

# **Democracy Hacked: Cyber Threats to Modern Governments in the Digital Age**

**Instructor: Jake Braun**

**Winter Quarter 2022**

## ***Introduction:***

A secure election, supported by voters' confidence that every vote will be counted as cast, forms the bedrock of our democracy. However, as evidenced since the 2016 election, U.S. trust in voting systems have become a serious national security concern. Given cyber interference by foreign adversaries, the matter of "securing the vote" – something that was once almost exclusively the responsibility of state and local officials – has now become a priority of our nation's top cybersecurity, homeland security, military, law enforcement, and intelligence leaders. And the United States is not alone in its vulnerabilities: As more governments do business online, there are more opportunities for states' adversaries to usurp democratic power from citizens.

As we look forward to future elections, we must expect potentially devastating attacks on our voting systems. They are irresistible targets for attackers to attempt to manipulate in order to undermine confidence in our democracy. In addition to Russia, many other groups, including North Korea, Iran, ISIS, China, and large foreign and domestic crime rings, have the resources to successfully attack our current voting systems. In fact, when asked whether Russia would attempt to attack future U.S. elections, as it did in 2016, Robert Mueller replied in his testimony before the House Judiciary Committee that "they're doing it as we sit here." We urgently need to secure our election systems from attack.

## ***Course Description:***

This course is designed to offer students an overview of the current cybersecurity landscape and the implications for protecting and promoting democracy. Students will hear first-hand insider perspectives from public and private sector cyber professionals and international experts on democratic engagement and protection of civil liberties. Students will gain insight on cybersecurity technology, threats to democratic institutions, and ways to combat cyber predators.

## ***Instructor Contact and Office Hours:***

Jake Braun - [jakebraun@gmail.com](mailto:jakebraun@gmail.com)- Office hours by appointment

## ***Class Structure:***

This class will take place synchronously and asynchronously, allowing students to watch lectures and participate in class discussion based on their own schedules as well as participate in live discussions.

## ***Grading/Assignments:***

- Participation (33%)
  - Students are expected to actively participate in the course discussions in two ways:
    - Each week, students will be required to submit 2-3 questions for the speaker based on readings and other course content.
    - A set of discussion questions based on the week's material will be posted to a discussion board on Canvas every Monday/ Students should select one of the

discussion questions and post a response (100 word minimum) based on readings and speaker presentations. Students may include information from outside research as well. Students should then respond to at least one other student's post with a meaningful comment or question.

- Policy Brief (33% - 16.5% per brief)
  - Each student will submit two policy briefs that provide a summary and analysis of a current issue in cybersecurity. Students will select from instructor-provided prompts for these briefs. All briefs should be one page, single spaced, 12 point font, 1-inch margins.
- Final Research Project (34%)
  - The final project will be a comprehensive report on a topic related to election security. For the project, students will draw on knowledge gained from the topics covered during the quarter and through their own research. All papers should be five pages, single spaced, 12 point font, 1-inch margins.

### **Required Reading:**

Students must acquire access to the two books listed below. Other readings will come from online publications or publicly available resources.

*Democracy in Danger* - Jake Braun

*The Perfect Weapon: War, Sabotage, and Fear in the Cyber Age* - David Sanger

Note: The paperback edition has an extra chapter. You may use any edition for class.

### **Suggested Reading:**

*The Cuckoo's Egg* - Cliff Stoll

*Lifting The Fog Of War* - Admiral Bill Owens

*Neuromancer* - William Gibson

*Snow Crash* - Neal Stephenson

### **Course Schedule and Readings:**

*Note: Some readings may be subject to change. Updated information will be posted to Canvas.*

### **Week 1:**

#### **Topic: Democracy and Cybersecurity: The Scale of the Problem**

- Review syllabus and final project
- Defining "cybersecurity" from the technical and policy perspectives
- 2020 presidential election and confidence in results
- Current cybersecurity policies

