



Cybersecurity In Digital Environment

Materials from Harvard Kennedy School – Executive Program –

Intended only for education purposes.

AARMENA Cyber Security Diploma Team

1. Prof. Dr. Martin Leiner - Friedrich Schiller University
2. Dr. Iyad Muhsen Aldajani - Friedrich Schiller University
3. Dr. Ali Maqousi - Petra University
4. Dr. Omar Emar – Petra University
5. Dr. Kamal Alawamleh – Petra University



READINGS:

1. Deibert, Ronald. 2020. "[We've become dependent on a technological ecosystem that is highly invasive and prone to serial abuse.](#) Download [We've become dependent on a technological ecosystem that is highly invasive and prone to serial abuse.](#)" Opinion in the Globe and Mail. 23 November 2020.(Required)
2. Hathaway, Melissa. 2019. "[Patching our Future is Dangerous and Unsustainable.](#)" Download "[Patching our Future is Dangerous and Unsustainable.](#)" *Centre for International Governance Innovation* Paper No: 219. June 2019. (Required)
3. **Video** :Oliver, John. Encryption: Last Week Tonight with John Oliver (HBO). 13 March 2016. <https://www.youtube.com/watch?v=zsJZ2r9YgzW>[Links to an external site.](#)(Required)
4. Parag, Khanna and Srinivasan, Balaji. 2021. "[Great Protocol Politics The 21st Century Doesn't Belong to China, the United States or Silicon Valley, It Belongs to the Internet](#)". Download "[Great Protocol Politics The 21st Century Doesn't Belong to China, the United States or Silicon Valley, It Belongs to the Internet](#)". *Foreign Policy*. (Required)

OPTIONAL READINGS:

1. Gosler, James R. "[The Digital Dimension](#) Download "[The Digital Dimension.](#)" *Download .*" In *Transforming U.S. Intelligence*. Washington, D.C., Georgetown University Press, Jennifer E. Sims and Burton Berber, 2005. p. 96-114 (Optional)
2. Hathaway, Melissa. "[Connected Choices: How the Internet is Challenging Sovereign Decisions](#) Download [Connected Choices: How the Internet is Challenging Sovereign Decisions.](#)" *American Foreign Policy Interests*. Issue 5, Volume 36. (Fall 2014). (Optional)
3. Hathaway, Melissa. 2020. "[Why Digital Infrastructure Must Be Resilient](#)" Download "[Why Digital Infrastructure Must Be Resilient](#)". *Centre for International Governance Innovation* OpEd. July 2020. (Optional)
4. Martin, Ciaran. 2020, "[Cyber Weapons are Called Viruses for a Reason.](#)" Download "[Cyber Weapons are Called Viruses for a Reason.](#)" *Kings College of London*. 10 November 2020. Lecture: <https://thestrandgroup.kcl.ac.uk/event/ciaran-martin-cyber-weapons-are-called-viruses-for-a-reason-statecraft-security-and-safety-in-the-digital-age/>[Links to an external site.](#) (Optional)
5. O'Hara, Kieron and Hall, Wendy . *Four Internets: The Geopolitics of Internet Governance*. Centre for International Governance Innovation Paper No. 206. 7 December 2018. <https://www.cigionline.org/publications/four-internets-geopolitics-digital-governance>[Links to an external site.](#) (Optional).



6. The Lawfare Podcast: Avril Haines, Eric Rosenbach, and David Sanger on U.S. Offensive Cyber Operations. <https://www.lawfareblog.com/lawfare-podcast-avril-haines-eric-rosenbach-and-david-sanger-us-offensive-cyber-operations> [Links to an external site.](#) (Optional).

