

State of North Carolina

County of Wake

IN THE
GENERAL COURT OF JUSTICE
SUPERIOR COURT DIVISION
20 CVS 0535

North Carolina State Conference of the NAACP, *ET AL.*,

Plaintiffs,

v.

The North Carolina State Board of Elections, *ET AL.*,

Defendants.

DECLARATION OF CANDICE HOKE

I, CANDICE HOKE, submit this Declaration under penalty of perjury. I make this declaration of my own personal knowledge, and am competent to testify to the matters set forth herein.

Summary of Conclusions

1. As explained in more detail below, it is my professional opinion that North Carolina election officials have more than sufficient time to transition before the General Election to the most secure method of voting currently available -- paper ballots on which voters indicate their choices in hand-marked, human-readable, human-auditable paper ballots. Most of the components of the recently purchased voting systems can still be used even with a transition to broad use of hand-marked paper ballots and cessation of the highly vulnerable ExpressVote machines that provide software-produced bar codes to indicate and tabulate the voter's choices.

Qualifications

2. I hold a J.D. from Yale Law School and an M.S. in Information Security Policy and Management from Carnegie Mellon University. I am currently the Founding Co-Director of the Center for Cybersecurity & Privacy Protection and Professor of Law, Emerita, at Cleveland State

University, Cleveland, Ohio. My professional experience includes assisting another jurisdiction – Cuyahoga County (Greater Cleveland), Ohio – in recovering from a disastrous electronic voting election and assisting its transition from direct recording electronic (“DRE,” *aka* types of “touchscreen”) voting machines to hand-marked paper ballots read by optical scanners. I make this declaration of my own personal knowledge, and I am competent to testify to the matters set forth herein.

3. I am a North Carolina native, born in Wake County, and primarily a product of North Carolina public schools. Most of my family remain citizens of North Carolina, and I often visit in my home state. I cast my first ballot in Mecklenburg County, and I served two terms as an appointee to the North Carolina Drug Commission.

4. In 2005, I founded the nonpartisan Center for Election Integrity at Cleveland State University as a joint project of the schools of public administration and law. Its mission was to improve the managerial, technological, and security capabilities of election administration in Ohio and throughout the Nation, as an essential means to ensure fair elections.

5. In 2006, after Cuyahoga County, Ohio (one of the 15 most populous election jurisdictions in the nation) launched its new electronic voting systems and experienced a notorious fiasco in the primary election, the Cuyahoga County Board of Elections and the County Commission jointly appointed me to serve on a 3-person investigatory panel. We were charged to ascertain the causes and cures for the managerial and technical failures of that election, in time for major remedial steps to be instituted before the November general election. I was the major author of the Final Report that included over 300 action recommendations for improving the election management process, including of its electronic voting systems.

6. Within a month of submitting that Report, the Cuyahoga County Board of Elections

and the County Commission formally appointed the Center for Election Integrity under my leadership to serve as Public Monitor of Cuyahoga Election Reform. Over the next two years, I sought to help restore administrative efficacy and public trust by transparently identifying election problems (such as inconsistency between the number of voters signing in to cast ballots and the number of ballots counted), providing expert consultation to the election administrators on their remedial efforts to correct existing problems and prevent future issues, and reporting publicly on their relative success. At times similar to a special master role, from 2006 - 08 we worked closely with election departmental and executive managers to suggest methods for improving or assuring their overall administrative and technological success. With talented and responsive new administrative leadership in their office, on which I was consulted, steady improvements occurred.

7. In Ohio, I also served within the election apparatus as a supervising poll worker; as a “roving” election technology trouble-shooter for multiple voting locations; as a voter registration problem-solver; and as a consultant to the Ohio Secretary of State’s office on election management and improvement, including on voting technology issues. On some federal Election Days, I served as a leader of the collaborative nonpartisan “election protection” effort, designed to identify and facilitate quick resolution of voting location issues to assure voter access.

8. I was the only law professor (and one of only two lawyers) to participate as a security researcher in the pathbreaking California Secretary of State’s scientific study of voting system security (*Top to Bottom Review*, 2007)¹ (“TTBR”) that was conducted through the University of California. My TTBR team focused primarily on analyzing and evaluating the security aspects of Diebold voting systems. Those voting systems included a number of design

¹ See <https://www.sos.ca.gov/elections/voting-systems/oversight/top-bottom-review/>.

features and resulting problems that are similar to the ExpressVote systems at issue here, presenting similar security and reliability concerns.

9. During the California TTBR study and thereafter, I worked closely with the Ohio Secretary of State's office in structuring its pathbreaking scientific study of voting system security (EVEREST, 2007).² This study included a close focus on ES&S voting systems, the manufacturer of the ExpressVote at issue here.

10. I have authored numerous published works on the security and regulation of voting systems and other election technologies, including some monographs solicited and published by the American Bar Association.

11. My work from 2006 to the present includes talks, publications, and consultation to explain election security issues in a technically accurate but accessible manner for those not technically trained; my foci were lawyers, executive managers, and election officials, as evidenced by *Judicial Protection of Popular Sovereignty: Redressing Voting Technology*, 62 Case Western Reserve Law Review 997 (2012).

12. In other work, I have sought to illuminate for security experts the unusual, if not unique, security context of public governmental elections, and the complexities of U.S. election administration that can impede security readiness and resilience. For instance, I served as the first voting technology expert appointed to the American Bar Association's Advisory Commission to the Election Law Committee, serving three terms (2007-10). I initiated and co-authored a primer on election technology forensics for election officials and their attorneys, which the ABA published electronically and distributed to the entire membership of the Section on State and Local

² See <https://www.verifiedvoting.org/wp-content/uploads/2012/10/10-ESSTechDetailsRedacted.pdf>; <https://security.cs.georgetown.edu/~msherr/papers/everest-ohio.pdf>.

