

Election Integrity and Electronic Voting Machines in 2018

Georgia, USA

E-Vote-ID 2019

Bregenz, Austria

Kellie Ottoboni Philip B. Stark Vanessa Teague

1–5 October 2019

University of California, Berkeley

University of California, Berkeley

University of Melbourne

Kellie and Philip are very grateful to Vanessa for giving this talk!

What happened in GA, 2018?

- Lead-up to the election was fraught:
 - allegations that Secretary of State Kemp tried to suppress Black voters
 - closed polling places
 - purged voter rolls
 - history of insecure election data
 - lawsuit to require paper ballots over the standard DRE voting machines
- The 2018 election produced anomalous results that could have been caused by malfunctioning, misprogrammed, or hacked election technology, including DREs

GA has a long history of voter suppression

- Voting Rights Act (1965)
 - Prevents racial discrimination in voting
 - Section 5 required certain states to get “preclearance” before changing voting procedures that might affect minority voters
- *Shelby County v. Holder* (2013) overturned the preclearance rule
 - Since then, election officials in Georgia have closed nearly 8% of the state’s polling places
- SoS Kemp’s “exact match” law: requires name on voter registration application to exactly match the legal name
 - Any discrepancy renders the registration “pending”.
 - In 2018, 53,000 voter registrations were pending. 70% were from Black voters.

Help America Vote Act (HAVA) and DREs

- HAVA passed in 2002 in response to serious problems with punchcard voting machines in the 2000 election
 - Gave states funding to upgrade from punchcard and lever systems, among other requirements
 - Many states used funding to purchase touchscreen DREs
- Premier (later ES&S) is DRE vendor for Georgia
 - Ties to the Republican party and state officials, incl. member of Kemp's administration
 - Lied to congress about remote desktop software, radios, etc.
 - Fined \$2.9MM in Philadelphia
- The AccuVote-TSx machines were shown to have significant problems

- Contractor for GA to program voting machines, host VRDB, etc.
 - Director, Merle King, notable apologist for DREs

Kennesaw State

- Contractor for GA to program voting machines, host VRDB, etc.
 - Director, Merle King, notable apologist for DREs
- 2017: Logan Lamb discovered he could access Kennesaw State's Center for Election server, with critical election data (voter records, passwords, etc.)
 - entire voter registration database for the state of Georgia, including sensitive personal information
 - instructional PDFs with passwords for poll workers to sign into a central server on Election Day
 - software files for GA's ExpressPoll pollbooks
 - Lamb could have altered data, preventing some voters from voting

Curling et al. v. Kemp, 2016-2018

- Lawsuit was seen in court just months before the 2018 election
 - Pointed to Kennesaw State's poor security and history of issues with DREs
- Curious behavior
 - Wiped the Kennesaw State servers, the only potential source of forensic evidence
- SoS Kemp ran against Stacey Abrams for Governor
 - Kemp was SoS overseeing the election; didn't recuse himself
 - Voter suppression continued: closed polling places, signature rejections, exact match law, etc.

Coalition for Good Governance (CGG) Suit, 2018

- Focuses on Lt. Gov contest
- Novel argument: “SoS doesn’t conduct elections”
 - programs/configures the machines (previously subcontracted to Kennesaw)
 - collects & reports the results (subcontracted to Clarity/ScytI)
- Novel argument: “kill the messenger”
 - Plaintiffs and Dem party told SoS about breaches/vulnerabilities; SoS accused them of hacking

Anomalous results

- High undervote rate, much higher than down-ticket contests
- Undervote rate varied substantially by mode of voting
 - Higher rate for ballots cast on DREs
 - Higher in precincts with larger percentage of Black voters
- Evidence of unusual DRE behavior, using data from poll tapes in Winterville Train Depot precinct

Differential Undervote Rate in Lt. Gov Contest

- Hypothesis: the undervote rate in the Lt. Governor contest did not depend on mode of voting
- Alternative: undervote rate different for DREs vs. paper (absentee by mail) ballots
- Statistical test: assume that the number of undervotes in each contest is fixed, but randomly distributed across modes of voting (hypergeometric)
- Data: reported vote totals by county and mode of voting, publically available from GA SoS website

Differential Undervote Rate in Lt. Gov Contest

| Contest | Counties w significant disparities |
|--------------------------------------|------------------------------------|
| Lt. Governor | 101 |
| Secretary of State | 4 |
| Attorney General | 4 |
| Commissioner of Agriculture | 5 |
| Commissioner of Insurance | 4 |
| State School Superintendent | 5 |
| Commissioner of Labor | 2 |
| Public Service Commission District 3 | 4 |
| Public Service Commission District 5 | 4 |

Significance: $p \leq 0.0001$

Differential Undervote Rates and Black Voters

- Data: precinct-level reported vote totals and voter registration in Fulton County
- Hypothesis: precinct differential undervote rate in Lt. Governor contest not associated with voter ethnicity
- Alternative: precinct differential undervote rate in Lt. Governor contest associated with percentage of Black voters in precinct
- Permutation test:
 - under the null, the differential undervote rate is independent of race
 - randomly permute differential undervote rate and compute correlation with percentage of registered Black voters by precinct

Differential Undervote Rates and Black Voters

| Contest | correlation | <i>p</i> -value |
|--------------------------------------|-------------|-----------------|
| Governor | -0.134 | 0.9903 |
| Lt. Governor | 0.557 | 0.0001 |
| Secretary of State | 0.092 | 0.0582 |
| Attorney General | 0.078 | 0.0902 |
| Commissioner of Agriculture | 0.207 | 0.0003 |
| Commissioner of Insurance | 0.246 | 0.0001 |
| State School Superintendent. | 0.154 | 0.0050 |
| Commissioner of Labor | 0.041 | 0.2376 |
| Public Service Commission District 3 | 0.042 | 0.2329 |
| Public Service Commission District 5 | 0.125 | 0.0145 |