READINGS

1. Levine, Edlyn V. 2021. ["The Die is Cast"](#) [Download "The Die is Cast"](#). *Communication of the ACM*, January, 2021 56-60.
2. [DSB Task Force on Cyber Supply Chain](#) [Download DSB Task Force on Cyber Supply Chain](#) *Defense Science Board*, February 2017.
3. DARPA programs illustrating the hardware and supply chain problem: [Leveraging the Analog Domain for Security \(LADS\) Broad Area Announcement](#) [Download Leveraging the Analog Domain for Security \(LADS\) Broad Area Announcement](#). (Read part II, section I): [Links to an external site.](#)
4. [Trusted Integrated Circuits](#) [Download Trusted Integrated Circuits](#) [Download uits](#) (TRUST)
5. [Supply Chain Hardware Integrity for Electronics](#) [Download Supply Chain Hardware Integrity for Electronics](#) (SHIELD)
6. ["Chip Wars: China, America and Silicon Supremacy"](#) [Download "Chip Wars: China, America and Silicon Supremacy"](#) PDF *The Economist*, Dec 1st 2018 edition. [WebLinks to an external site.](#)
7. Warren, Samuel and Louis Brandeis. ["The Right to Privacy."](#) [Download "The Right to Privacy."](#) *Harvard Law Review*, vol. 4, no. 5, 1890, pp. 193-220.
8. 2014. ["Report to the President Big Data and Privacy: A Technological Perspective"](#) [Download "Report to the President Big Data and Privacy: A Technological Perspective"](#) (May, 2014).
9. 1. **Contributor** *i.e* Committee on Law Enforcement and Intelligence Access to Plaintext Information in an Era of Widespread Strong Encryption: Options and Trade Offs, Computer Science and Telecommunications Board, National Academies of Sciences, Engineering, and Medicine: 2018 ["Introduction"](#) [Decrypting the Encryption Debate: A Framework for Decisionmakers](#) [Download "Introduction"](#) [Decrypting the Encryption Debate: A Framework for Decisionmakers](#). *The National Academies Sciences, Engineering and Medicine*. 1-14.
10. A downloadable PDF can also be found [here](#) [Links to an external site.](#)
11. 2. Levy, Ian and Robinson, Crispin. 2018. ["Principles for a More Informed Exceptional Access Debate"](#) [Download "Principles for a More Informed Exceptional Access Debate"](#) November 29, 2018
12. 3. Hal Abelson et al., 2021. ["Bugs in our Pockets The Risks of Client-Side Scanning"](#) [Download "Bugs in our Pockets The Risks of Client-Side Scanning"](#) Executive Summary, October 15, 2021,

13.



OPTIONAL CASE STUDY

***self-study – we will not cover in lecture):

1. Robertson, Jordan and Riley, Michael. 2018. [“The Big Hack: How China Used a Tiny Chip to Infiltrate U.S. Companies PDF Download “The Big Hack: How China Used a Tiny Chip to Infiltrate U.S. Companies PDF”](#) & In-[Word Download WordBloomberg Businessweek](#), Oct. 4 2018.
2. Apple Statement, [“What Businessweek got Wrong about Appl Download “What Businessweek got Wrong about Apple”](#) October 4, 2018
3. Schmidt, Stephen. 2018. Amazon Statement, [“Setting the Record Straight on Bloomberg BusinessWeek’s Erroneous Article.pdf Download “Setting the Record Straight on Bloomberg BusinessWeek’s Erroneous Article.pdf”](#) AWS Security Blog
4. Supermicro Statement, [“Supermicro Refutes Claims in Bloomberg Article. pdf Download Supermicro Refutes Claims in Bloomberg Article. pdf”](#) 2018
- 5.
6. Warren, Samuel and Louis Brandeis. [“The Right to Privacy.”](#) Download [“The Right to Privacy.”](#) Harvard Law Review, vol. 4, no. 5, 1890, pp. 193-220.
7. 2014. [“Report to the President Big Data and Privacy: A Technological Perspective”](#) Download [“Report to the President Big Data and Privacy: A Technological Perspective”](#)(May, 2014).

