

# Elliott School of International Affairs

THE GEORGE WASHINGTON UNIVERSITY

## Emerging Threats Fall 2020

IAFF 6186 Section 13 | 3.0 Credits | CRN 55262  
Online Instruction | Synchronous Session Thursday, 5.10–6.40pm  
Class dates: September 3, 2020 to December 14, 2020

**Prof. Paul D. Williams**

Virtual Office Hours: I will remain online between 6.40-7.00pm for issues that can be discussed with other students present. Or, we can arrange a private meeting by appointment. Email: [pauldw@gwu.edu](mailto:pauldw@gwu.edu)

### Course Description

This MA seminar course provides a survey of emerging risks and threats that are likely to have a significant impact on human security, the national security of many states, and global security. It is a required course for the “Science & Technology” concentration in the Security Policy Studies MA program. It therefore pays special attention to a range of issues where science and technology play a major role. Topics covered include how to think about securitization, risk, and technological innovation; revolutions in military affairs; warfare in the “gray zone”; nuclear terrorism; conflict in cyberspace; advances in robotics and autonomous weapons systems; machine learning and Artificial Intelligence; security-related applications of biotechnology; as well as security challenges related to public health, demography, urbanization, the environment, outer space, and quantum computing.

For each issue, we will discuss several questions to analyze the politics of scientific and technological:

- What are the most relevant scientific and technological developments?
- Who benefits from these developments, and who loses out?
- What are the key drivers of change and who are the most salient actors involved?
- What risks and threats do these developments pose for security policies at the local, national, regional, and global levels?
- How should security policies be reformed in response to these developments?

A scientific and technical background is not required but will enhance understanding of some issues.

### Learning Outcomes

At the end of this course, students should be able to:

- understand and apply the concept of securitization and engage in threat analysis related to salient contemporary issues;
- think critically about the politics of scientific and technological developments as they relate to security policy;
- think critically about a variety of perspectives and learn to discern good analysis;
- develop their own positions and recommendations for improving security policies in one or two of these issue areas;
- develop their research, analytical, written and oral communication skills.

### **Course Workload / Credit Hour Policy**

In a 15-week semester, including exam week, a three-credit graduate course would usually have around 100 minutes of direct/guided instruction, and about 350 minutes of independent work per week. You will spend approximately 2 hours per week engaged in a combination of recorded video lectures and live synchronous sessions, and 1 hour per week participating in discussion exercises (for a total of 37.5 hours of guided instruction for the semester. Homework and other independent work (e.g. readings, course papers, etc.) is estimated at around 75 hours for the semester. In total you are expected to work for at least 112.5 hours over the semester.

### **Technology Requirements**

As an online student, it is necessary to possess baseline technology skills in order to participate fully in the course. Please consult the GW Online website (<https://online.gwu.edu/technical-requirements-and-support>) for further information about recommended configurations and support. If you have questions or problems with technology for this course, please consult the Technology Help link in the left navigation menu in our course in Blackboard.

You should be able to:

- Use a personal computer and its peripherals.
- Use word processing and other productivity software.
- Use the webcam and microphone on your device.
- Use your computer *to* upload recordings and images to your computer.
- Seek technology help by contacting GW Information Technology (<https://online.gwu.edu/student-support>, 202-994-4948).

If you have any problems with the software in this course, please reference the Technology Help link in the left navigation menu in our course on Blackboard.

### **Course Weekly Schedule**

1. Introduction and Overview (Thursday 3 September)
2. Securitization, Risk and Technological Change (Thursday 10 September)
3. Revolutions in Military Affairs and “Gray Zone” Conflict (Thursday 17 September)
4. Nuclear Terrorism (Thursday 24 September)
5. Warfare in Cyberspace (Thursday 1 October)
6. Robotics and Autonomous Weapons Systems (Thursday 8 October)
7. Artificial Intelligence and Future War (Thursday 15 October)
8. Health Security (Thursday 22 October)

9. Biotechnology and “Super Soldiers” (Thursday 29 October)
10. Demography and Security (Thursday 5 November)
11. Urbanization and Securing Cities (Thursday 12 November)
12. Security in the Anthropocene (Thursday 19 November)
- No Class: Thanksgiving Break, 25-28 November
13. Security and Outer Space (Thursday 3 December)
14. Quantum Technologies and International Security (Thursday 10 December)

### Course Assessment

Attendance and Participation			10%
Op-Ed/Position Paper	(1,250-1,500 words)	Due Session 7	25%
Policy Critique Memo	(3 pages single-spaced)	Due Session 10	25%
Research Paper	(3,500-4,000 words)	Due 12/14/20	40%

Attendance and Participation (10%): This is a seminar, not a lecture course. Student contributions are thus essential. Students are required to attend all sessions, arrive on time, and have read *at least* the items listed under Required Reading prior to each session.

#### Op-Ed/Position Paper (25%). Due Session 7 Class

Write an op-ed style/position paper on how to respond to a key threat/risk to human, national or global security, including an argument justifying the actions or policies you consider necessary. Choose an issue that is covered during Sessions 1-7 of the course. You cannot select the same topic for either of your other two written papers.

Your paper should be double-spaced and 1,250-1,500 words in length, including all footnotes but excluding the Bibliography. Use standard (12-point) font and standard (1-inch) margins. Chicago Manual-style footnotes and Bibliography is preferred. The Chicago Manual Style Citation Quick Guide is available here:

[https://www.chicagomanualofstyle.org/tools\\_citationguide/citation-guide-1.html](https://www.chicagomanualofstyle.org/tools_citationguide/citation-guide-1.html)

Please submit your paper in Microsoft Word format via Blackboard.

#### Policy Critique Memo (25%). Due Session 10 Class

Write a policy memorandum critiquing a current policy problem related to the issues discussed week’s 2-8 of the course. It should be no more than three (3), 12-point typed, single-spaced, pages in length (approximately 1,500 words). If the memo exceeds three pages, the grade will be reduced. There is no need to include footnotes, references or a bibliography.

Address your memo to the National Security Advisor of any government or the relevant decision-maker in an international organization of your choice. The memo must identify a current policy problem (not an imaginary or idealized problem). Explain why it is important (why should the decision-maker bother to read this memo?). Summarize what’s wrong with current policy by identifying the shortcomings. Spell out some alternative options (present ideas about how to make policy better, responding directly

to the shortcomings you identify). Aim for policy solutions that are “PAIR” – Practical, Actionable, Innovative, and Realistic. Analyze the pros and cons of those options (be dispassionate and analytical—every option has identifiable risks). Then recommend an option (why is this option better than the other options). Be sure to state how you respond to the “con” arguments of your chosen option and mitigate the risks you identify. Finally, explain how to implement your option, including assessing the requisite resources and addressing political risks (domestic or international) associated with your recommendation. Please follow this format:

Executive Summary (up to ¼ page written after you finish)

1. Policy Problem
  - a. What is the problem with the current policy? It might be useful to think in terms of goals/methods/resources of the policy you’re critiquing.
2. Why Important?
  - a. What differences does it make (to security/political/economic/humanitarian interests)?
3. Shortcomings of current policy (Sections 1-3 together ½ page)
  - a. Why do we need a change in policy?
4. Options (1 ½ pages)
  - a. Option A
    - i. Pros
    - ii. Cons
  - b. Option B
    - i. Pros
    - ii. Cons
  - c. [Option C]
    - i. [Pros]
    - ii. [Cons]
5. Recommendations (up to ½ page)
  - a. Advocacy
  - b. Response to Counterarguments
6. Implementation (up to ½ page)
  - a. Politics
    - i. Domestic
    - ii. International
  - b. Money / Resources

Please submit an electronic version of the memo in Microsoft Word format via Blackboard.

