

**House Bill 767**  
**Election Law –**  
**Securing Elections From Foreign Interference**  
**SUPPORT**

Ways and Means  
February 27, 2018

Poorvi L. Vora  
Professor of Computer Science  
The George Washington University

I am a Professor of Computer Science at The George Washington University. My research of the last fifteen years has been in the general area of computer security and privacy, with a special emphasis on the integrity of electronic voting systems. My qualifications and complete CV, as well as more details about my work, may be found on my website<sup>1</sup>. As some of you might recall, I testified at a joint hearing of this committee and the Senate Education, Health and Environmental Affairs Committee in September last year.

My testimony today represents what I have learned from my own research and that of hundreds of others over about four decades. The literature in this field is clear, unequivocal and non-partisan: computerized election systems present multiple opportunities for intentional alteration of election outcomes and are also vulnerable to error. This assessment applies to the optical scan voting systems used in Maryland, and includes voting machines that are not on the internet. Experts recommend that, in addition to making every attempt to secure the voting systems used, an independent, public, risk-limiting audit<sup>2</sup> of the voter-verified paper ballots should be performed after every election to verify that the election outcome correctly represents the voter-verified evidence<sup>3</sup>. An election should be certified only after it passes the audit.

**I strongly support this Bill:** it requires the manual examination of voter-verified paper ballots, in public, using statistical measures to gauge the quality of the audit, before election certification. It also requires that discrepancies should be examined further by expanding the audit. It also requires hard copy election registers be available at polling centers in case of failure of the electronic poll books or internet connections.

I offer the following friendly amendments, whose purpose is to clarify aspects of the audit for Maryland's specific needs.

First, Maryland has a number of different types of ballots: most voters use standard ballots for the optical scan system, for which there is a single representation of the vote: the marked ovals. Express Vote ballots encode the vote in a barcode which has not been verified by the voter, and any audit should examine the vote recorded in text and not in the barcode. Similarly, absentee ballots delivered online are manually duplicated at the local

---

<sup>1</sup> <http://www.seas.gwu.edu/~poorvi/>

<sup>2</sup> Post-election audits of both the election outcome and the election technology are recommended by the Presidential Commission on Election Administration, see: "The American Voting Experience: Report and Recommendations of the Presidential Commission on Election Administration", January 2014, pg 66, <https://law.stanford.edu/wp-content/uploads/sites/default/files/publication/466754/doc/slspublic/Amer%20Voting%20Exper-final%20draft%2001-04-14-1.pdf> and "Report on Election Auditing" by the Election Audits Task Force of the League of Women Voters of the United States, January 2009, [http://lwv.org/files/Report\\_ElectionAudits.pdf](http://lwv.org/files/Report_ElectionAudits.pdf)

<sup>3</sup> P.B. Stark and D.A. Wagner, "Evidence Based Elections", IEEE Security and Privacy, special issue on electronic voting, 2012. [www.stat.berkeley.edu/%7Estark/Preprints/evidenceVote12.pdf](http://www.stat.berkeley.edu/%7Estark/Preprints/evidenceVote12.pdf)

boards. The original returned absentee ballots, and not the duplicated ones, should be used for the audit. **The Bill should make this explicit.**

All software tabulation errors may not require a full hand count. The audit will determine if the error appears large enough to have changed the election outcome; in this case one would need a full hand count to determine if the election outcome declared was incorrect, and, if so, to correct it. **I recommend that**

**(III) CORRECTION OF THE ELECTRONICALLY TABULATED RESULTS THROUGH A FULL MANUAL COUNT OF ALL BALLOTS IN A CONTEST IF ANY SOFTWARE TABULATION ERROR IS DETECTED;**

**be replaced by:**

**(III) CORRECTION OF THE ELECTRONICALLY TABULATED RESULTS THROUGH A FULL MANUAL COUNT OF ALL BALLOTS IN A CONTEST IF THE AUDIT INDICATES THE OUTCOME IS INCORRECT**

Finally, **I recommend that the Bill make explicit the responsibility of election officials to publish the details of the audit and a complete audit report.**

Respectfully,

Prof. Poorvi L. Vora  
Professor, Department of Computer Science  
The George Washington University, DC

*Note: my affiliation is included for identification only*

**Poorvi L. Vora** is Professor of Computer Science at The George Washington University. Her research focus has been on end-to-end independently verifiable (E2E) voting systems which enable voters and observers to audit election outcomes without requiring them to rely on the trustworthiness of election technology or unobserved election processes. Prof. Vora was a member of the team that deployed polling-place, paper-ballot-based, E2E voting system Scantegrity II in the Takoma Park elections of 2009 and 2011, and of the team that developed remote voting E2E system Remotegrity and accessible voting variant Audiotegrity, used in 2011. She has worked with the National Institute of Standards and Technology (NIST) on definitions of desired properties of E2E systems, and on information-theoretic models and measures of voting system security properties. She obtained her Ph.D. from North Carolina State University.

[poorvi@gwu.edu](mailto:poorvi@gwu.edu)