8. READINGS:

9. 1. Joyce, Rob. 2017. [“Improving and Making Vulnerability Equities Process Transparent Is the Right Thing to Do”](#) Download [“Improving and Making Vulnerability Equities Process Transparent Is the Right Thing to Do”](#)
10. <https://web.archive.org/web/20171210120612/https://www.whitehouse.gov/blog/2017/11/15/improving-and-making-vulnerability-equities-process-transparent-right-thing-do>. (November 15, 2017). [Links to an external site.](#)
11. 2. Statement of Katie Moussouris for the hearing entitled, [“Data Security and Bug Bounty Programs: Lessons Learned from the Uber Breach and Security Researchers”](#) Download [“Data Security and Bug Bounty Programs: Lessons Learned from the Uber Breach and Security Researchers”](#) for the Senate Committee on Commerce, Science, and Transportation’s Subcommittee on Consumer Protection, Product Safety, Insurance, and Data Security¹ on Tuesday, February 6, 2018. Available online:

12. _____

13. RECOMMENDED READING:



14.1 . **NEW!** (Not limited to, but please do read Introduction & Conclusion). Ellis, Ryan and Yuan, Stevens. 2020. "[Bounty Everything: Hackers and the Making of the Global Bug Market Place](#) Download [Bounty Everything: Hackers and the Making of the Global Bug Market Place](#)". *Data and Society*

OFFENSIVE CYBER OPERATIONS:

1. Sanger, David E. and Barnes, Julian E. 2021 "[U.S. and Britain Help Ukraine Prepare for Potential Russian Cyberassault](#)" Download "U.S. and Britain Help Ukraine Prepare for Potential Russian Cyberassault". *The New York Times*
2. Sanger, David E. 2012. "[Obama Order Sped Up Wave of Cyberattacks Against Iran](#) Download "Obama Order Sped Up Wave of Cyberattacks Against Iran." *The New York Times*.
3. Sanger, David E. and Broad, William J. 2017. "[Trump Inherits a Secret Cyberwar Against North Korean Missiles](#) Download "Trump Inherits a Secret Cyberwar Against North Korean Missiles." *The New York Times*.
4. Sanger, David E. and Schmitt, Eric. 2017. "[Cyberweapons, Used Against Iran and North Korea, Are a Disappointment Against ISIS](#) Download "Cyberweapons, Used Against Iran and North Korea, Are a Disappointment Against ISIS." *The New York Times*,
5. Sanger, David E. and Perloth, Nicole. 2019. "[Download "U.S. Escalates Online Attacks on Russia's Power Grid.](#) Download U.S. Escalates Online Attacks on Russia's Power Grid." Download "The New York Times.

THE RANSOMWARE DELUGE:

1. Sanger, David E., Perloth, Nicole, and Barnes, Julian E.. 2021. "[As Understanding of Russian Hacking Grows, So Does Alarm.](#)" Download "As Understanding of Russian Hacking Grows, So Does Alarm." *The New York Times*.
2. Sanger, David E. 2021. "[Once, Superpower Summits Were About Nukes. Now, It's Cyberweapons.](#)" Download "Once, Superpower Summits Were About Nukes. Now, It's Cyberweapons." *The New York Times*.
3. Sanger, David E. ,Shear, Michael, and Troianovski, Anton. 2021. "[Biden and Putin Express Desire for Better Relations at Summit Shaped by Disputes.](#)" Download "Biden and Putin Express Desire for Better Relations at Summit Shaped by Disputes." *The New York Times*.
4. Sanger, David E. and Perloth, Nicole. 2021. "[Biden Warns Putin to Act Against Ransomware Groups, or U.S. Will Strike Back.](#)" Download "Biden Warns Putin to Act Against Ransomware Groups, or U.S. Will Strike Back." *The New York Times*.



OPTIONAL/ STRONGLY RECOMMENDED:

Sanger, David E. *The Perfect Weapon: War, Sabotage, and Fear in the Cyber Age*. Crown, New York, 2018.

["Preface Download "Preface"](#) pp. xi-xxiii

["Chapter 1: Original Sins Download "Chapter 1: Original Sins"](#) pp. 7-36.