Government Law (October 2008). At the Pentagon, I advised the top attorneys in the U.S. Department of Defense on insecure and possibly illegal voting technologies that an obscure DoD agency (the Federal Voting Assistance Program) was funding and promoting to State governments. I worked closely with the U.S. Department of Justice, Antitrust Division, on their successful efforts to unwind ES&S's attempt to control the ballots of 75% of American voters through its purchase and merger with the next-largest voting systems company (Premier Election Systems, formerly known as Diebold Election Systems). I collaborated with leaders within the U.S. Department of Homeland Security (DHS) on initiatives to expose the grossly inadequate software security and security designs of widely deployed voting technologies – including those manufactured by ES&S. In summer 2016, I advised DHS cybersecurity staff on the likelihood of Russian interference with our deployed election technologies (specifically voter registration databases, electronic pollbooks for approving voters' credentials at the voting locations, and vote recording/tabulation systems).

13. I taught Election Law for over a decade, with coursework that included lectures and advanced readings on election technologies and their scientifically documented security vulnerabilities. I also taught or supervised Information Security courses for law students and, via continuing education offerings, for practicing attorneys from 2015 - 17. In 2017 I resigned my law faculty position to refocus my work on information security and election cyber risk management. A brief overview of my credentials pertaining to election management and technologies is attached as Exhibit 1 and a more comprehensive C.V. as Exhibit 2.

14. My expertise thus extends to the claims here and remedies requested, including: (1) operational, administrative, and security issues in preparing and conducting an election; (2) cyber risk assessments and best practices to mitigate security vulnerabilities; (3) problems with pollworker training and compliance when they are expected to implement complex procedural or

technical rules; (4) information and comprehension deficits that occur during election technology procurement and launch, often associated with (if not traceable to) manufacturer/vendor misrepresentations and marketing promotions that cause procurement officers to believe the systems will be accurate, secure, and resilient despite bugs, failures, misconfiguration, and attackers/hackers; and (5) the feasibility of election offices changing to a different voting system before the November general election, and of conducting post-election audits to enable effective checks on whether the computerized vote tabulation was accurate.

Human-Readable and Human-Auditable Ballots are Essential

Components of Election Security

15. It is axiomatic among information security professionals that unauthorized digital access or “hacking” of virtually any electronic information system is not a matter of *whether* they can be breached, but *with how much effort*, and *whether the breaches will be detectable and correctable*. We provide a number of defensive strategies to reduce the risk, but where the target is highly attractive and difficult to defend—as are U.S. elections in 2020 -- part of the mission must be “resilience.” While the concept of resilience as applied to systems and the data they contain (for instance, in elections, voter registration data or vote tabulation data) is multi-faceted, one aspect is widely agreed and pertinent here: assuming a successful attack, we need structured backups and managerial/procedural methods so that despite the attack, the data can be reliably and accurately reconstructed to enable mission achievement nonetheless.

16. In our public elections, hand-marked paper ballots with human readable markings provide the essential backups needed to reconstruct an election’s tabulation in case the scanners, central servers, tabulators, voting devices, or other vulnerable components have been attacked (or

inadvertently misconfigured). Sometimes these attacks will be recognized and can be blocked before data integrity is harmed, but sophisticated miscreants will often be able to corrupt the data without an evidentiary trail that tips off election officials to examine the system or its vote tabulations more closely.

17. These basic points about digital information systems' vulnerabilities to both inside and remote attackers are the reasons Federal law already requires routine auditing and other resiliency measures for sensitive, mission-critical information systems in the financial, health care delivery, and military sectors.

18. In the election context, the paper ballot with the voter's own hand-marked, human-readable ballot markings provides a tangible record that the voter can review to assure that it accurately represents the choices made. With hand marking, software cannot mis-record a voter's choices because of bugs, misconfiguration, or malicious logic. When aggregated into batches (such as a precincts), randomly selected ballot batches can be hand-tallied to compare to machine counts of the same batches in a statistically structured audit that will function as a check on the validity of the computer-generated tally.

19. Hand-marked paper ballots provide a record that allows reconstruction of an entire election even if scanners or other technical components are discovered to have generated untrustworthy tallies. This makes the election system truly *resilient* even with unreliable or vulnerable voting systems in place. Hand-marked paper ballots also provide the basis for meaningful auditing to determine whether the computers and tabulators that generated the totals can be trusted. But the ballot markings must be readable by humans – a requirement bar-coded vote summaries ineluctably fail.

The Timing of Transitioning to Optical Scanning Systems with Human Readable Marks

20. I have had a formal role advising election officials in two populous urban jurisdictions on how to achieve effective transitions to newer voting equipment, specifically Cleveland, Ohio - Cuyahoga County (2008) and Pittsburgh, Pennsylvania - Allegheny County (2019). For several other counties, I have functioned more as a sounding board and background resource on their expected transitions, for public advocates or an election official. In each of my formal roles, the County election office chose (or was required) to move from touchscreen voting devices to hand-marked paper ballots with precinct-based optical scanners.

21. There are many precedents for implementing a new voting system change at the speed and on the timetable requested by Plaintiffs, including 2020 precedents within North Carolina.

22. Normally the best time to transition to new voting equipment is in an odd-numbered (non-Federal election) year. Given the newer recognition of serious cyberthreats to our democratic processes, however, and especially to our mission-critical election technologies such as voting and voter registration systems, many jurisdictions have decided to transition from their vulnerable and untrustworthy voting systems despite less than optimal scheduling. For instance, Allegheny County (Greater Pittsburgh area), Pennsylvania launched its new hand-marked paper ballot/precinct optical scan system for first use in the Federal 2020 primary. Some large jurisdictions (including Cuyahoga County, Ohio) shifted from all-electronic DREs to hand-marked paper ballots in barely 60 days, immediately prior to the 2008 presidential primary.

23. Numerous North Carolina counties such as Mecklenburg County transitioned to the ExpressVote during 2020. Mecklenburg County Commissioners approved the funding of the ExpressVote on January 7, 2020, and the ExpressVote devices were first used in the March 3, 2020

primary election. The transition of Mecklenburg County and other North Carolina counties to using the ExpressVote in the early months of 2020 was a much more complex and difficult undertaking than it would be for those same counties to move to hand-marked paper ballots, given that these counties already use hand-marked paper ballots for mailed-in absentee voting, (and some may also use paper ballots for provisional voting).