Research Paper (40%). Due 5pm (EST) Monday December 14, 2020

Develop a research question of your choice that analyzes developments covered in one of the areas discussed in this course. You must submit your proposed research question to me in writing, and I must approve it in advance of submission.

Your paper should be double-spaced and 3,500-4,000 words in length, including all footnotes but excluding the Bibliography. If the paper is not within this word range, the grade will be reduced. Use standard (12-point) font and standard (1-inch) margins.

Chicago Manual-style footnotes and Bibliography is preferred. The Chicago Manual Style Citation Quick Guide is available here:

[https://www.chicagomanualofstyle.org/tools\\_citationguide/citation-guide-1.html](https://www.chicagomanualofstyle.org/tools_citationguide/citation-guide-1.html)

Please submit your paper in Microsoft Word format via Blackboard.

### Grading Scale / Late Submission of Papers and Incompletes

<i>Excellent</i>	<i>Good</i>	<i>Needs Improvement</i>	<i>Low Pass</i>	<i>Fail</i>
A 96%-100%	B+ 87%-89%	B- 80%-83%	C 74%-76%	F Under 70%
A- 90%-95%	B 84%-86%	C+ 77%-79%	C- 70%-73%	

- Other symbols that may appear include *AU*, Audit; *I*, Incomplete; *IPG*, In Progress; *W*, Authorized; Withdrawal; *Z*, Unauthorized Withdrawal; *CR*, Credit; *NC*, No Credit. <http://bulletin.gwu.edu/university-regulations/>
- Late papers will be penalized one-third of the grade per working day (from A to A-, from A- to B+, etc.). Save and print your work regularly as you write. Problems with technology are not an acceptable reason for late work.
- An Incomplete may be given if a student, for reasons beyond the student's control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. An Incomplete can only be granted if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded F, Failure. Incomplete work must be completed within the designated time period agreed upon by the instructor, student, and school, but no more than one calendar year from the end of the semester in which the course was taken. To record the exact expectations, conditions, and deadlines of the Incomplete please use the Elliott School's Incomplete Grade Contract: <http://go.gwu.edu/incompletecontractgraduate> The completed and signed contract is to be submitted to the Academic Affairs and Student Services Office. All students who receive an Incomplete must maintain active student status during the subsequent semester(s) in which the work of the course is being completed. If not registered in other classes during this period, the student must register for continuous enrollment status. For more information regarding Incompletes please review the relevant sections in the University Bulletin: <http://bulletin.gwu.edu/universityregulations/#Incompletes>

## **Netiquette**

Please observe the following rules of netiquette for communicating online:

- Remain professional, respectful, and courteous at all times.
- Remember that a real human being wrote each post and will read what you write in response. It is easy to misinterpret discussion posts. Let's give the benefit of the doubt.
- If you have a strong opinion on a topic, it is acceptable to express it as long as it is not phrased as an attack. Please be gracious with differing opinions.
- When upset, wait a day or two prior to posting. Messages posted (or emailed) in anger are often regretted later.
- Proofread and use the spell check tool when you type a post. It makes the post easier to read and helps your readers understand what you are saying.

I reserve the right to delete any post that is deemed inappropriate for the discussion forum, blog, or wiki without prior notification to the student. This includes any post containing language that is offensive, rude, profane, racist, or hateful. Posts that are seriously off-topic or serve no purpose other than to vent frustration will also be removed.

## Course Readings

In addition to the weekly Required Readings below, the longer list of Recommended Readings is a good place to start when writing your papers. You should also keep up-to-date with contemporary events by sifting the quality international press e.g. *Washington Post*, *New York Times*, *Financial Times*, *International Herald and Tribune*, *The Economist* etc.

I'd also recommend the National Geographic series, "Year Million" (2017). It's thought-provoking, good fun, and discusses lots of issues that we will be discussing in class. Season 1 is six episodes of about 50 mins each. It costs \$14.99 on iTunes or Amazon.

Finally, useful websites that regularly feature relevant articles for this course include:

- *Defense One*, <https://www.defenseone.com>
- *War on the Rocks*, <https://warontherocks.com>
- Center for a New American Security, <https://www.cnas.org/research/technology-and-national-security>
- Center for Security and Emerging Technology, Georgetown University, <https://cset.georgetown.edu>

### Session 1 (3 September): Introduction and Overview

- What are the most important emerging global trends?
- What are the security implications of these trends?
- How will (local and global) politics effect scientific and technological innovations?
- How should we prioritize between human, national and global security?

#### Required Reading

*Global Trends: Paradox of Progress* (NIC, Jan. 2017), pp.ix-xi and 1-28. At <https://www.dni.gov/files/documents/nic/GT-Full-Report.pdf>

*Long-Range Emerging Threats Facing the United States As Identified by Federal Agencies* (US GAO, Dec. 2018), pp.1-11, <https://www.gao.gov/products/GAO-19-204SP>

### Session 2 (10 September): Securitization, Risk and Technological Change

- What does it mean to "securitize" an issue?
- Should HIV/AIDS be securitized?
- What does the diversification of political risk mean for security?
- How should we understand technology's relationship to world politics?
- Do you agree with Cronin's "lethal empowerment theory" of technology?

#### Required Reading

Nyman, J., "Securitization" in P.D. Williams and M. McDonald (eds.), *Security Studies: An Introduction* (Routledge, 3<sup>rd</sup> edn, 2018), pp.100-113.

- Elbe, S., "Should HIV/AIDS be securitized? The ethical dilemmas of linking HIV/AIDS and security," *International Studies Quarterly*, 50:1 (2006): 119-144. [Skim this reading]
- Rice, C. and A. Zegart, "Managing 21<sup>st</sup> Century Political Risk," *Harvard Business Review*, May-June 2018, pp.130-8.
- Drezner, D., "Technological change and international relations," *International Relations*, 33:2 (2019): 286-303.
- Cronin, A.K., *Power to the People: How open technological innovation is arming tomorrow's terrorists* (Oxford University Press, 2020), Introduction (pp.1-15).

## Recommended Reading

### On Securitization

- Buzan, B. et al, *Security: A New Framework for Analysis* (Lynne Rienner, 1998).
- Williams, M.C., "Words, Images, Enemies: Securitization and International Politics," *International Studies Quarterly*, 47:4 (2003): 511-31.
- Hansen, L., "The Little Mermaid's Silent Security Dilemma and the Absence of Gender in the Copenhagen School," *Millennium: Journal of International Studies*, 29:2 (2000): 285-306.
- McDonald, M.J., "Securitization and the Construction of Security," *European Journal of International Relations*, 14:4 (2008): 563-587.
- Haacke, J. and P.D. Williams, "Regional Arrangements, Securitization, and Transnational Security Challenges: The African Union and the Association of Southeast Asian Nations Compared," *Security Studies*, 17:4 (2008): 775-809. [Read the conceptual discussion]

### On Risk

- Petersen, K.L., "Risk analysis – A field within security studies?" *European Journal of International Relations*, 18:4 (2011): 693-717.
- Bremmer, I. and P. Keat, *The Fat Tail: The Power of Political Knowledge in an uncertain world* (Oxford University Press, 2010), chs 1 and 2.
- Jarvis, D.S.L. and M. Griffiths, "Learning to Fly: The Evolution of Political Risk Analysis," *Global Society*, 21:1 (2007): 5-21.
- "What is political risk?" *The Economist*, 8 June 2017, <https://www.economist.com/blogs/economist-explains/2017/06/economist-explains-8>
- Beck, U., *Risk Society* (Sage 1986), ch.1.
- Jasanoff, S., "The Songlines of Risk," *Environmental Values*, 8:2 (1999): 135-152. [http://www.environmentandsociety.org/sites/default/files/key\\_docs/ev\\_8no.2\\_jasanoff\\_sheila.pdf](http://www.environmentandsociety.org/sites/default/files/key_docs/ev_8no.2_jasanoff_sheila.pdf)

### On Technology and Warfare

- E.A. Cohen, "Technology and Warfare" in J. Baylis et al (eds.), *Strategy in the Contemporary World* (Oxford University Press, 5<sup>th</sup> edition, 2016), pp.121-136.
- S. Biddle, *Military Power* (Princeton University Press, 2004), chapter 4.
- M. O'Hanlon, *The Science of War* (Princeton University Press, 2009), chapter 4.
- Horowitz, M.C., *The Diffusion of Military Power* (Princeton University Press, 2010).



