

## **Undergraduate Thesis Prospectus**

**Complex Election Systems: Trusting and Understanding**  
(technical research project in Computer Science)

**Results of Public Distrust in American Elections**  
(sociotechnical research project)

by

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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## **General Research Problem**

*How can the public completely trust election results in a free and fair democracy?*

America's decentralized election system and its aging and underfunded infrastructure expose it to attacks, tampering, and the risk of inaccuracies. Many voters demand more convenient and verifiable elections, complicating the problem (NAS, 2018). Distrust in electoral systems promotes conspiracy theories, contempt, and even violence, as the Capitol riot of January 6, 2021 (US House of Representatives, 2021). Here we propose to examine two halves to the problem: the technical security and accuracy of elections, and public confidence in the results.

## **Complex Election Systems: Trusting and Understanding**

*How can secure and encrypted elections and reporting promote public trust in elections?*

The project is in the CS department with Angela Orebaugh as the technical advisor. As an independent project, principals, theories, and strategies of cybersecurity will be compared to the needs of real election offices, like the office of a Summer 2022 internship in Chesterfield County. Elections are unique, thousands of jurisdictions across the country operate independently, yet parallel to each other. When it comes to election day, Americans expect all results to come the night of, anything else is seen as suspicious and causes problems for the transfer of power (Kirby, 2020). Any changes at the federal or state level have to be properly adopted in all localities. Election infrastructure is irregular across localities and often unknown to most of the public they serve. Importantly, election infrastructure includes more than tabulating millions of votes, also the voter registration systems need maintenance year-round as residents register and move. Sensitive voter information was among the targets of Russian interference in the 2016 US

election (Abrams, 2019). The project goal is to analyze the effect of different systems on public trust. Research must be aware that election flaws may be used as red herrings for other advocacy issues. Systems must account for federal and state laws and regulations on elections and supporting infrastructure. Increasing trust in infrastructure requires knowledge on the nature of trust, how trust degrades overtime, and how it can be earned. Konecki (2019) examines how trust is created, maintained, and destroyed. Trust refers to the human psychological phenomenon, including more than just a citizen's trust in the abstract idea of “government.”

The past decade has seen increased scrutiny and technology emerging to alleviate some popular concerns. State-wide systems have improved database processes, but they remain varied. Local election offices often control systems but lack the resources to properly implement security policy. Local offices bear the brunt of elections by counting votes, reporting results, and interacting with voters directly. As technology improves and elections are considered more important (Johnson, 2017) new election systems have been proposed, specifically around encryption and crowdsourced verification (Microsoft, 2020). Of course, election infrastructure is fractured and implementation is ultimately the choice and responsibility of local county officials. Experiencing the struggles of implementing security policy was a key concern in the Chesterfield County internship, where limited resources and time mean localities have to use consultants or interns to meet basic security policy. Hopefully, these experiences will provide guidance moving forward on implementing security policy with limited resources and the public trusting the resulting systems.

## **Unintentional and Intentional Results of Distrust in Elections**

*How do social groups promote distrust in the American election system?*

*Some social groups have sown distrust in the integrity of U.S. elections. Public trust in American institutions in general is at record lows (Gallup, 2022). Distrust in electoral systems has joined distrust in elected officials. Healthy skepticism is good for a democracy, but when skepticism turns to contempt, violence, and destruction the consequences are dangerous, as the disruption of the peaceful transfer of power in January, 2021, demonstrated. Such distrust is an existential threat to American democracy (Cohen, 2021).*

Conspiracy theories thrived long before the internet, but on the internet the normalization and the spread of baseless theories has become effortless. Researchers often study misinformation and the popular trust in government. Im et al. (2014) found a correlation between high internet usage and distrust in government. Abalakina-Paap et al. (1999) links distrust to belief in conspiracy theories. The effect can be self-reinforcing: internet usage fosters the distrust that makes implausible conspiracy theories attractive; the theories, in turn, instill more distrust. The consequence is often termed “falling down the rabbit hole,” a reference to *Alice’s Adventures in Wonderland* (Carroll, 1865): once one false conspiracy theory is believed, others follow, leading the believer further from reality.

Qanon followers are users (usually Trump supporters) that follow the posts of a user named “Q.” Qanon followers are dissatisfied with government institutions and generally hold conservative and right-wing ideas. Q posts are usually vague and short (leaving room for the imagination) such as the recent post “Shall we play a game once more?” (ADL, 2022). Stop the Steal, a group bent on President Trump’s re-election, was birthed by Trump’s retweet on December 26, 2020 with the hashtag “#StopTheSteal.” The Jan 6 House Committee was created by Congress to hold those responsible accountable for organizing the Jan 6 riots and set the record straight and inform the public of the extent of the riot. The Cyber Ninjas managed the 2020 election audit in Arizona. The company usually provided application security and had no prior experience with elections. It has since gone out of business, but will carry a legacy of illegitimate claims about the 2020 US election

and scrutinizing the results. In a statement, Cyber Ninjas (2022) announced: “We are confident the work we did made an impact and was consistent with the Christian values our company and this country were founded upon. It is this foundation that makes America great.”

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