24. The North Carolina counties that recently chose to deploy the ExpressVote made the shift after the State's approval of its use on December 13, 2019. Each defendant county that selected the ExpressVote system from the certified voting systems on the State's menu of options had to deploy it no later than the Federal March 3rd primary election. Mecklenburg County's January 7th appropriation meant the county had less than 60 days to prepare and achieve the transition, and other counties had approximately 60 days if they chose ExpressVote.

25. A more extensive time frame would be available to the North Carolina counties currently using the ExpressVote to assure a successful transition to secure, trustworthy voting practices using (predominantly hand-marked) paper ballots and precinct optical scanners than many of these counties faced in transitioning to the ExpressVote earlier this year.

26. Additionally, transitioning to hand-marked paper ballots with precinct optical scanners means that far fewer technological voting units must be configured, programmed, tested, secured and contracted for transport to voting locations, secured at the voting locations, and then set up and managed by precinct pollworkers during pre-election preparation and Election Day. The transition does require, however, more paper ballots to be provided than simply for backup or provisional voting. Logistical planning for securely delivering the paper ballots both to the voting locations and back to the election offices for tabulation is also necessary. These tasks fall well within the normal professional scope of election office managers, however, and are feasible within

the time periods available before the 2020 General Election.

27. Voter education in how to fill out their ballots in ways that assure their ballot will be tabulated should also be on the task list for any effective voting system transition. Given that optical scan forms are ubiquitous within school and employment settings, voters rarely face obstacles in learning how to mark paper ballots with the type of markings that will be counted. Using public service announcements on broadcast media, and by partnering with nonpartisan nonprofit organizations that seek to assure voting rights, election offices can achieve the broad public understandings about how to mark paper ballots that will count.

28. In next-door Virginia and other counties nationwide, successful transitions to hand-marked paper ballots and robust post-election auditing were achieved on far tighter timetables than would be available here, so long as the decision were made by early September. A significant number of experienced consultants and free professional advice from election official colleagues can be tapped to raise confidence and provide quality project planning. The voting system vendors also provide project plans for election offices to transition to their voting systems. By pooling efforts and borrowing guidance (including poll worker manuals and training programs) from other N.C. jurisdictions that have already adopted the more secure voting technologies needed to protect vote integrity, defendant counties can lower the transaction costs and smooth the path while also greatly improving election security and voter confidence in the election results.

29. Based on my experience in Cuyahoga County, and my expertise developed over years of work in the field of election management and technologies, in my opinion more than sufficient time remains for North Carolina counties to successfully transition from ExpressVote voting machines to the use of hand-marked paper ballots with precinct optical scanners for the upcoming November 2020 general election.

Feasibility of Transition to a Different Voting System During a Primary Election
vs. General Election

30. A wide range of factors cause primary elections to be far more complex to manage than a general election. These significant administrative tasks requisite to many primary elections generally counsel against launching a new voting system in those elections, if it can be avoided.

31. Contrary to the intuition of many novices in the election administrative space, a General Election in November – even with a Presidential race on the ballot – is normally far simpler to manage administratively than its primary, despite much higher voter participation. The General Election presents far fewer ballot styles to produce and manage, and normally requires much shorter ballots (many fewer candidates than primaries). For instance, in the 2020 primary election, for each distinct voting unit, Mecklenburg County had to produce separate ballots for four political parties, each with a multitude of candidates, whereas in the General Election all voters in a given precinct will make their selections on the same ballot.³ Further, there is generally no need to qualify candidates administratively as the primary election (and sometimes, runoff primary election) qualified the candidates that would proceed to the General Election.

32. Transitioning to a new voting system using hand-marked paper ballots is therefore easier administratively if scheduled for a General Election rather than a primary, and should be much easier for the defendant counties than their rushed deployment of the ExpressVote for the 2020 primary election.

Special Aspects Rendering This Type of Transition Easier Than Others

33. Very few components of the newly purchased insecure voting system would need

³ An electoral jurisdiction may provide ballots for all elections, primary and general, in authorized languages other than English, but these ballots are translations of the English.

to be changed in order to achieve a much more secure system that relies on human readable ballot markings. In many voting system transitions, counties change their vendor/manufacturer, and every component comprising the certified voting system. In practice, this normally means purchasing new computers as central “election management system” (EMS) server(s) that receive uploads of licensed complex software that must be laboriously configured for their particular county. These EMS workstations are then used to configure an election that will specify all races, candidates, and issue questions; tabulate ballots, and report results (among other tasks). Memory media must be purchased and, dependent upon the voting system, configured to contain a redundant record of vote data in the precinct tabulator (here, an optical scanner). The optical scanner devices must be purchased and configured. Substantial staff training must occur, precinct supplies to support the new system must be analyzed and obtained, and other logistical preparations undertaken for the transportation and storage of the electronic equipment and for all the supplies.

34. In the present case, the defendant counties have already purchased and deployed their new EMS servers, software, the precinct optical scanners—albeit to read bar codes rather than human readable marks, and in some cases, have also purchased high speed optical scanning/tabulation equipment for tabulating in the election offices instead of at precincts. All of this hardware and most of the software can continue to be used with little to no change. The vendor does not need to change. No new technical equipment procurements must occur, except possibly to support early absentee voting.

35. The same precinct optical scanners that were used in the 2020 primary can easily be used to read human-marked and human-readable ballots. The scanners can be loaded with different (certified) software to read these human-marked and human-readable marks instead of

reading bar codes. The high-speed optical scanners that are used for central counting of ballots also can still be used, requiring only different (certified) software and reconfiguration; their engineering enables them to tabulate human-readable marks as well as bar codes, but only need modest software and configuration changes. In most urban counties, some of their central count scanners are already being used for reading mailed-in absentee ballots containing human-readable ballot markings.

36. A modest and very manageable number of procedural and precinct-supply changes would be needed to support a hand-marked paper ballot election in these circumstances. These include, for instance, some method to assure voter privacy in marking paper ballots (often a cardboard divider between voters); pens that mark with scanner-readable ink; sufficient paper ballots for each precinct; lockable supply and ballot bags; and for early absentee voting at vote centers, a secure method of managing the diverse ballots so that the correct ballot can be identified and provided to each voter. The logistical changes needed are far simpler than in most other voting system transitions.