D.R. McCarthy (ed.), *Technology and World Politics* (Routledge, 2017).  
Ellman, J. et al, *Assessing the Third Offset Strategy* (CSIS, June 2017),  
<https://www.csis.org/analysis/assessing-third-offset-strategy>

### **Session 3 (17 September): Revolutions in Military Affairs and “Gray Zone” Conflict**

- What counts as a Revolution in Military Affairs?
- What new technologies will likely have the most salient impact on global security?
- What are the principal characteristics of warfare in the “gray zone”?
- How might “gray zone” activities be effectively countered?

#### **Required Reading**

Freedman, L., *Strategy: A History* (Oxford University Press, 2016), chapter 16 “The Revolution in Military Affairs,” pp.214-36.  
Singer, P.W., *Wired for War: The Robotics Revolution and Conflict in the 21<sup>st</sup> Century* (Penguin, 2009), chapter 10 pp.179-204.  
Brose, C., “The New Revolution in Military Affairs: War’s Sci-Fi Future,” *Foreign Affairs*, 98:4 (2019): 122-33.  
Hughes, G., “War in the Grey Zone: Historical reflections and contemporary implications,” *Survival*, 62:3 (2020): 131-58.

#### **Recommended Reading**

##### On RMAs

Schaubelt, C.M., “Whither the RMA?” *Parameters*, (Autumn 2007): 95-107,  
<http://strategicstudiesinstitute.army.mil/pubs/parameters/Articles/07autumn/schnaube.pdf>  
Echevarria, A.J., “The Revolution in Military Affairs and the Continued Relevance of Clausewitz,” *Joint Forces Quarterly*, (Winter 1995-96):  
<http://www.clausewitz.com/readings/Echevarria/ECHJFQ.htm>  
Cohen, E., “Change and Transformation in Military Affairs,” *Journal of Strategic Studies*, 27:3 (2004): 395-407.  
Cohen, E., “A Revolution in Warfare,” *Foreign Affairs*, 75:2 (1996): 37-54.

##### Gray Zone Warfare

Morris, L.J. et al, *Gaining Competitive Advantage in the Gray Zone* (RAND, 2019),  
[https://www.rand.org/content/dam/rand/pubs/research\\_reports/RR2900/RR2942/RAND\\_RR2942.pdf](https://www.rand.org/content/dam/rand/pubs/research_reports/RR2900/RR2942/RAND_RR2942.pdf)  
Kapusta, P., *The Gray Zone*, Oct.-Dec. 2015,  
<https://www.soc.mil/SWCS/SWmag/archive/SW2804/GrayZone.pdf>  
Barno, D. & N. Bensahel, “Fighting and Winning in the Gray Zone,” *War on the Rocks*, 19 May 2015, <https://warontherocks.com/2015/05/fighting-and-winning-in-the-gray-zone/>

##### Hybrid Warfare

- Johnson, R., "Hybrid War and Its Countermeasures: A Critique of the Literature," *Small Wars & Insurgencies*, 29:1 (2018): 141-63.
- Hoffman, F., "Hybrid Warfare and Challenges," *Joint Forces Quarterly*, 52:1 (2009): 34–39.
- Galeotti, M., "Hybrid, ambiguous, and non-linear? How new is Russia's 'new way of war'?" *Small Wars & Insurgencies*, 27: (2016): 282-301.
- Chivvis, C.S., "Understanding Russian Hybrid Warfare: And what can be done about it," Testimony to US Congress, 22 March 2017, [https://www.rand.org/content/dam/rand/pubs/testimonies/CT400/CT468/RAND\\_CT468.pdf](https://www.rand.org/content/dam/rand/pubs/testimonies/CT400/CT468/RAND_CT468.pdf)
- Fridman, O., "Hybrid Warfare or *Gibridnaya Voyna*? Similar, But Different," *RUSI Journal*, 162:1 (2017): 42-49.

#### **Session 4 (24 September): Nuclear Terrorism**

- Why has there been no mega-terrorist attack on the United States since 9/11?
- Has the risk of nuclear terrorism increased or decreased since 9/11?
- Are non-state actors more likely to buy, steal or build a nuclear weapon?
- Should states be encouraged or explicitly threatened in order to ensure that they safeguard nuclear materials?

#### **Required Reading**

- Allison, G., "Nuclear Terrorism: Did we beat the odds or change them?" *Prism*, 7:3 (2018): 3-21.
- Lieber, K.A. and D.G. Press, "Why States Won't Give Nuclear Weapons to Terrorists," *International Security*, 38:1 (2013): 80-104.
- McIntosh, C. and I. Storey, "Between Acquisition and Use: Assessing the Likelihood of Nuclear Terrorism," *International Studies Quarterly*, 62:2 (2018): 289-300.
- Litwak, R.S., "Recalibrating Deterrence to Prevent Nuclear Terrorism," *Washington Quarterly*, 40:1 (2017): 55-70.

#### **Recommended Reading**

- The Treaty on the Non-Proliferation of Nuclear Weapons and associated texts.  
Available at: <http://www.fas.org/nuke/control/npt/text/index.html>
- Nuclear Posture Review 2018* (US Department of Defense, 2018), pp.65-68, <https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF>
- Eaves, E., "What Does Nuclear Terrorism Really Mean?," *Bulletin of the Atomic Scientists*, April 7, 2016, <http://thebulletin.org/what-does-nuclear-terrorism-really-mean9309>
- Bunn, M., et al, *Preventing Nuclear Terrorism* (Harvard University, Belfer Center report, March 2016), <https://www.belfercenter.org/sites/default/files/legacy/files/PreventingNuclearTerrorism-Web.pdf>

- Downes, R.J. and C. Hobbs, "Nuclear terrorism and virtual risk: Implications for prediction and the utility of models," *European Journal of International Security*, 2:2 (2017): 203-22.
- Weiss, L., "On fear and nuclear terrorism," *Bulletin of the Atomic Scientists*, 71:2 (2015): 75-87.
- Allison, G.T., *Nuclear Terrorism: The Ultimate Preventable Catastrophe* (Macmillan, 2004).
- Allison, G., "A Response to Nuclear Terrorism Skeptics," *The Brown Journal of World Affairs*, 16:1 (2009): 31-44, [https://www.brown.edu/initiatives/journal-world-affairs/sites/brown.edu/initiatives/journal-world-affairs/files/private/articles/16.1\\_Allison.pdf](https://www.brown.edu/initiatives/journal-world-affairs/sites/brown.edu/initiatives/journal-world-affairs/files/private/articles/16.1_Allison.pdf)
- Mowatt-Larssen, R., 'The Armageddon test: Preventing nuclear terrorism', *Bulletin of the Atomic Scientists*, 65 (2009): 60–70.
- Volders, B. and T. Sauer (eds), *Nuclear Terrorism: Countering the Threat* (Routledge, 2016).
- Black-Branch, J., "Nuclear Terrorism by States and Non-state Actors: Global Responses to Threats to Military and Human Security in International Law," *Journal of Conflict & Security Law*, 22:2 (2017): 201-48.
- Litwak, R.S., *Deterring Nuclear Terrorism* (Wilson Center, Oct. 2016), [https://www.wilsoncenter.org/sites/default/files/deterring\\_nuclear\\_terrorism\\_robert\\_litwak.pdf](https://www.wilsoncenter.org/sites/default/files/deterring_nuclear_terrorism_robert_litwak.pdf)
- Rezaei, F., "Shopping for Armageddon: Islamist Groups and Nuclear Terror," (2017), <http://www.mepc.org/journal/shopping-armageddon-islamist-groups-and-nuclear-terror>
- Bunn, M., "ISIS Seizes Nuclear Material, but That's Not the Reason to Worry," *The National Interest* (July 11, 2014), <http://nationalinterest.org/feature/isis-seizes-nuclear-material—that's-not-the-reason-worry-10849>
- Kroenig, M., *Exporting the Bomb: Technology Transfer and the Spread of Nuclear Weapons* (Cornell University Press, 2010).