["Chapter 2: Pandora's Inbox" Download "Chapter 2: Pandora's Inbox"](#) pp. 37-54

Hardware Cybersecurity and Supply Chain Risk

READINGS

1. Levine, Edlyn V. 2021. ["The Die is Cast" Download "The Die is Cast"](#). *Communication of the ACM*, January, 2021 56-60.
2. [DSB Task Force on Cyber Supply Chain Download DSB Task Force on Cyber Supply Chain](#) Defense Science Board, February 2017.
3. DARPA programs illustrating the hardware and supply chain problem:
 - [Leveraging the Analog Domain for Security \(LADS\) Broad Area Announcement Download Leveraging the Analog Domain for Security \(LADS\) Broad Area Announcement](#). (Read part II, section I):
 - [Links to an external site.Trusted Integrated Circuits Download Trusted Integrated Circuits Download uits\(TRUST\)](#)
 - [Su Download Supply Chain Hardware Integrity for Electronics Download pply Chain Hardware Integrity for Electronics\(SHIELD\)](#)
4. ["Chip Wars: China, America and Silicon Supremacy" Download "Chip Wars: China, America and Silicon Supremacy"](#)PDF The Economist, Dec 1st 2018 edition. [WebLinks to an external site.](#)

OPTIONAL CASE STUDY



***self-study – we will not cover in lecture):

1. Robertson, Jordan and Riley, Michael. 2018. ["The Big Hack: How China Used a Tiny Chip to Infiltrate U.S. Companies PDF Download "The Big Hack: How China Used a Tiny Chip to Infiltrate U.S. Companies PDF"](#) & In-[Word_Download Word](#)*Bloomberg Businessweek*, Oct. 4 2018.
2. Apple Statement, ["What Businessweek got Wrong about Appl Download "What Businessweek got Wrong about Apple"](#) October 4, 2018
3. Schmidt, Stephen. 2018. Amazon Statement, ["Setting the Record Straight on Bloomberg BusinessWeek's Erroneous Article.pdf Download "Setting the Record Straight on Bloomberg BusinessWeek's Erroneous Article.pdf"](#) *AWS Security Blog*
4. Supermicro Statement, ["Supermicro Refutes Claims in Bloomberg Article. pdf Download Supermicro Refutes Claims in Bloomberg Article. pdf"](#) 2018

QUESTION ON CASE:

- - A. **Bloomberg's claim is highly contested.**
 - B. What does the Bloomberg article reveal about the complexity and vulnerability of the supply chain?
 - C. What does it reveal about the complexity and vulnerability of hardware?
 - D. Regardless of this article's validity, do you think such attacks are possible? What are the weak points of the supply chain?
 - E. What do you think companies, governments, and organizations can do to mitigate hardware risk?

Privacy Basics

- Warren, Samuel and Louis Brandeis. ["The Right to Privacy." Download "The Right to Privacy."](#) *Harvard Law Review*, vol. 4, no. 5, 1890, pp. 193-220.
- 2014. ["Report to the President Big Data and Privacy: A Technological Perspective" Download "Report to the President Big Data and Privacy: A Technological Perspective"](#)(May, 2014).

Encryption

READINGS:

1. **Contributor** i.e Committee on Law Enforcement and Intelligence Access to Plaintext Information in an Era of Widespread Strong Encryption: Options and Trade Offs, Computer Science and Telecommunications Board, National Academies of Sciences, Engineering, and Medicine: 2018 "[Introduction](#)" [Decrypting the Encryption Debate: A Framework for Decisionmakers](#) [Download "Introduction"](#) [Decrypting the Encryption Debate: A Framework for Decisionmakers](#). *The National Academies Sciences, Engineering and Medicine*. 1-14. A downloadable PDF can also be found [here](#)[Links to an external site.](#)
2. Levy, Ian and Robinson, Crispin. 2018. "[Principles for a More Informed Exceptional Access Debate](#)" [Download "Principles for a More Informed Exceptional Access Debate"](#) November 29, 2018
3. Hal Abelson et al., 2021. "[Bugs in our Pockets The Risks of Client-Side Scanning](#)" [Download "Bugs in our Pockets The Risks of Client-Side Scanning"](#) Executive Summary, October 15, 2021,

OPTIONAL READING:

- Whitfield, Diffie and Landau, Susan. 2007. "[Cryptography](#)" [Download "Cryptography"](#) *Privacy on the Line: The Politics of Wiretapping and Encryption*, MIT Press, rev. ed., pp. 11-47.