37. To assure that election security is achieved and not simply a potential, even where human readable paper ballots are the voting method, election offices must conduct post-election, pre-certification statistical auditing based on the original hand-marked paper ballots, to check on the accuracy of the computer-generated counts. Many sound models have been provided in the public realm and are used by other jurisdictions, allowing North Carolina counties to utilize experience gained elsewhere to assure election security and accuracy for all their voters.

Conclusion

38. There is more than sufficient time for election officials in North Carolina counties to make the transition to hand-marked, human readable paper ballots for the November General

Election and to adopt auditing methods to assure election security and accuracy.

I declare under penalty of perjury that the foregoing is true and correct.

Executed this 6th day of July, 2020.

Candice Hoke
Candice Hoke

Signer was physically present at time of signing.

I, the undersigned notary public, hereby certify that CANDICE HOKE personally appeared before me this day and acknowledged the due execution of this AFFIDAVIT.

Witness my hand and official seal, this the 6th day of July, 2020.

Susan L. Hays-South
Notary Public Susan L. Hays-South

My commission expires July 17, 2020, 2020.

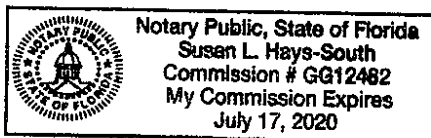


Exhibit 1:

Summary of Relevant Credentials of Declarant Candice Hoke

- Founding Director of the *Center for Election Integrity* and Project Director of the *Public Monitor of Cuyahoga Election Reform* (2006–08). Previously, Cybersecurity Engineer on the *Cyber Risk & Resilience Team*, CERT/Software Engineering Institute. Currently the Founding Co-Director of the *Center for Cybersecurity & Privacy Protection*, Cleveland, Ohio.
- Has advised Federal officials on deployed voting systems' vulnerabilities and the omission of effective security designs, testing, election offices' security infrastructure and tech management, and on the threats (and questionable legality) presented by Internet voting, within the U.S. Departments of Homeland Security, Defense, Justice, and the Executive Office of the President (from 2008 forward).
- Testified before Congress on the need for post-election auditing (U.S. House of Representatives, Committee on Administration); before the U.S. Election Assistance Commission on the need for comprehensive voting system cyber "incident reporting"; before the Ohio General Assembly on the vulnerabilities of Ohio's voting systems, and before numerous other public bodies at State and local levels.
- Has worked closely with congressional offices of both major parties and major national nonprofit organizations in drafting and critiquing proposed legislation to improve election technologies' security.
- Research Team Leader within the definitive scientific study of deployed voting systems for the California Secretary of State California, specifically on aspects of Diebold systems; published as *Top to Bottom Review of Voting Systems* (2007).
- Consultant for structuring the Ohio EVEREST scientific study (2007) of Ohio's deployed voting systems, and educator on election law and processes for security assessments.
- As Director of the *Public Monitor of Cuyahoga Election Reform*, led technical teams in nationally unprecedented cyber risk assessments of election technical security, authored public reports on the security deficiencies warranting correction; proposed and led Ohio's first post-election audit of cast ballots; facilitated improved managerial and technical processes that included poll worker recruitment and training.
- Served as the voting technology expert for 3 terms on the American Bar Association's Standing Committee on Election Law, Advisory Commission, and was one of only 2 academics appointed to the Ohio Attorney General's first Cybersecurity Advisory Board. Currently serves on Verified Voting's Advisory Board.
- After the 2 largest voting system vendors merged, leading to 1 corporation controlling over 72% of Americans' votes, led the national nonprofit and election officials' coalition that successfully worked with the U.S. Department of Justice Antitrust Division to compel divestment of the merger.
- Author or co-author of numerous published articles and reports on election technologies and other election administration issues, including an election tech forensics guide.
- Was a Professor of Law, Cleveland State University for over two decades (until Aug. 2017), and is currently Professor of Law, Emerita, working as a cybersecurity consultant, educator, and advocate.

- Broadcast media experience includes all major US television networks plus local TV and radio in 9 major media markets, national and local NPR interviews; U.S. newspapers/print media include AP, *NY Times*, *Los Angeles Times*, and the *Washington Post*.
- Education: J.D., Yale Law School (*Yale Law Journal*); M.S. in Information Security Policy & Management, Carnegie Mellon University.

EXHIBIT 2

CANDICE HOKE

10713 Boca Pointe Dr.
Orlando, FL 32836
shp899 at icloud dot com

EDUCATION

Master of Science in Information Security Policy & Management, Carnegie Mellon University, 2014.
Juris Doctor, Yale Law School, Yale University, 1983. *Yale Law Journal*.
Bachelor of Arts, *cum laude*, Hollins University, 1977.

EMPLOYMENT

Consultant, Operational Security and Cyber Risk Assessments, 2018 - present (private practice).
Professor of Law, Cleveland-Marshall College of Law, Cleveland State University, Cleveland, OH. 1994 – 2017 (tenured in 1995); Professor of Law *emerita* 2017 - present.

- Founding Co-Director, Center for Cybersecurity & Privacy Protection, 2015 – present.
- Director, Center for Election Integrity, 2005-08; Project Director, Public Monitor of Cuyahoga Election Reform.

Cyber Security Engineer, Cyber Risk & Resilience Team, CERT Division of the Software Engineering Institute, Carnegie Mellon University (predominantly part-time), May 2014 - Feb 2015.
Founder & Executive Director, Center for Election Excellence, Cleveland Hts, OH (part-time), 2008-11.
Visiting Research Engineer & Research Team Leader, Department of Electrical Engineering and Computer Sciences, University of California-Berkeley, May-Aug. 2007 (for voting systems security studies).
The Judge Ben C. Green Visiting Professor of Law, Case Western Reserve University Law School, Cleveland, OH, 1993-94.
Assistant Professor of Law, University of Pittsburgh School of Law, Pittsburgh, PA, 1987- 93.
Adjunct Assistant Professor, Northeastern University, Master of Public Administration, Boston, MA, summer term 1986.
Associate Attorney, Hill and Barlow, Boston, MA, 1985–87.
Law clerk to The Honorable Hugh H. Bownes, of the U.S. Court of Appeals for the First Circuit, Boston, MA, 1983 – 85.
Summer Associate Attorney, Equal Rights Advocates, Inc., San Francisco, CA, summers 1980, 1982.
Summer Associate Attorney, Thelen Marrin Johnson and Bridges, San Francisco, CA, summer 1981.