### **Readings:**

*U.S. Department of Homeland Security Cybersecurity Strategy*

[https://www.dhs.gov/sites/default/files/publications/DHS-Cybersecurity-Strategy\\_1.pdf](https://www.dhs.gov/sites/default/files/publications/DHS-Cybersecurity-Strategy_1.pdf)

*National Cyber Strategy of the United States of America* <https://www.whitehouse.gov/wp-content/uploads/2018/09/National-Cyber-Strategy.pdf>

*A Civil Perspective on Cybersecurity*

By Jane Holl Lute and Bruce McCall  
<http://www.wired.com/2011/02/dhs-op-ed/>

*Working to Preserve the Stability of Cyberspace*

By Paul Nicholas

<https://thediplomat.com/2017/09/working-to-preserve-the-stability-of-cyberspace/>

## **Week 2:**

### **Topic: The Basics of Cybersecurity: The Top 20 Critical Security Controls**

**Speaker:** Tony Sager, Former Chief Operating Officer of National Security Agency (NSA) Information Assurance Directorate; Currently, Senior Vice President at Center for Internet Security (CIS), where he leads the development of the CIS Critical Security Controls.

### **Readings:**

*Top 20 Critical Security Controls*

<http://www.sans.org/critical-security-controls/control/3>

*Top 4 Critical Security Controls*

<http://www.tripwire.com/state-of-security/security-data-protection/top-four-critical-security-controls/>

*Overview of above via Infosec*

<https://resources.infosecinstitute.com/the-center-for-internet-security-cis-top-20-critical-security-controls/#gref>

*OWASP Top Ten*

<https://owasp.org/www-project-top-ten/>

*The Perfect Weapon* by David Sanger - Preface, Prologue, Chapters 1 & 2

Note: *Democracy in Danger* must be finished by next week. You may want to start reading it this week.

## **Week 3:**

### **Topic: Current State of “Security and Confidence” in the US Voting System**

### **Readings:**

*Election-Hacking Lessons From the 2018 DEF CON Hackers Conference*

By Sue Halpern

<https://www.newyorker.com/news/dispatch/election-hacking-lessons-from-the-2018-def-con-hackers-conference>

*Democracy in Danger* by Jake Braun

*States and localities are on the front lines of fighting cyber-crimes in elections*

<https://www.brookings.edu/blog/fixgov/2019/08/15/states-and-localities-are-on-the-front-lines-of-election-security/>

*National Academies report*

<https://www.nap.edu/catalog/25120/securing-the-vote-protecting-american-democracy>

*The Perfect Weapon* by David Sanger - Chapters 3-4

## **BRIEF DUE NEXT WEEK**

### **Week 4:**

**Topic: The Promise & Peril of New Technologies**

**Speaker:** Luukas Ilves, Former Counsellor for Digital Affairs for Estonia's Permanent Representation to the European Union

### **Readings:**

*Estonia's advance towards an e-state also brings about a new challenge in foreign policy*

By Luukas Ilves

<https://www.diplomaatia.ee/en/article/e-estonian-foreign-policy/>

*Luukas Ilves on the Digital Priorities for the Estonian Presidency*

Video

<https://www.euractiv.com/section/digital/video/luukas-ilves-counsellor-for-digital-affairs-permanent-representation-of-estonia-to-the-eu-on-the-digital-priorities-for-the-estonian-presidency/>

*e-Residency 2.0 White Paper*

<https://s3.eu-central-1.amazonaws.com/ereswhitepaper/e-Residency+2.0+white+paper+English.pdf>

*Budapest Convention on Cybercrime*

<https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=0900001680081561>

*Email and Internet Voting: The Overlooked Threat to Election Security*

<https://www.commoncause.org/page/email-and-internet-voting-the-overlooked-threat-to-election-security/>

*The Democratic Party deepfaked its own chairman to highlight 2020 concerns* by Donie O'Sullivan

<https://us.cnn.com/2019/08/09/tech/deepfake-tom-perez-dnc-defcon/index.html>

(Optional) *Tech Expert Ben Buchanan on the Links Between Artificial Intelligence and National Security* - Intelligence Matters podcast

