



# Cybersecurity In Digital Environment

Materials from Harvard Kennedy School – Executive Program –

**Intended only for education purposes.**

## AARMENA Cyber Security Diploma Team

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## 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)

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## 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 pply 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 1<sup>st</sup> 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 Security<sup>1</sup> 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.

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## 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 1<sup>st</sup> 2018 edition. [WebLinks to an external site.](#)

## OPTIONAL CASE STUDY



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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,

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## 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 Security<sup>1</sup> on Tuesday, February 6, 2018. Available online:

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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"](#).