Winterville Train Depot (SoS Kemp's precinct)

- 76 citizen photos of poll tapes

```
*****
ELECTION RESULTS REPORT
*****
Clarke County
State of
Georgia General Election

November 6, 2018
DATE: Nov-06-2018
POLL CTR: 70K00
1A W'ville Train Depot
MACHINE ID: 0
VERSION: 1 COPY: 0
COUNT: 0 SIZE: 32M
ACCU-VOTE RELEASE: 4, 5, 2
REPORT: US 1, 14, 7

TIME: 19:51 11/06/2018
MACHINE SERIAL: 113185
PUBLIC COUNTER: 117
SYSTEM COUNTER: 1880

*****
** PRECINCT: 10 **
1A W'ville Train Depot
*****
BALLOTS CAST 117
*****
Governor
RACE # 50

B. KEMP (R) 40
S. ABRAMS (D) 73
T. METZ (L) 4
```

```
*****
ELECTION RESU
*****
Clarke C
State
Georgia Gene

November
DATE: Nov-06-201
POLL CTR:
1A W'ville
MACHINE ID:
VERSION: 1
COUNT: 0
ACCU-VOTE RELE
REPORT:

TIME: 19:50
MACHINE SERIAL
PUBLIC COUNT
SYSTEM COUNT

*****
** PRECINCT:
1A W'v'
*****
BALLOTS CAS
*****
Governor
RACE # 50

B. KEMP (I
```

Winterville Train Depot (SoS Kemp's precinct)

```
*****
ELECTION RESULTS REPORT
*****
Clarke County
State of
Georgia General Election

November 6, 2018
DATE: Nov-06-2018
POLL CTR: 70K00
1A W'ville Train Depot
MACHINE ID: 0
VERSION: 1 COPY: 0
COUNT: 0 SIZE: 32M
ACCU-VOTE RELEASE: 4, 5, 2
REPORT: US 1, 14, 7

TIME: 19:51 11/06/2018
MACHINE SERIAL: 113185
PUBLIC COUNTER: 117
SYSTEM COUNTER: 1880

*****
** PRECINCT: 10 **
1A W'ville Train Depot
*****
BALLOTS CAST 117
*****
Governor
RACE # 50

B. KEMP (R) 40
S. ABRAMS (D) 73
T. METZ (L) 4
```

```
*****
ELECTION RESU
*****
Clarke C
State
Georgia Gene

November
DATE: Nov-06-201
POLL CTR:
1A W'ville
MACHINE ID:
VERSION: 1
COUNT: 0
ACCU-VOTE RELE
REPORT:

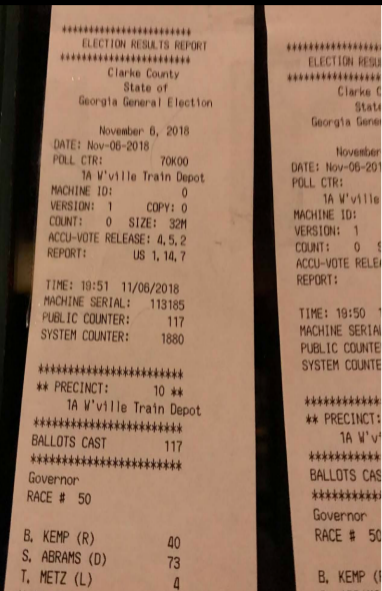
TIME: 19:50
MACHINE SERIAL
PUBLIC COUNT
SYSTEM COUNT

*****
** PRECINCT:
1A W'v'
*****
BALLOTS CAS
*****
Governor
RACE # 50

B. KEMP (I
```

- 76 citizen photos of poll tapes
- similar #voters used all 7
 - 6 of 7 DREs showed majority for D in every statewide contest
 - 1 showed majority for R in every statewide contest
 - surprising, if machines worked properly?

Winterville Train Depot (SoS Kemp's precinct)



- 76 citizen photos of poll tapes
- similar #voters used all 7
 - 6 of 7 DREs showed majority for D in every statewide contest
 - 1 showed majority for R in every statewide contest
 - surprising, if machines worked properly?
- Permutation test: voters were directed to machines “as if” at random
 - condition on votes per machine & per candidate
 - statistic: largest share discrepancy (D or R) across machines

Winterville Train Depot (SoS Kemp's precinct)

| Contest | <i>p</i> -value | <i>p</i> -value if machine 3 were flipped |
|--------------------------------------|-----------------|---|
| Governor | 0.114 | 0.464 |
| Lt. Governor | 0.025 | 0.795 |
| Secretary of State | 0.018 | 0.450 |
| Attorney General | 0.151 | 0.543 |
| Commissioner of Agriculture | 0.026 | 0.734 |
| Commissioner of Insurance | 0.030 | 0.604 |
| State School Superintendent. | 0.097 | 0.807 |
| Commissioner of Labor | 0.008 | 0.797 |
| Public Service Commission District 3 | 0.046 | 0.280 |
| Public Service Commission District 5 | 0.025 | 0.939 |

Conclusions

- Evidence that DREs failed to record a large percentage of votes in Lt. Governor contest
- Evidence that some DREs malfunctioned: lost votes and/or flipped votes
- GA lawmakers are poised to replace DREs with BMDs for all voters
- Procurement process ignored advice of the only technologist on the committee
- Lawsuit seeks to block universal use of BMDs in favor of HMPB