World"

"The AK-47, one of Russia's most popular exports, turned 60 this year. Michael Hodges, author of AK47: The Story of the People's Gun, says that the weapon Mikhail Kalashnikov invented to defend his motherland has become a symbol of Third World revolutionary struggle and Islamic jihad."

http://www.onthemedia.org/episodes/2007/12/28/segments/90595

16 September: Diamond, *Guns, Germs, and Steel*, *Part 3, Chapter 14, Part 4, Epilogue & Afterward*
Organizations & Institutions, Area Studies, and Diamond's vision for future

WEEK 5

19 September: **1st EXAM**

21-23 September: Movie: **Last Best Chance**
Discussions questions will be distributed in class.

George Schultz, William Perry, Henry Kissinger, and Sam Nunn, "A World Free of Nuclear Weapons," *Wall Street Journal,* 4 January 2007

George Schultz, William Perry, Henry Kissinger, and Sam Nunn, "Toward a Nuclear-Free World," *Wall Street Journal,* 8 January 2008

Joseph Cirincione, *Bomb Scare: The History and Future of Nuclear Weapons*, Introduction & Chapter 1

Optional Podcast: MIT Technology and Culture Forum with Joe Cirincione, 22 February 2007
http://forum.wgbh.org/wgbh/forum.php?lecture_id=3474

WEEK 6

26-30 September: Cirincione, *Bomb Scare,* Chapters 2-4
Atomic physics & start of the nuclear age
The Manhattan Project, nuclear weapons complex, nuclear testing

Optional: OTA, *Technologies Underlying Weapons of Mass Destruction* (Washington, DC: OTA 1993), chapter 4, "Technical Aspects of Nuclear Proliferation," pp. 117-195, http://www.fas.org/spp/starwars/ota/934406.pdf

WEEK 7

3-7 October: Cirincione, *Bomb Scare*, Chapter 5 & 6
The Nuclear Non-Proliferation Treaty and other arms control efforts
Atoms for Peace, Cooperative Threat Reduction

Optional: Scott D. Sagan, "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb," *International Security,* Winter 1996/97, 21:3, pp 54-86.

WEEK 8

10-14 October: Cirincione, *Bomb Scare*, Chapter 7 & 8
The US-India nuclear agreement: *atoms for mangoes?*
Unsecured nuclear material & nuclear trafficking
Nuclear waste

PODCAST: **WNYC's "Yes Nukes?" 28 September 2007**

"With climate change looming large in the national consciousness, nuclear energy is experiencing a PR makeover. This Monday saw the first proposal for new reactors in America since the Three Mile Island meltdown in 1979. We look into the evolution of nuclear energy's image."

http://www.onthemedia.org/episodes/2007/09/28/segments/86338

Optional: Defense Science Board, Permanent Task Force on Nuclear Weapons Surety "Report on the Unauthorized Movement of Nuclear Weapons" (originally released February 2008, revised April 2008) http://www.acq.osd.mil/dsb/reports/2008-04-Nuclear_Weapons_Surety.pdf

George Bunn, Chaim Braun, Alexander Glaser, Edward Lyman, and Fritz Steinhausler, "Research Reactor Vulnerability to Sabotage by Terrorists," *Science and Global Security*, 2003, 11, pp 85-107 .

WEEK 9

17 October: *No class - GT Fall Recess*

19 October: **2nd EXAM**

21 October: Naef Al-Rodhan, *Politics of Emerging Strategic Technologies,* General Introduction

WEEK 10

24-28 October: Rodhan, *Politics of Emerging Strategic Technologies,* Part I, Chapters 1-5

WEEK 11

31 October, 2-4 November:
Rodhan, *Politics of Emerging Strategic Technologies,* Part I, Chapters 6-10

WEEK 12

7-11 November: Rodhan, *Politics of Emerging Strategic Technologies,* Part II

WEEK 13

14-18 November: Graeme A. Hodge, Diana M. Bowman and Karinne Ludlow, *New Global Frontiers in Regulation: The Age of Nanotechnology,* Part 1 & 2

WEEK 14

21 November: Hodge, et al., *New Global Frontiers in Regulation: The Age of Nanotechnology*, Part 3

23-25 November: *No class - Thanksgiving Recess*

WEEK 15

28-30 November, 2 December: Hodge, et al., *New Global Frontiers in Regulation: The Age of Nanotechnology*, Part 4

WEEK 16

5-7 December: Hodge, et al., *New Global Frontiers in Regulation: The Age of Nanotechnology*, Part 5 & 6

9 December: Conclusions & Wrap-Up

14 December (tentative): Review for final exam, location & time TBD

16 December: **FINAL EXAM** Friday 8:00AM to 10:50AM

One Last 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