## Session 5 (1 October): Warfare in Cyberspace

- What are the key characteristics of cyberspace?
- What are the principal implications that cyberspace raises for war and security?
- Is cyberwar a myth?
- How should we think about deterrence and coercion in cyberspace?
- How relevant is social media to understanding 21<sup>st</sup> century warfare?

### Required Reading

- [Read if you're new to cybersecurity issues.] J.B. Sheldon, "The Rise of Cyberpower" in J. Baylis et al (eds.), *Strategy in the Contemporary World* (Oxford University Press, 5<sup>th</sup> ed, 2016), pp.282-98.
- Rid, T., *Cyber War Will Not Take Place* (Oxford University Press, 2013), chs 1-3.
- Nye, J.S., "Deterrence and Dissuasion in Cyberspace," *International Security*, 41:3 (2016/17): 44-71.

Singer, P.W. and E.T. Brooking, *LikeWar: The Weaponization of Social Media* (Houghton Mifflin Harcourt, 2018), chs 1 and 4 (pp.1-23 and 83-117)  
US DoD, *Cyber Strategy* (2018), Summary.

## Recommended Reading

### Databases

Cyber Operations Tracker by the Council on Foreign Relations:

<https://www.cfr.org/interactive/cyber-operations>

Significant Cyber Incidents Since 2006, CSIS,

<https://www.csis.org/programs/cybersecurity-and-governance/technology-policy-program/other-projects-cybersecurity>

### General Readings

Segal, A., *The Hacked World Order* (Public Affairs, 2017), ch2, "The Anatomy of Cyberpower," pp.31-56.

Singer, P.W. and A. Friedman, *Cybersecurity and Cyberwar: What Everyone Needs to Know* (Oxford University Press, 2014), <https://www.cybersecurityandwar.com/>

Nye, J.S., "Power and National Security in Cyberspace," in K. Lord & T. Sharp (eds), *America's Cyber Future: Security and Prosperity in the Information Age*, Vol.2 (CNAS, June 2011), 5–24

[https://www.files.ethz.ch/isn/129907/CNAS\\_Cyber\\_Volume%20II\\_2.pdf](https://www.files.ethz.ch/isn/129907/CNAS_Cyber_Volume%20II_2.pdf)

Arquilla, J. and D. Ronfeldt, "The Advent of Netwar (Revisited)," in J. Arquilla and D. Ronfeldt (eds.), *Networks and Netwars: The Future of Terror, Crime, and Militancy* (RAND, 2001), pp.1-25.

Clark, D., et al, *At the Nexus of Cybersecurity and Public Policy* (The National Academies Press, 2014), chs. 1 and 3, <http://www.nap.edu/catalog/18749/at-the-nexus-of-cybersecurity-and-public-policy-some-basic>

Zimet, E. & E. Skoudis, "A Graphical Introduction to the Structural Elements of Cyberspace," in F.D. Kramer et al (eds.), *Cyberpower and National Security* (CTNSP, 2009): <http://ctnsp.dodlive.mil/2009/04/01/cyberpower-and-national-security/?and?national?security/>

### On Cyber War

Rid, T., "Cyber War Will Not Take Place", *Journal of Strategic Studies*, 35:1 (2012): 5-32.

Arquilla, J., "Cyber War Is Already Upon Us," *Foreign Policy*, March/April 2012, [http://www.foreignpolicy.com/articles/2012/02/27/cyberwar\\_is\\_already\\_upon\\_us](http://www.foreignpolicy.com/articles/2012/02/27/cyberwar_is_already_upon_us)

Gartzke, E., "The Myth of Cyberwar: Bringing War in Cyberspace Back Down to Earth," *International Security*, 38:2 (2013): 41-73.

Singer, P.W. and A. Friedman, *Cybersecurity and Cyberwar: What Everyone Needs to Know* (Oxford University Press, 2014), pp.120-165.

<https://www.cybersecurityandwar.com/>

Slayton, R., "What is the cyber offense-defense balance? Conceptions, causes and assessment," *International Security*, 41:3 (2016/17): 72-109.

## Session 6 (8 October): Robotics and Autonomous Weapons Systems

- Robots “sense-process-act”—how will advances in robotics effect international security?
- How should we think about “autonomy” in relation to weapons systems?
- What limitations, if any, should be place on Lethal Autonomous Weapon Systems (LAWS)?
- How are drones/UAVs being used in contemporary warfare? How is this likely to change over time?

### Required Reading

- Scharre, P., *Army of None: Autonomous Weapons and the Future of War* (W.W. Norton, 2018), chs. 1-3 (pp.11-56)
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- Mayer, M., “The new killer drones: understanding the strategic implications of next-generation unmanned combat aerial vehicles,” *International Affairs*, 91:4 (2015): 765-80.
- Shah, A., “Do U.S. Drone Strikes Cause Blowback? Evidence from Pakistan and Beyond,” *International Security*, 42:4 (2018): 47-84.
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- Dispelling Myths About Armed Drones project, RAND Corporation, <https://www.rand.org/nsrd/projects/armed-drones.html>

#### Autonomous Weapons Systems

- Scharre, P. and M.C. Horowitz, *An Introduction to Autonomy in Weapons Systems* (CNAS Working Paper, Feb. 2015), [https://s3.amazonaws.com/files.cnas.org/documents/Ethical-Autonomy-Working-Paper\\_021015\\_v02.pdf?mtime=20160906082257](https://s3.amazonaws.com/files.cnas.org/documents/Ethical-Autonomy-Working-Paper_021015_v02.pdf?mtime=20160906082257)

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Boulanin, V. and M. Verbruggen, *Mapping the Development of Autonomy in Weapons Systems* (SIPRI, Nov. 2017), esp. Executive Summary, pp.vii-ix, [https://www.sipri.org/sites/default/files/2017-11/siprireport\\_mapping\\_the\\_development\\_of\\_autonomy\\_in\\_weapon\\_systems\\_1117\\_1.pdf](https://www.sipri.org/sites/default/files/2017-11/siprireport_mapping_the_development_of_autonomy_in_weapon_systems_1117_1.pdf)

## **Session 7 (15 October): Artificial Intelligence and Future War**

- What is intelligence? What is cognition?
- What roles are machine learning and AI already playing in the security realm?
- What are the main security implications of AI: in the military, information and economic realms?
- What are the main characteristics of computational propaganda and “deepfakes”? And what should humans do about them?

### Required Reading

Horowitz, M.C., “Artificial Intelligence, International Competition, and the Balance of Power,” *Texas National Security Review*, 1:3 (2018): 36-57.