<https://www.stitcher.com/podcast/cbs-radio-news/intelligence-matters/e/67448738>

*The Perfect Weapon* by David Sanger - Chapters 5-6

**POLICY BRIEF DUE TODAY - UPLOAD TO CANVAS BY 11:59 PM CT**

## **Week 5:**

### **Topic: Improving Election Security for Residents of Cook County**

**Speaker:** Noah Praetz, Former Director of Elections, Cook County, Illinois.

#### **Readings:**

*2020 Vision: Election Security in the Age of Committed Foreign Threats*

By Noah Praetz

[https://www.cookcountyclerk.com/sites/default/files/pdfs/Election%20Security%20White%20Paper\\_Praetz\\_12062017\\_0.pdf](https://www.cookcountyclerk.com/sites/default/files/pdfs/Election%20Security%20White%20Paper_Praetz_12062017_0.pdf)

*Election security in 2020 means a focus on county officials, DHS says*

<https://www.cnet.com/news/election-security-in-2020-means-a-focus-on-county-officials-dhs/>

*A Voter's Guide to Election Security*

<https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2018/11/01/a-voters-guide-to-election-security>

*3 years after Russian hackers tapped Illinois voter database, officials spending millions to safeguard 2020 election*

<https://www.chicagotribune.com/politics/ct-illinois-election-security-russian-hackers-20190805-qtoku33szjdrhknwc7pxbu6pvq-story.html>

*The Unsexy Threat to Election Security*

<https://krebsonsecurity.com/2019/07/the-unsexy-threat-to-election-security/>

*The Perfect Weapon* by David Sanger - Chapters 7-8

## **BRIEF DUE NEXT WEEK**

## **Week 6:**

### **Topic: Technical Vulnerabilities in the US Election System**

**Speaker:** Sherri Ramsay, Former Director of National Security Agency (NSA) / Central Security Service Threat Operations Center (NTOC) where she led discovery and characterization of threats to national security systems, providing situational awareness of those threats, and coordinating actionable information to counter those threats.

#### **Readings:**

*DEF CON 25 Voting Machine Hacking Village Report*

By Matt Blaze, Jake Braun, Harri Hursti, Joseph Lorenzo Hall, Margaret MacAlpine, and Jeff Moss

<https://www.defcon.org/images/defcon-25/DEF%20CON%2025%20voting%20village%20report.pdf?data1=v1>

*DEFCON 26 Voting Machine Village Hacking Report*

By Matt Blaze, Jake Braun, Harri Hursti, Margaret MacAlpine, and Jeff Moss

<https://harris.uchicago.edu/files/cpi - def con 26 voting village report - final 4.pdf>

*DEFCON 27 Voting Machine Village Hacking Report*

By Matt Blaze, Harri Hursti, Margaret MacAlpine, Mary Hanley, and Jeff Moss

<https://harris.uchicago.edu/files/def con 27 voting village report.pdf>

*Voting System Security and Reliability Risks*

Brennan Center for Justice

<https://www.brennancenter.org/sites/default/files/analysis/Fact Sheet Voting System Security.pdf>

*Critical U.S. Election Systems Have Been Left Exposed Online Despite Official Denials*

[https://www.vice.com/en\\_us/article/3kxzk9/exclusive-critical-us-election-systems-have-been-left-exposed-online-despite-official-denials](https://www.vice.com/en_us/article/3kxzk9/exclusive-critical-us-election-systems-have-been-left-exposed-online-despite-official-denials)

*The scramble to secure America's voting machines*

<https://www.politico.com/interactives/2019/election-security-americas-voting-machines/>

*The Perfect Weapon* by David Sanger - Chapters 9-10

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**Week 7:**

**Topic: Cyber Threats to Democracy: Russia and the Geopolitical Landscape**

**Speaker:** Ambassador Douglas Lute, Former Ambassador to NATO; Former Assistant to the President and Deputy National Security Advisor for Iraq and Afghanistan; Former President Obama's Special Assistant and Senior Coordinator for Afghanistan and Pakistan.