PUBLICATIONS

BOOK CHAPTERS & MONOGRAPHS

Voting Technologies and the Quest for Trustworthy Elections, Chapter 17 in *America Votes*, Benjamin Griffith, ed., American Bar Association Press, 2nd ed. 2012.
Voting and Registration Technology Issues: Lessons from 2008 (with David Jefferson), Chapter 3 of *America Votes! Supplement*, Benjamin Griffith, ed. American Bar Association Press 2009.
Resolving the Unexpected In Elections: Election Officials' Options [election forensics], with computer scientists Matt Bishop, David Jefferson, Mark Graff, and Sean Peisert, October 2008), first published by

the American Bar Association and distributed to the Section on State and Local Government, October 2008; currently available at <http://nob.cs.ucdavis.edu/bishop/notes/2008-forensic/index.html>.
The Guarantee Clause, Encyclopedia of American Federalism, 2 vols. Greenwood Press; E. Katz, et al., eds. 2006.

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- Are they worth reading? An in-depth analysis of online advertising companies' privacy policies, (with Lorrie Faith Cranor, Pedro Leon, et al.), I/S: A Journal of Law and Policy for the Information Society, vol. 11, issue 2, Aug 2015.
- Judicial Protection of Popular Sovereignty: Redressing Voting Technology, *Symposium: Baker v. Carr After 50 Years: Appraising the Reapportionment Revolution*, 62 Case Western Reserve Law Review 997, 2012.
- State Discretion Under New Federal Welfare Legislation: Illusion, Reality, and a Federalism-Based Constitutional Challenge, 9 Stanford L. & Policy Rev. 115, 1997, solicited for the *Symposium: Welfare Reform and Beyond*.
- Review of Federalism and Rights by Ellis Katz & G. Alan Tarr and To Make a Nation: The Rediscovery of American Federalism by Samuel H. Beer, 47 Journal of Legal Education 149, 1997.
- Arendt, Tushnet, and Lopez: The Philosophical Challenge Behind Ackerman's Theory of Constitutional Moments, 47 Case W. Res. L. Rev. 903, 1997; solicited to respond to Mark Tushnet in *Symposium: The New Federalism After United States v. Lopez*.
- Constitutional Impediments to National Health Reform: Tenth Amendment and Spending Power Hurdles, 21 Hastings Const. L. Q. 489, 1994; lead article in *Symposium: Health Care and the Constitution*.

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- Transcending Conventional Supremacy: A Reconstruction of the Supremacy Clause, 24 Connecticut Law Rev. 829, 1994.
- Preemption Pathologies and Civic Republican Values, 71 Boston Univ. Law Review 685, 1991, lead article).

PEER-REVIEWED CONFERENCE & WORKSHOP PAPERS

- Are They Worth Reading? An In-Depth Analysis of Online Advertising Companies' Privacy Policies (with Lorrie Faith Cranor, Pedro Leon, et al.) presented by co-author at 2014 TPRC: 42nd Research Conference on Communication, Information and Internet Policy, George Mason Univ., Arlington, VA. Sept. 12-14, 2014.
- Self-Regulation of the Online Behavioral Advertising Industry: Empirical Analysis and Regulatory Competence (with Lorrie Faith Cranor, Pedro Leon, et al.), Privacy Law Scholars Conference, George Washington University, June 6-7, 2014.
- Internet Voting: Formulating Structural Governance Principles for Elections Cybersecurity, proceedings of ISGIG 2009: Second International Symposium on Global Information Governance, September 15-17, 2009, Prague, Czech Republic; published in ACM Library.
<http://dl.acm.org/citation.cfm?id=1920329>
- E-Voting and Forensics: Prying Open the Black Box (with Matt Bishop, Sean Peisert, Mark Graff and David Jefferson), EVT/WOTE (Electronic Voting Technology/Workshop on Trustworthy Elections), USENIX Security Conference, Montreal, CA, August 2009.
<http://www.usenix.org/events/evtvote09/tech/>
- GEMS Tabulation Database Design Issues In Relation to Voting Systems Certification Standards (with Thomas P. Ryan), EVT: Electronic Voting Technology Workshop, USENIX Security Conference, Boston, MA, August 6, 2007. <http://www.usenix.org/events/evt07/tech/>

OTHER SCHOLARLY CONFERENCE & WORKSHOP PAPERS

- Essential Research Needed to Support UOCAVA-MOVE Act Implementation at the State and Local Levels (co-authored with Matt Bishop), one version published in the NIST-FVAP-EAC Workshop on UOCAVA Remote Voting Systems, held in Washington, D.C., August 2010.
http://www.nist.gov/itl/csd/ct/uocava_workshop_aug2010.cfm;
updated in SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1697848
- Election Cyber Security and the Federal Quest for Online Voting (presentation in the Schloss-Dagstuhl, Germany, Symposium: Verifiable Elections and the Public), July 10-15, 2011
<http://www.dagstuhl.de/program/calendar/partlist/?seminr=11281&SUOG>
- Licensing and Other Credentialing for Software Engineering, Software Assurance Working Group Sessions, U.S. Department of Homeland Security, National Cyber Security Division, MITRE-1, McLean, VA, June 29, 2011.
- A Common Law Remedy for Genetic Discrimination, in Symposium: Is There a Pink Slip in Your Genes? Genetic Discrimination Law Conference, Cleveland-Marshall College of Law, Cleveland, OH, December 6, 2001.
- State Discretion Under New Federal Welfare Legislation: Illusion, Reality, and a Federalism-Based Constitutional Challenge, ABA Annual Meeting, Section on State and Local Government Law, Chicago, IL, August 6, 1997.
- Arendt, Ackerman, and Lopez: Testing the Theory of Constitutional Moments (responding to a paper by Mark Tushnet), Symposium on the New Federalism After United States v. Lopez, Case Western Reserve University Law School, Nov. 10-11, 1996.
- Federalism Issues in National Health Reform, 15th Annual Health Law Teachers Conference, sponsored by the American Society of Law, Medicine, and Ethics, et al., Indianapolis, IN, June 2-4, 1994.
- Constitutional Impediments to National Health Reform: Tenth Amendment Hurdles, at the Conference on National Health Care Reform: The Legal Issues, sponsored by the Law-Medicine Center of Case Western Reserve University, Feb. 25-26, 1994.