Scharre, P. “Killer Apps: The Real Dangers of an AI Arms Race,” *Foreign Affairs*, 98:4 (2019): 135-44.

Chessen, M., *The MADCOM Future: How AI will enhance computational propaganda, reprogram human culture, and threaten democracy ... and what can be done about it* (Atlantic Council, Sept. 2017).

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### Introductory/Background on AI

Hutson, M., “Artificial Intelligence Glossary: AI, In So Many Words”, *Science Magazine*, 357, Issue 6346, July 7, 2017, p.19.

Tegmark, M., *Life 3.0: Being Human in the Age of Artificial Intelligence* (Alfred Knopf, 2017).

Bostrom, N., *Superintelligence: Paths, Dangers, Strategies* (Oxford University Press, 2014).

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Andersen, K., “Enthusiasts and Skeptics Debate Artificial Intelligence,” *Vanity Fair*, 26 Nov. 2014, <http://www.vanityfair.com/news/tech/2014/11/artificial-intelligence-singularity-theory>

Helbing, D. *et al.*, “Will Democracy Survive Big Data and Artificial Intelligence?” *Scientific American*, February 25, 2017. At:

<https://www.scientificamerican.com/article/will-democracy-survive-big-data-and-artificial-intelligence/>

Winter-Levy, S. and J. Trefethen, "Safety First: Entering the Age of Artificial Intelligence," *World Policy Journal*, 33:1 (2016): 105-111.

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Hoadley, D.S. and N.J. Lucas, *Artificial Intelligence and National Security* (CRS Report, April 2018), <https://fas.org/sqp/crs/natsec/R45178.pdf>

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Lee, K-F., *A.I. Super-Powers: China, Silicon Valley and the New World Order* (Houghton Mifflin Harcourt, 2018).

Fedasiuk, R., *Chinese Perspectives on AI and Future Military Capabilities* (Georgetown University CSET, Aug. 2020), <https://cset.georgetown.edu/research/chinese-perspectives-on-ai-and-future-military-capabilities/>

Holzer, J.R. and F.R. Moses, "Autonomous Systems in the Intelligence Community: Many Possibilities and Challenges," *Studies in Intelligence*, 59:1 (2015): 21-29, <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/csi-studies/studies/vol-59-no-1/pdfs/Autonomous-Systems.pdf>

Boulanin, V. (ed.), *The Impact of Artificial Intelligence on Strategic Stability and Nuclear Risk* (SIPRI, May 2019), <https://www.sipri.org/publications/2019/other-publications/impact-artificial-intelligence-strategic-stability-and-nuclear-risk>

Gill, A.S., "Artificial Intelligence and International Security: The Long View," *Ethics & International Affairs*, 33:2 (2019): 169-79.

### Computational Propaganda and "Deepfakes"

Woolley, S.C., "Computational Propaganda and Political Bots: An Overview," in S. Powers and M. Kounalakis (eds.) *Can Public Diplomacy Survive the Internet: Bots, Echo Chambers, and Disinformation?* May 2017, pp.13-17. <https://www.state.gov/documents/organization/271028.pdf>

Hulcoop, A. and J. Scott-Railton, et al., "Tainted Leaks: Disinformation and Phishing with a Russian Nexus," (The Citizen Lab: University of Toronto Munk School of Global Affairs. June 20, 2017), pp.1-29. <https://citizenlab.ca/2017/05/tainted-leaks-disinformation-phish/>

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Davis, R. et al, *Deepfakes* (Harvard University, Tech Factsheets for Policymakers, Spring 2020), <https://www.belfercenter.org/publication/technology-factsheet-deepfakes>

## Session 8 (22 October): Health Security (7 November)

- How should we think about the relationship between pandemics, public health and security?
- Is “global health security” a viable concept in contemporary world politics?
- What global governance structures are necessary to effectively contain pandemics?
- What are the main implications of treating the pharmaceutical industry as a national security asset?

### Required Reading

Harrison, M., “Pandemics” in M. Jackson (ed.), *The Routledge History of Disease* (Routledge, 2016), pp.129-46.

Rushton S., “Global Health Security: Security for Whom? Security from What?” *Political Studies*, 59:4 (2011): 779-96.

Davies, S.E., “Securitizing Infectious Diseases,” *International Affairs*, 84:2 (2008): 295-313.

Moon et al, “Will Ebola change the game? Ten essential reforms before the next pandemic. The report of the Harvard-LSHTM Independent Panel on the Global Response to Ebola,” *Lancet*, 386 (2015): 2204-21. [Skim this article.]

### Recommended Reading

McInnes, C. and K. Lee, *Global Health and International Relations* (Polity, 2012), ch.6, pp.130-57.

Youde, J., “High Politics, Low Politics, and Global Health,” *Journal of Global Security Studies*, 1:2 (2016): 157-70.

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Elbe et al, “Medical countermeasures for national security: a new government role in the pharmaceuticalization of society,” *Social Science & Medicine*, 131 (2015): 263-271.

Harman, S. and C. Wenham, “Governing Ebola: between global health and medical humanitarianism,” *Globalizations*, 15:3 (2018): 362-376.

Davies, S.E. & B. Bennett, “A gendered human rights analysis of Ebola and Zika,” *International Affairs*, 92:5 (2016): 1041-60.

Davies, S.E., “Artificial Intelligence in Global Health,” *Ethics & International Affairs*, 33:2 (2019): 181-92.

## Session 9 (29 October): Biotechnology and “Super Soldiers”

- Who benefits most from the ongoing revolution in biotechnology?
- How is biotechnology changing the contemporary security terrain?
- What are the principal security implications of developments in synthetic biology?
- What are the major ethical and policy issues involved in “human enhancement”?
- What are the most useful “augments” for soldiers?



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- Malet, D., "Captain America in International Relations: The Biotech Revolution in Military Affairs," *Defence Studies*, 15:4 (2015): 320-40.
- Gronvall, G., "The security implications of synthetic biology," *Survival*, 60:4 (2018): 165-80.
- NAP, *Biodefense in the Age of Synthetic Biology* (NAP, 2018), Summary + chs 2 & 3 (pp.1-7 & 15-35).
- Lin, P, M.J. Mehlman, K. Abney, *Enhanced Warfighters: Risk, Ethics, and Policy* (The Greenwall Foundation, 2013), pp.1-27,  
[http://ethics.calpoly.edu/greenwall\\_report.pdf](http://ethics.calpoly.edu/greenwall_report.pdf)
- Scharre, P. et al, "Super Soldiers: Summary of Findings and Recommendations," CNAS, 28 November 2018, <https://www.cnas.org/publications/reports/summary-of-findings-and-recommendations-1>

## Recommended Reading

- Huang, J.Y. and M.E. Kosal, "The Security impact of the Neurosciences," *The Bulletin of the Atomic Scientists*, 20 June 2008, <https://thebulletin.org/security-impact-neurosciences>
- Enemark, C., *Biosecurity Dilemmas* (Georgetown University Press, 2017), ch.1 "Biodefence and the Security Dilemma," and ch.7 "The Agenda of Global Health Security." **E-book available via GW Libraries**
- Dieuliis, D., "Biotechnology for the Battlefield," *War On The Rocks*, 27 November 2018, <https://warontherocks.com/2018/11/biotechnology-for-the-battlefield-in-need-of-a-strategy/>
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- CNAS, "Super Soldiers" series of publications, <https://www.cnas.org/super-soldiers>
- Scharre, P. and L. Fish, *A Strategy for Enhancing Warfighter Survivability* (CNAS, April 2018) <https://www.cnas.org/publications/reports/super-soldiers>
- Malet, D. *Biotechnology and International Security* (Rowman & Littlefield, 2016).
- Ford, K. and C. Glymour, "The enhanced warfighter," *Bulletin of the Atomic Scientists*, 70:1 (2014): 43-53.
- Fazal, T.M., "Dead Wrong? Battle deaths, military medicine, and exaggerated reports of war's demise," *International Security*, 39:1 (2014): 95-125.
- Ryan, M. and T. Keane, "Biotechnology and human augmentation: Issues for national security practitioners," *Strategy Bridge*, 5 February 2019,  
<https://thestrategybridge.org/the-bridge/2019/2/5/biotechnology-and-human-augmentation-issues-for-national-security-practitioners>

## Session 10 (5 November): Demography and Security

- How would you characterize global demographic trends?
- Is a world with 10 billion humans a security issue?
- Are certain population structures at higher risk of armed conflict?
- How do population dynamics affect national security and global security?
- How persuasive is the “geriatric peace” thesis?