Vulnerability Economy: Security, Commerce, & Zero-Days

READINGS:

1. Joyce, Rob. 2017. "[Improving and Making Vulnerability Equities Process Transparent Is the Right Thing to Do](https://web.archive.org/web/20171210120612/https://www.whitehouse.gov/blog/2017/11/15/improving-and-making-vulnerability-equities-process-transparent-right-thing-do)" Download "[Improving and Making Vulnerability Equities Process Transparent Is the Right Thing to Do](https://web.archive.org/web/20171210120612/https://www.whitehouse.gov/blog/2017/11/15/improving-and-making-vulnerability-equities-process-transparent-right-thing-do)" "<https://web.archive.org/web/20171210120612/https://www.whitehouse.gov/blog/2017/11/15/improving-and-making-vulnerability-equities-process-transparent-right-thing-do>. (November 15, 2017). [Links to an external site.](#)
2. Statement of Katie Moussouris for the hearing entitled, "[Data Security and Bug Bounty Programs: Lessons Learned from the Uber Breach and Security Researchers](#)" Download "[Data Security and Bug Bounty Programs: Lessons Learned from the Uber Breach and Security Researchers](#)" for the Senate Committee on Commerce, Science, and Transportation's Subcommittee on Consumer Protection, Product Safety, Insurance, and Data Security¹ on Tuesday, February 6, 2018. Available online:

RECOMMENDED READING:

1. **NEW!** (Not limited to, but please do read Introduction & Conclusion). Ellis, Ryan and Yuan, Stevens. 2020. "[Bounty Everything: Hackers and the Making of the Global Bug Market Place](#)" Download [Bounty Everything: Hackers and the Making of the Global Bug Market Place](#)". *Data and Society*



International Cyber Conflict

Readings

1. Gartzke, Erik. "[The Myth of Cyberwar: Bringing War in Cyberspace Back Down to Earth](#) [Download The Myth of Cyberwar: Bringing War in Cyberspace Back Down to Earth.](#)" *International Security*, vol. 38, no. 2, 2013, pp.41-73.
2. Kello, Lucas. "[The Meaning of the Cyber Revolution: Perils to Theory and Statecraft](#) [Download The Meaning of the Cyber Revolution: Perils to Theory and Statecraft.](#)" *International Security*, vol. 38, no. 2, 2013, pp. 7-40.
3. Nye, Joseph S. "[Nuclear Lessons for Cyber Security?](#) [Download Nuclear Lessons for Cyber Security?](#)" *Strategic Studies Quarterly*, vol. 5, no. 4, 2011, pp. 18-38.
4. Rid, Thomas. "[Cyber War Will Not Take Place](#) [Download Cyber War Will Not Take Place.](#)" *The Journal of Strategic Studies*, vol. 35, no. 1, 2012, pp. 5-32.
5. Nakasone, Paul M. and Michael Sulmeyer. "[How to Compete in Cyberspace: Cyber Command's New Approach](#) [Download How to Compete in Cyberspace: Cyber Command's New Approach.](#)" *Foreign Affairs*, August 2020.
6. (**Optional**): Kello, Lucas. *The Virtual Weapon and International Order*. Yale University Press, 2017.
This book is recommended, not required; it is purchasable online through various outlets.

Discussion Questions

1. Are cyber weapons transforming international relations and security?
2. Are cyber attacks peaceful, warlike, or something else?
3. Can cyber attacks be deterred?



Internet Governance

- Oever, T, Niels and Moriarty Kathleen. 2019. ["The Tao of IETF"](#) Download ["The Tao of IETF"](#).