TECHNICAL REPORTS

- Documentation Assessment of the Diebold Voting Systems, commissioned by the California Secretary of State and part of larger study conducted by the University of California (with David Kettyle), July 20, 2007. http://www.sos.ca.gov/elections/elections_vsr.htm
- Collaborative Public Audit, Final Report of Cuyahoga County's November 2006 General Election (with co-author workgroup), April 2007,
http://engagedscholarship.csuohio.edu/cgi/viewcontent.cgi?article=1001&context=lawfac_reports
- College Poll Worker Guidebook for the U.S. Election Assistance Commission, a Center for Election Integrity project with Abigail Horn, Principal Investigator, Dec. 2006, final edition at http://www.eac.gov/assets/1/Page/A_Guidebook_for_Recruiting_College_Poll_Workers.pdf
- Final Report of the Cuyahoga Election Review Panel, primary author, with Ronald Adrine & Thomas J. Hayes, July 20, 2006.
http://engagedscholarship.csuohio.edu/cgi/viewcontent.cgi?article=1003&context=lawfac_reports
- Operational Security and Management Assessment Reports for the Public Monitor of Cuyahoga County Election Reform, 2006-08.

PUBLIC & EXTERNAL ACTIVITIES

FEDERAL AGENCY TESTIMONY & COUNSEL

- U.S. Dept. of Homeland Security, U.S. CERT and other staff, requesting insight and recommendations on analyzing and achieving election cybersecurity objectives, July 2016- Jan. 2017.
- Risks and Legality of Internet Voting Initiatives, presentations and discussions with the Office of General Counsel, U.S. Department of Defense, June 2011- Jan. 2012.
- Licensing the Software Engineering Workforce, DHS Working Groups on Software Assurance, MITRE: McLean, VA, June 29, 2011.
- Department of Homeland Security, Director Cyber + Strategy, discussions of steps within DHS scope that would assist in protecting US election cybersecurity, Oct. 2010.
- U.S. Justice Department, Antitrust Division: regarding the merger of the two largest voting system companies and subsequent divestiture of assets; led a national collaboration of nonprofit research and advocacy entities dedicated to fair elections in negotiations with the Department, Dec. 2009-May 2010.
- Executive Office of the President, Office of Legal Counsel: discussions of election cybersecurity and omission of election systems from designation as critical infrastructure assets warranting federal protection and planning; federal legislative needs for fair, secure, accurate, and accountable elections, May-June 2009, March 2010.
- Tracking Voting Technology Field Performance: The Federal Role. Public Hearing of U.S. Election Assistance Commission; solicited written and oral testimony to include technical monitoring program established in Cuyahoga County, Ohio; Washington, D.C., Dec. 8, 2008.
<http://www.eac.gov/assets/1/AssetManager/testimony%20candice%20hoke%20center%20for%20election%20integrity%20public%20meeting%20december%208%202008.pdf>
- Comparing Provisional Ballots in Ohio and Indiana, testimony before the U.S. Election Assistance Commission concerning the November 2004 General Election, Feb. 2005.
- U.S. Justice Department, Office of Legal Counsel, per request, consulted on the constitutionality under Tenth Amendment and Spending Power of the President's proposed health reform bill, April – May, July 1994.

FEDERAL LEGISLATIVE TESTIMONY & COUNSEL

- Legislative drafting and critiques of bills concerning election technologies and election cybersecurity for Members of the U.S. House and Senate including Senators Schumer, Cornyn, and Feinstein; Representatives Maloney and Holt, and for committee staff of both parties, 2007-16.
- Risks and Legality of Internet Voting Initiatives, presentations and discussions with the Chief of Staff of the Chair of U.S. Senate Armed Services Committee; Legal Staff of other Senate Armed Services Committee members (both parties); Legal Staff, U.S. House of Representatives, Committee on Administration; Legal Staff, U.S. Senate Rules Committee, June 2011- Jan. 2012.
- Testimony before the U.S. House of Representatives, Elections Subcommittee of the House Administration Committee, on independent post-election auditing and impediments to election auditing and transparency. Washington, D.C., March 20, 2007 (invited oral & written).
http://engagedscholarship.csuohio.edu/cgi/viewcontent.cgi?article=1037&context=fac_presentations
- U.S. Senate, Committee on the Judiciary, Subcommittee on the Constitution. As requested, reviewed, edited and commented on draft health reform legislation; drafted additional legislative proposals; wrote legal memoranda in support of proposed legislation, and provided written testimony for the record, summer and fall 1995.

STATE TESTIMONY & COUNSEL

Effective Management of Voting Systems Procurement and Launch Issues, invited witness, Allegheny County Public Hearing on Voting Systems Procurement, Pittsburgh, PA., June 7, 2019; Fall 2019.

Regarding the Ohio Secretary of State's Voting System Security study (EVEREST), before the Ohio General Assembly, fall 2007.

A Deliberative Process for Reform of Ohio Election Statutes, written and oral testimony on S.B. 380, House Committee on State Government and Elections, Columbus, OH, Dec. 11, 2008.

Consultant and legislation drafting, proposals for post-election auditing and other election administrative issues in Ohio, New Jersey, Pennsylvania, and other States, Dec. 2007 – June 2011.

Consultant on Ohio constitutional ballot initiative to establish a State minimum wage with COLA provision for automatic increases annually, summer 2005.

ELECTION TECHNOLOGY STANDARDS-SETTING WORKGROUPS

NIST Workgroups focused on developing the new Federal Voluntary Voting System Guidelines, specifically the VVSG-cybersecurity and VVSG-testing workgroups, 2016-present.