### Required Reading

- Sciubba, J.D., *The Future Faces of War: Population and National Security* (Praeger, 2010), ch.1 “A Framework for Demography and National Security,” pp.1-16.
- Goldstone, J., H. Root and M.G. Marshall, “Demographic Growth in Dangerous Places: Concentrating Conflict Risk,” *International Area Studies Review* 17:2 (2014): 120-133.
- Haas, M., “A Geriatric Peace? The Future of U.S. Power in a World of Aging Populations,” *International Security*, 32:1 (2007): 112-147.
- Brooks, D.J. et al, “The Demographic Transition Theory of War: Why Young Societies Are Conflict Prone and Old Societies Are the Most Peaceful,” *International Security*, 43:3 (2018/19): 53-95.

### Recommended Reading

- Goldstone, J., H. Root and M.G. Marshall, “The Impact of Global Demographic Changes on the International Security Environment” in C. Crocker et al (eds.), *Managing Conflict in a World Adrift* (US Institute of Peace Press, 2015), pp. 241-254.
- Sciubba, J.D., “Demography and Instability in the Developing World,” *Orbis*, 56:2 (2012): 267-77.
- Goldstone, J.A., “The New Population Bomb: The Four Megatrends that will Change the World,” *Foreign Affairs*, 89:1 (2010): 31-43.
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- Goldstone, J.A., E.P. Kaufmann and M.D. Toft (eds.), *Political Demography: How Population Changes Are Reshaping International Security and National Politics* (Oxford University Press, 2011), Introduction and Conclusion.
- Toft, M.D., “Demography and national security: The politics of population shifts in contemporary Israel,” *International Area Studies Review*, 15:1 (2012): 21-42.
- Sommers, M., *The Outcast Majority: War, development, and youth in Africa* (University of Georgia Press, 2015), chapter 1, “Demography and Alienation.”
- Urdal, H., “A Clash of Generations? Youth Bulges and Political Violence,” *International Studies Quarterly*, 50:3 (2006): 607-29.

## Session 11 (12 November): Urbanization and Securing Cities

- How would you characterize the relationship between urbanization and violent conflict?

- How best can we understand the science and ecology of cities and their security implications?
- What does urbanization mean for insurgents and those countering insurgents? And terror networks and those countering terror networks? What does the 2008 Mumbai attack reveal?
- How did ISIS use urban environments to its advantage when fighting superior forces?
- Why is intelligence gathering so important for urban operations?

### Required Reading

- Buhaug, H. and H. Urdal, "An urbanization bomb? Population growth and social disorder in cities," *Global Environmental Change*, 23:1 (2013): 1-10. [Skim main conclusions.]
- Evans, M., "Future war in cities: Urbanization's challenge to strategic studies in the 21<sup>st</sup> century," *International Review of the Red Cross*, 98:1 (2016): 37–51.
- Spencer, J., "The Destructive Age of Urban Warfare," *Modern War Institute*, 28 March 2019, <https://mwi.usma.edu/destructive-age-urban-warfare-kill-city-protect/>
- Postings, R., "A guide to the Islamic State's way of urban warfare," 9 July 2018, <https://mwi.usma.edu/guide-islamic-states-way-urban-warfare/>
- Nayak, P. and M. Krepon, *The Unfinished Crisis: US Crisis Management after the 2008 Mumbai Attacks* (Stimson Center, Feb. 2012), pp.5-23  
[https://www.stimson.org/sites/default/files/file-attachments/Mumbai-Final\\_1\\_1.pdf](https://www.stimson.org/sites/default/files/file-attachments/Mumbai-Final_1_1.pdf)

### Recommend Reading

- Fragile Cities – UN University research outputs: <https://cpr.unu.edu/tag/fragile-cities>
- Betz, D. and H. Stanford-Tuck, "The City is Neutral: On Urban Warfare in the 21<sup>st</sup> Century," *Texas National Security Review*, 2:4 (2019): 60-87.
- Spencer, J., "The City is Not Neutral: Why Urban Warfare is so Hard," *Modern Warfare Institute*, 4 March 2020, <https://mwi.usma.edu/city-not-neutral-urban-warfare-hard/>
- Small Arms Survey 2015: Weapons and the World* (Cambridge University Press, 2015), ch.2 "Violence and Frontier Urbanization"  
<http://www.smallarmssurvey.org/fileadmin/docs/A-Yearbook/2015/eng/Small-Arms-Survey-2015-Chapter-02-EN.pdf>
- Kilcullen, D., *Out of the Mountains: The Coming Age of the Urban Guerrilla* (Oxford University Press, 2013).
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- Small Arms Survey 2007: Guns and the City* (Cambridge University Press, 2007), <http://www.smallarmssurvey.org/publications/by-type/yearbook/small-arms-survey-2007.html>

## On the U.S. Military and Urban Warfare

Gentile, G. et al, *Reimagining the Character of Urban Operations for the US Army* (RAND Corporation, 2017),

[https://www.rand.org/pubs/research\\_reports/RR1602.html](https://www.rand.org/pubs/research_reports/RR1602.html)

Harris, Col. M. et al., *Megacities and the United States Army: Preparing for a Complex and Uncertain Future* (Chief of Staff of the Army's Strategic Studies Group, June 2014), <https://www.army.mil/e2/c/downloads/351235.pdf>

Robertson, W.G. and L.A. Yates (eds.), *Block By Block: The Challenges of Urban Operations* (Fort Leavenworth: Combat Studies Institute, 2003), Introduction and Conclusion. [Full book PDF available here:

<http://cgsc.contentdm.oclc.org/cdm/ref/collection/p16040coll3/id/88>]

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South, T., "The subterranean battlefield," *Military Times*, 26 February 2019,

<https://www.militarytimes.com/news/your-army/2019/02/26/the-subterranean-battlefield-warfare-is-going-underground-into-dark-tight-spaces/>

## **Session 12 (19 November): Security in the Anthropocene**

- How does the concept of the Anthropocene change traditional understandings of the environment, security, geopolitics and geoeconomics?
- Is "industrial humanity" the real security disaster?
- What are the benefits and costs of geoengineering as a response to climate change? Is there a "security hazard" to geoengineering?
- Are there other ways technology can help manage security threats in the Anthropocene?

### **Required Reading**

"Briefing: Climate Change," *The Economist*, 21 September 2019, pp.22-25.

Dalby, S., "Environmental Change" in P.D. Williams and M. McDonald (eds.), *Security Studies: An Introduction* (Routledge, 3<sup>rd</sup> edn, 2018).