**Readings:**

*U.S. NATO Envoy Warns Of Russian 'Malign Influence' Ahead Of Talks*

<https://www.rferl.org/a/us-envoy-nato-russia-council-influence-cyberattacks/28183839.html>

*Everything We Know About Russia's Election-Hacking Playbook*

By Andy Greenberg

<https://www.wired.com/story/russia-election-hacking-playbook/>

*The US Gives Cyber Command the Status It Deserves*

By Lily Hay Newman

<https://www.wired.com/story/cyber-command-elevated/>

US Senate, "Report on Russian Election Hacking"

[https://www.intelligence.senate.gov/sites/default/files/documents/Report\\_Volume1.pdf](https://www.intelligence.senate.gov/sites/default/files/documents/Report_Volume1.pdf)

*NYT's David Sanger on the Perils of Cyber Conflict* - Intelligence Matters Podcast

<https://www.stitcher.com/podcast/cbs-radio-news/intelligence-matters/e/60697185?autoplay=true>

*The Application of International Law in Cyberspace: State of Play*

<https://www.un.org/disarmament/update/the-application-of-international-law-in-cyberspace-state-of-play/>

*The Perfect Weapon* by David Sanger - Chapters 11-12 & Afterword (& chapter 13 recommended if using paperback edition)

**Week 8:**

**Topic: Elections 2016: What We Know Now and What to Do About It**

**Speaker:** General Francis X. Taylor, Former Under Secretary for Intelligence and Analysis at the U.S. Department of Homeland Security

**Readings:**

*Cybersecurity Lessons From the 2016 Presidential Election*

By Rick M. Robinson

<https://securityintelligence.com/cybersecurity-lessons-from-the-2016-presidential-election/>

*Written testimony of NPPD Office of Cybersecurity and Communications Assistant Secretary Andy Ozment for a House Committee on Oversight and Government Reform, Subcommittee on Information Technology hearing titled "Cybersecurity: Ensuring the Integrity of the Ballot Box"*

U.S. Department of Homeland Security

<https://www.dhs.gov/news/2016/09/28/written-testimony-nppd-house-oversight-and-government-reform-subcommittee>

*We hired the author of 'Black Hawk Down' and an illustrator from 'Archer' to adapt the Mueller report so you'll actually read it*

<https://www.insider.com/mueller-report-rewritten-trump-russia-mark-bowden-archer-2019-7>

*2020 election security to face same vulnerabilities as in 2016*

<https://searchsecurity.techtarget.com/news/252468837/2020-election-security-to-face-same-vulnerabilities-as-in-2016>

*S.1540 - Election Security Act of 2019*

<https://www.congress.gov/bill/116th-congress/senate-bill/1540/text>

**FINAL DUE NEXT WEEK FOR GRADUATING STUDENTS**

**Week 9:**

**Topic: A Hacker's View of Cyber Policy**

**Speaker:** Harri Hursti, Data Security and Election Security Expert; Co-founder of Voting Village at DEF CON Hacking Conference.

**Readings:**

*Voting Machine Hackers Have 5 Tips to Save the Next Election*

By Carsten Schurmann and Jari Kickbusch

<https://www.wired.com/story/voting-machine-hackers-5-tips/>

*To Fix Voting Machines, Hackers Tear Them Apart*

By Lily Hay Newman

<https://www.wired.com/story/voting-machine-hacks-defcon/>

*Political campaigns prep for battle with hackers*

By Daniel Strauss and Scott Bland

<http://www.politico.com/story/2017/09/19/hackers-political-campaigns-242863>

*Hackers were told to break into U.S. voting machines. They didn't have much trouble.*

<https://www.washingtonpost.com/business/2019/08/12/def-con-hackers-lawmakers-came-together-tackle-holes-election-security/>

**FINAL PAPER DUE**