NIST Cybersecurity Framework Workshop preceding initial drafting of the Cybersecurity Framework, Pittsburgh, PA, May 29-31, 2013.

Federal Voting Assistance Program (FVAP) of U.S. Department of Defense, Security Workgroups, Chicago and Washington, D.C. 2010.

Voting Rights Institute of the Ohio Secretary of State, workgroups on Voting Technology, Auditing, and Election Official Education, 2007- 10.

APPOINTED PUBLIC POSITIONS

Member, Ohio Attorney General's Cybersecurity Advisory Board, Subcommittee on Data Protection Legislation, Sept. 2016- Jan. 2018. <http://www.ohioattorneygeneral.gov/Media/News-Releases/September-2016/Attorney-General-DeWine-Launches-CyberOhio-Initiat>

Member, Advisory Council, Voting Rights Institute, Ohio Secretary of State. Workgroups on Voting Technology and Auditing; Election Official Education, 2007- 10.

Public Monitor of Cuyahoga Election Reform. Pioneered field assessments of operational, technical and physical security. Assessed and offered recommendations for improving managerial, technical, and other operational functionality plus achieving compliance with governing law. Initiated first post-election audit in Ohio. Provided crisis management recommendations and PR support. Joint Appointment by the Board of Elections of Cuyahoga County, and County Commissioners of Cuyahoga County. August 2006 - Dec. 2008.

Member, Cuyahoga Election Review Panel. As the onsite member of 3-person panel, structured and supervised the investigative and reporting teams and provided executive management of investigative and reporting commission charged to determine the causes and cures for a high-profile Federal election failure. Conducted all recruitment, hiring, onboarding and training; drafted final report. Completed intensive investigation and public report within the 60-day assigned time frame. Interfaced with broadcast and print media locally and internationally as part of crisis management. Joint Appointment by the Board of Elections of Cuyahoga County and County Commissioners of Cuyahoga County. May - August 2006.

INVITED TALKS & PANEL PRESENTATIONS

- Election Security in Florida: Readiness for 2020, League of Women Voters--Florida, Zoom presentation for statewide participants, June 26, 2020.
- Florida Election Security Challenges in 2020, for the Voting Rights Coalition and League of Women Voters of Palm Beach County, Zoom presentation, April 2, 2020.
- Florida Election Security Readiness for 2020, Miami-Dade League of Women Voters, Miami, FL, Sept. 17, 2019; Northern Keys League of Women Voters and their partner organizations, Key Largo, FL, Sept. 15, 2019.
- Election Security Improvements Realized, Annual Conference of the Center for Cybersecurity & Privacy Protection, Cleveland State University, Cleveland, OH, May 31, 2019.
- Federal Litigation to Redress Election Cybersecurity Deficiencies, Election Verification Conference, Washington, D.C., March 2019.
- Election Security: A 2018 Midterms Retrospective, Penn State Symposium on Election Security, Penn State University, State College, PA, December 3, 2018.
- Election Cybersecurity: Are We Ready for 2018? League of Women Voters, Oberlin, OH, June 2, 2018.
- Conference: Can Adversaries Hack Our Elections? Can We Stop Them? University of California at Irvine, Irvine, CA, March 13, 2018.
- Voting System Vulnerabilities and their Potential Consequences, State of the Net Conference, Washington, DC, January 29, 2018.
- Outdated Legal Frameworks for Redressing Exploited Voting Technology Vulnerabilities, First DEFCON Voting Village, Las Vegas, NV, July 28, 2017.
- The Federal Interest in Expanding Cyber Risk Insurance, 2d Annual Conference on Cybersecurity & Privacy Protection, Cleveland, OH, April 28, 2017.
- Constitutional Rights to Election Tabulation Accuracy, in Recounts and Beyond, Election Verification Conference, George Washington University, Washington, D.C., March 15-17, 2017.
- Avoiding Email Insecurity in Achieving Secure Confidential Communications With Clients, Cleveland, OH, Dec. 2, 2016.
- Pervasive Cybersecurity to Reduce Risk, Chemical Industry General Counsel Symposium, Thompson Hine, Cleveland, OH, Oct. 25-26, 2016.
- Developing a Resilience-Oriented Security Culture, CRAIN 360: Cyber Security Conference, Crain's Cleveland Business, Oct. 5, 2016.
- Privacy Interests and Election Technologies, Cleveland IAPP KnowledgeNet, Cleveland, OH, April 26, 2016.
- Election Cyber Security and the Federal Quest for Online Voting presented at Schloss-Dagstuhl, Germany, Symposium: Verifiable Elections and the Public), July 10-15, 2011.
- Moderator and Panel Member, Election Technologies: What's On the Table & Off, and Why, Overseas Vote Foundation Annual Summit, Pew Charitable Trusts, Washington, D.C., February 10, 2011.
- Keynote Address: Credentialing the Workforce: Licensing Software Developers to Achieve Enhanced Software Security, NSF-funded Summit on Education for Secure Software, Washington, D.C., October 18 - 19, 2010.
- Election Recounts: Law and Practice, Panel presentation at Election Verification Network, Washington, D.C., March 2010.

Internet Voting: Formulating Structural Governance Principles for Elections Cybersecurity, presentation to the international conference ISGIG 2009: Second International Symposium on Global Information Governance, Prague, Czech Republic, Sept. 15-17, 2009.

Litigating Voting Technology Deficiencies, American Bar Association, Section on State & Local Government, Chicago, IL, March 21, 2009.

Keynote Address: Ignorance of Computer Security Science and Usability Engineering: The Public Costs, NSF-funded Living in the KnowlEdge Society Workshop, Villanova University, Villanova PA, March 19 - 21, 2009.

Lawyers' Roles in Election Administration Fairness, Proficiency and Accountability, COGEL: Council on Government Ethics Laws, Annual Conference, Chicago, IL, Dec. 9, 2008.

Statewide Voter Registration Database and Other Election Security Issues, Ohio Election Summit sponsored by the Ohio Secretary of State, Columbus, OH, Dec. 2, 2008.

Voting Technology: History and Litigation, American Bar Association, Section on State and Local Government Fall Meeting, Chicago, IL, Sept. 2008.