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IPBES, *Global Assessment on Biodiversity & Ecosystem Services: Summary for Policymakers* (May 2019), pp.2-9. [Skim the rest]

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### Recommended Reading

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- Dalby, S., "Rethinking Geopolitics: Climate Security in the Anthropocene," *Global Policy*, 5:1 (2014): 1-9.
- McNeill, J.R., *Something New Under the Sun: An environmental history of the 20<sup>th</sup> century world* (W.W. Norton, 2000).
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- Nightingale, P. and R. Cairns, *The Security Implications of Geoengineering: Blame, Imposed Agreement and the Security of Critical Infrastructure* (Climate Geoengineering Governance Working Paper Series: 018, 2015), <http://www.geoengineering-governance-research.org/perch/resources/cgg-working-paper-18revisefeb15.pdf>

### Session 13 (3 December): Security and Outer Space

- Are you a "space warrior" or "space worrier"?
- Which activities in outer space are security issues?
- How significant a threat is the militarization and/or weaponization of space?
- What are the two most important factors that will shape the future of security issues in outer space?
- What should a U.S. national space strategy entail?

### Required Reading

- Vedda, J.A. and P.L. Hays, *Major Policy Issues in Evolving Global Space Operations* (Aerospace Corporation Center for Space Policy and Strategy and Mitchell Institute for Aerospace Studies, Feb. 2018), [https://aerospace.org/sites/default/files/2018-05/Space\\_Policy\\_FINAL\\_interactive\\_0.pdf](https://aerospace.org/sites/default/files/2018-05/Space_Policy_FINAL_interactive_0.pdf) [Skim all of the issues discussed.]
- Harrison et al, *Space Threats Assessment 2020* (CSIS Aerospace Security Project, March 2020), pp.1-7 <https://www.csis.org/analysis/space-threat-assessment-2020>

- NASIC, *Competing in Space* (December 2018), <https://www.nasic.af.mil/News/Article-Display/Article/1733201/usaf-nasic-releases-unclassified-competing-in-space-assessment/>
- Colby, E., *From Sanctuary to Battlefield: A Framework for a U.S. Defense and Deterrence Strategy for Space*, (CNAS, January 2016), [http://www.cnas.org/sites/default/files/publications-pdf/CNAS%20Space%20Report\\_16107.pdf](http://www.cnas.org/sites/default/files/publications-pdf/CNAS%20Space%20Report_16107.pdf)
- U.S. Department of Defense, *Defense Space Strategy: Summary* (June 2020), [https://media.defense.gov/2020/Jun/17/2002317391/-1/-1/1/2020\\_DEFENSE\\_SPACE\\_STRATEGY\\_SUMMARY.PDF](https://media.defense.gov/2020/Jun/17/2002317391/-1/-1/1/2020_DEFENSE_SPACE_STRATEGY_SUMMARY.PDF)

## Recommended Reading

### General

- “Space Security Factsheet,” Space Security Index, <http://spacesecurityindex.org/wp-content/uploads/2014/10/SpaceSecurityFactSheet.pdf> [Concise overview of key dimensions of space security]
- Space Security Index, <http://spacesecurityindex.org> [Executive Summaries are free]
- The Space Review* weekly online journal with short articles, commentaries and reviews <http://www.thespacereview.com>
- Brachet, G., *The Security of Space Activities* (SIPRI Non-proliferation paper 51, July 2016), <https://www.sipri.org/publications/2016/eu-non-proliferation-papers/security-space-activities>
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- Johnson-Freese, J., *Space Warfare in the 21<sup>st</sup> Century* (Routledge, 2016).
- Moltz, J.C., *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests* (Stanford University Press, 2<sup>nd</sup> edn., 2011).
- Moltz, J.C., *Crowded Orbits: Conflict and Cooperation in Space* (Columbia University Press, 2014).
- O’Hanlon, M.E., *Neither Star Wars nor Sanctuary: Constraining the Military Uses of Space* (Brookings Institution, 2004).

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- Arbatov, A. and V. Dvorkin (eds.), *Outer Space: Weapons, Diplomacy, and Security* (Carnegie Endowment, 2010), [https://carnegieendowment.org/files/outer\\_space\\_excerpt1.pdf](https://carnegieendowment.org/files/outer_space_excerpt1.pdf)

- Larsen, P.B., "Outer Space Arms Control: Can the USA, Russia and China Make this Happen," *Journal of Conflict and Security Law*, 20 June 2017, <https://doi.org/10.1093/jcsl/krw026>
- Al-Rodham, N., "Weaponization and Outer Space Security," *Global Policy*, 12 March 2018, <https://www.globalpolicyjournal.com/blog/12/03/2018/weaponization-and-outer-space-security>
- CBS, "The Battle Above," 2015: on US-China competition over satellites, <https://www.cbsnews.com/news/rare-look-at-space-command-satellite-defense-60-minutes-2/>
- Weeden, B., *Through a Glass Darkly: Chinese, American, and Russian Anti-satellite Testing in Space* (Secure World Foundation, 17 March 2014), [http://swfound.org/media/167224/Through\\_a\\_Glass\\_Darkly\\_March2014.pdf](http://swfound.org/media/167224/Through_a_Glass_Darkly_March2014.pdf)

### U.S. Counterspace Capabilities Threat Assessments

See also the earlier annual *Space Threats Assessments* for 2019 & 2018, by Todd Harrison et al at CSIS.

Weeden, B. and V. Sampson, *Global Counterspace Capabilities: An Open Source Assessment* (Secure World Foundation, April 2018) [http://swfound.org/media/206118/swf\\_global\\_counterspace\\_april2018.pdf](http://swfound.org/media/206118/swf_global_counterspace_april2018.pdf)

### Official USG statements:

- "Fact Sheets: President Donald J. Trump is Unveiling an America First National Space Strategy," The White House, 23 March 2018, <http://www.whitehouse.gov/briefings-statements/president-donald-j-trump-unveiling-america-first-national-space-strategy/>
- Office of the Assistant Secretary of Defense for Homeland Defense & Global Security, "Space Domain Mission Assurance: A Resilience Taxonomy," Department of Defense, September 2015, <http://www.hsdl.org/?view&did=789773>

### On U.S. Space Force

"Text of Space Policy Directive-4: Establishment of the United States Space Force," 19 February 2019, <https://www.whitehouse.gov/presidential-actions/text-space-policy-directive-4-establishment-united-states-space-force/>

"DoD Submits US Space Force Proposal," 1 March 2019, <https://www.defense.gov/explore/story/Article/1767808/dod-submits-us-space-force-proposal/>

"Does America Need a Space Force?", Policy Roundtable, *Texas National Security Review*, (2018), <https://tnsr.org/roundtable/policy-roundtable-does-america-need-a-space-force/>

Donovan, M., "Unleashing the Power of Space: The case for a separate space force," *War on the Rocks*, 1 August 2019, <https://warontherocks.com/2019/08/unleashing-the-power-of-space-the-case-for-a-separate-u-s-space-force/>

Johnson, K., *Space Force or Space Corps? Competing visions for a new military service* (CSIS Briefs, June 2019), <https://www.csis.org/analysis/space-force-or-space-corps>

## **Session 14 (10 December): Quantum Technologies and International Security**

- How are quantum technologies in computers, sensors, and communications advancing? Think about key indicators such as quantum advantage, the number of coherent qubits running programs, and retaining the talent pool.
- What applications of quantum technologies—computers, sensors, communications—are most relevant to international security?
- To what extent will quantum technologies revolutionize cryptography, precision guidance, and radar/sensors?
- What are the geopolitical implications of advances in quantum technologies?

