

Pittsburgh, PA 15217

Members, County Council
436 Grant St.
Pittsburgh, PA 15219

Dear Council Members,

My name is Roger Dannenberg. I've lived in Pittsburgh since 1979, and I have been a member of the Carnegie Mellon Computer Science Department faculty since 1983. I live in Squirrel Hill at ---- -----.

I'd like to state why electronic voting of the form used in the recent primary should not be trusted. Electronic voting machines are controlled by computers that can be programmed to behave in completely arbitrary ways. Maybe if I tap three times on a candidate and then draw a circle counterclockwise, the voting machine will transfer 5% of the vote to my selection at the end of the day. This deceit would never be detected by testing. It *might* be detected by a complete inspection of the software programs, but there are many steps to translate and copy the programs into the voting machine, so there are many opportunities to substitute corrupted software.

From the stories you have heard today, you should realize that electronic votes are intangible, fragile, exposed, and unprotected throughout the voting process in spite of good intentions. One way to avoid most of these problems is to use paper as a fallback. Unlike computation, paper obeys the laws of physics, something even I can trust. While it is possible to exchange paper forgeries for originals or stuff the ballot box with more paper, at least paper is visible and tangible, making it easier to design safeguards. For this reason, the ACM, the largest professional organization of computer scientists, has recommended that electronic voting systems enable voters to inspect a paper record to verify the accuracy of their vote. When computer scientists say put your trust in paper, the message should be very clear.

In closing, I would like to endorse the specific recommendations made in the report prepared by the Allegheny Chapter of VotePA. By following these recommendations, Allegheny County can address the obvious and critical need for election integrity. Thank you.

Sincerely,

Roger B. Dannenberg, Ph.D.