### **Required Reading**

*Quantum Computing: Tech Factsheets for Policymakers* (Harvard University, Spring 2020), <https://www.belfercenter.org/publication/technology-factsheet-quantum-computing>

Biercuk, M.J. & R. Fontaine, “The Leap into Quantum Technology: A Primer for National Security Professionals,” *War on the Rocks*, 17 November 2017, <https://warontherocks.com/2017/11/leap-quantum-technology-primer-national-security-professionals/>

Smith, F.L., “Quantum technology hype and national security,” *Security Dialogue*, (2020), OnlineFirst, DOI: 10.1177/0967010620904922

Kania, E. & J. Costello, *Quantum Hegemony? China’s ambitions and the challenge to U.S. innovation and leadership* (CNAS, September 2018), <https://www.cnas.org/publications/reports/quantum-hegemony>

### **Recommended Reading**

#### On Quantum Technologies and International Security

Lindsay, J., “Demystifying the Quantum Threat: Infrastructure, Institutions, and Intelligence Advantage,” *Security Studies*, 29:2 (2020): 335-61.

Lindsay, J., “Surviving the Quantum Cryptocalypse,” *Strategic Studies Quarterly*, Summer 2020, pp.49-73.

Biercuk, M.J., “Read before pontificating on quantum technology,” *War on the Rocks*, 13 July 2020, <https://warontherocks.com/2020/07/read-before-pontificating-on-quantum-technology/>

#### On Quantum Technologies

“An Introduction to Quantum Computing,” 5 video series (total 20 mins), <https://www.youtube.com/playlist?list=PL15cUA9pRkPal2fFettZHcSe9Uba0U-26>

Gerbert, P. & F. Rueß, *The Next Decade in Quantum Computing* (Boston Consulting Group, Nov. 2018), <https://www.bcg.com/publications/2018/next-decade-quantum-computing-how-play.aspx>



Matuschak, A. and M. Nielsen, *Quantum Computing for the Very Curious* ( ),  
<https://quantum.country/qcvc> [This gets very technical.]

See also the U.S. National Quantum Initiative Act (2018),  
<https://www.congress.gov/bill/115th-congress/house-bill/6227> This bill directs the President to implement a National Quantum Initiative Program to, among other things, establish the goals and priorities for a 10-year plan to accelerate the development of quantum information science and technology applications.

## University Policies and Procedures

### Academic Integrity

Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information. Please review GW's policy on academic integrity, located at <https://studentconduct.gwu.edu/code-academic-integrity>. All graded work must be completed in accordance with the George Washington University Code of Academic Integrity. For more information see Academic Dishonesty Prevention ([https://studentconduct.gwu.edu/sites/g/files/zaxdzs1151/f/170116\\_Student\\_Academic\\_Integrity\\_Resource\\_Development.pdf](https://studentconduct.gwu.edu/sites/g/files/zaxdzs1151/f/170116_Student_Academic_Integrity_Resource_Development.pdf))

### Sharing of Course Content

Unauthorized downloading, distributing, or sharing of any part of a recorded lecture or course materials, as well as using provided information for purposes other than the student's own learning may be deemed a violation of GW's Student Conduct Code.

### Use of Student Work (FERPA)

The professor will use academic work that you complete during this semester for educational purposes in this course during this semester. Your registration and continued enrollment constitute your consent.

### Copyright Policy Statement

Materials used in connection with this course may be subject to copyright protection under Title 17 of the United States Code. Under certain Fair Use circumstances specified by law, copies may be made for private study, scholarship, or research. Electronic copies should not be shared with unauthorized users. If a user fails to comply with Fair Use restrictions, he/she may be liable for copyright infringement. For more information, including Fair Use guidelines, see Libraries and Academic Innovations Copyright page (<https://library.gwu.edu/scholarly-communications/copyright/basics>).

### Disability Support Services & Accessibility

If you may need disability accommodations based on the potential impact of a disability, please register with Disability Support Services (DSS) at <https://disabilitysupport.gwu.edu/registration>. If you have questions about disability accommodations, contact DSS at 202-994-8250 or [dss@gwu.edu](mailto:dss@gwu.edu) or visit them in person in Rome Hall, Suite 102. For additional information see: <https://disabilitysupport.gwu.edu/>.

For information about how the course technology is accessible to all learners, see the following resources:

- Blackboard Accessibility <http://www.blackboard.com/accessibility.aspx>
- Kaltura (video platform) accessibility: <https://corp.kaltura.com/products/core-platform/video-accessibility>

### Religious Observances

In accordance with University policy, students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance. For details and policy, see: <https://registrar.gwu.edu/university-policies#holidays>

### **Mental Health Services**

The University's Mental Health Services offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include: crisis and emergency mental health consultations confidential assessment, counseling services (individual and small group), and referrals. For additional information call 202-994-5300 or see: <https://healthcenter.gwu.edu/counseling-and-psychological-services>

### **Emergency Preparedness and Response Procedures**

The University has asked all faculty to inform students of these procedures, prepared by the GW Office of Public Safety and Emergency Management in collaboration with the Office of the Executive Vice President for Academic Affairs.

To Report an Emergency or Suspicious Activity call the University Police Department at 202-994-6111 (Foggy Bottom) or 202-242-6111 (Mount Vernon).

### **Shelter in Place – General Guidance**

Although it is unlikely that we will ever need to shelter in place, it is helpful to know what to do just in case. No matter where you are, the basic steps of shelter in place will generally remain the same.

- If you are inside, stay where you are unless the building you are in is affected. If it is affected, you should evacuate. If you are outdoors, proceed into the closest building or follow instructions from emergency personnel on the scene.
- Locate an interior room to shelter inside. If possible, it should be above ground level and have the fewest number of windows. If sheltering in a room with windows, move away from the windows. If there is a large group of people inside a particular building, several rooms may be necessary.
- Shut and lock all windows (for a tighter seal) and close exterior doors.
- Turn off air conditioners, heaters, and fans. Close vents to ventilation systems as you are able. (University staff will turn off ventilation systems as quickly as possible).
- Make a list of the people with you and ask someone to call the list in to UPD so they know where you are sheltering and who is with you. If only students are present, one of the students should call in the list.
- Await further instructions. If possible, visit GW Campus Advisories <http://campusadvisories.gwu.edu/> for incident updates or call the GW Information Line 202-994-5050.
- Make yourself comfortable and look after one other. You will get word as soon as it is safe to come out.

### **Evacuation**

An evacuation will be considered if the building we are in is affected or we must move to a location of greater safety. We will always evacuate if the fire alarm sounds. In the event of an evacuation, please gather your personal belongings quickly (purse, keys, GWorld card, etc.) and proceed to the nearest exit. Every classroom has a map at the door designating both the shortest egress and an alternate egress. Anyone who is physically unable to walk down the stairs should wait in the stairwell, behind the closed doors. Firemen will check the stairwells upon entering the building.

Once you have evacuated the building, proceed to our primary rendezvous location: the court yard area between the GW Hospital and Ross Hall. In the event that this location is unavailable, we will meet on the ground level of the Visitors Parking Garage (I Street entrance, at 22nd Street). From our rendezvous location, we will await instructions to re-enter the School.

### **Alert DC**

Alert DC provides free notification by e-mail or text message during an emergency. Visit GW Campus Advisories for a link and instructions on how to sign up for alerts pertaining to GW. If you receive an Alert DC notification during class, you are encouraged to share the information immediately.

### **GW Alert**

GW Alert provides popup notification to desktop and laptop computers during an emergency. In the event that we receive an alert to the computer in our classroom, we will follow the instructions given. You are also encouraged to download this application to your personal computer. Visit GW Campus Advisories <http://campusadvisories.gwu.edu/> to learn how.

### **Additional Information**

Additional information about emergency preparedness and response at GW or the University's operating status can be found on GW Campus Advisories <http://campusadvisories.gwu.edu/> or by calling the GW Information Line at 202-994-5050.