Litigation on Voting Technology Issues, Annual Meeting, American Bar Association, New York, New York, NY (program co-sponsored by 4 Sections and Councils), Aug. 8, 2008.

Technical Monitoring and other Post-TTBR Interim Strategies for Election Integrity, Electronic Voting Technology Workshop, USENIX Conference, San Jose, CA (panel with chief election administration officers of California, New York, and the federal Election Assistance Commission), July 27-30, 2008.

Trustworthy Elections? The Way Forward, Chautauqua Institution, Chautauqua, NY, in the week dedicated to Restoring Legitimacy to Our Elections, July 3, 2008.

Understanding Voting Technology Security Issues, Pew Charitable Trusts and Electionline.org conference for selected media representatives, Chicago, IL, Dec. 6, 2007.

The California TTBR Study of E-Voting Security Issues, ABA Standing Committee on Election Law, Washington, DC, Oct. 2007.

Working With Election Officials for Increased Transparency, National Post-Election Audit Summit, Minneapolis, MN, Oct. 2007.

Polling Locations Competence and Voting Technology Issues, NAACP Public Hearing on Voter Suppression and November General Election, Cleveland, OH, Nov. 14, 2006.

Ohio: A Crucible for Improving the Nation's Elections, Conference on Election 2006 and the Future of American Politics, Oberlin College, Oberlin, OH, November 10-12, 2006.

Federalism Issues in National Health Reform, 15th Annual Health Law Teachers Conference, sponsored by the American Society of Law, Medicine, and Ethics, et al., Indianapolis, IN, June 2-4, 1994.

Constitutional Impediments to National Health Reform: Tenth Amendment Hurdles, at the Conference on National Health Care Reform: The Legal Issues, sponsored by the Law-Medicine Center of Case Western Reserve University, Feb. 25-26, 1994.

Anti-Discrimination Protection and Disability Accommodation for the HIV-Infected Individual, at HIV: The Human Perspective Conference, Pennsylvania/New York AIDS Regional Education and Training Center, et al., Pittsburgh, PA, Nov. 12, 1989.

CONFERENCE & WORKSHOP LEADERSHIP

Panel Chair, Recounts, Election Accountability and Beyond, Election Verification Conference, George Washington University, Washington, DC, March 16, 2017.

Conference Committee, Annual Awards Chair, Election Verification Conference, George Washington University, Washington, DC, March 2016.

Panel Chair and presenter, Cross-Cutting Program: The Challenges of Internet Voting and New Election Technologies: Are Votes Counted as Cast?" at the 2012 Annual Meeting of the Association of American Law Schools, Washington, D.C., Jan. 5, 2012.

General Chair (of Program Committee and Organizing Committee), 2011 GTIP: Governance of Technology, Information and Policies Workshop (GTIP), co-located with ACSAC: Annual Computer Security Applications Conference, Orlando, FL, Dec. 6, 2011.

Program Committee member, 2012 and 2011 EVT/WOTE (Electronic Voting Technology /Workshop on Trustworthy Elections), co-located with USENIX Security Conference, Bellevue, Washington, August 2012; San Francisco, CA, August 2011.

Program Committee member, 2010 GTIP Governance of Technology, Information and Policies Workshop (GTIP), co-located with ACSAC: Annual Computer Security Applications Conference, Austin, TX, Dec. 7, 2010.

SELECTED GUEST EDITORIALS (OP-EDS) & BLOG POSTS

Pennsylvania's Voting Systems, Pittsburgh Post-Gazette, Dec. 12, 2018.

Election Integrity: Missing Components to Remedy, The Hill, Nov. 8, 2016. <http://thehill.com/blogs/congress-blog/technology/304835-election-integrity-missing-components-to-remedy>

The Quest for Cyber Resilience- Not Mere Security, <http://achievingcybersecurity.org/category/resilience>

Constitutional Obstacles to National Health Reform, In Brief, Jan. 1, 1994.

BAR ADMISSIONS & PROFESSIONAL CERTIFICATIONS

Admitted to practice

U.S. Court of Appeals for the First Circuit, 1985.

U.S. District Court for Massachusetts, 1985.

Massachusetts, 1984.

Certifications

CIPP/US, by the International Association of Privacy Professionals, 2014 - present.

EDITORIAL BOARDS AND REFEREE FOR BOOKS

Co-Founder & Co-Editor, SSRN LSN Cybersecurity, Data Privacy, & e-Discovery Law & Policy e-Journal, 2015-present.

Editorial Board Member, JETS: Journal of Election Technologies, 2 volumes, 2013, 2014.

Evaluated election-related articles for Publius, intermittently 2005-08.

Evaluated articles for the Election Law Journal, intermittently 2006-10.

Evaluated proposed text in Employment Law for LexisNexis, 2001.

Evaluated proposed treatise published as Erwin Chemerinsky, Constitutional Law, Aspen, 1997, 2002.

Evaluated proposed text on Feminist Jurisprudence for Aspen, 1992.

Evaluated proposed casebook, Sullivan, Calloway, and Zimmer, Employment Law, 1992.

PROFESSIONAL ASSOCIATIONS

International Association of Privacy Professionals

ACM - Association of Computer Machinery

NGO ADVISORY COMMITTEES AND BOARDS

Member, Board of Directors, League of Women Voters-Florida, November 2019 - June 2020; Election Security Advisor to the Board, June 2020- present.

Member, Board of Directors, Verified Voting Foundation 2007-10; Chair, Capacity Building and Development Committee, 2009-10; Advisory Board, 2010-present.

Northeast Ohio Cybersecurity Consortium (comprised of major corporations, universities, hospital systems, regional Federal Reserve Bank, and other entities). Chair, Committee on Workforce and Economic Development, 2015-16.

Member, Standing Committee on Election Law, Advisory Commission, American Bar Association, three terms, 2007- 10.

Member, Advisory Board, Florida Voters Coalition, 2007-12.

Member, Advisory Board, Richard Austin Election Center, Michigan 2007-10.

MEDIA

Commentator on election cybersecurity, election law and administration, Internet of Things cybersecurity and privacy / data protection, for broadcast and print media including National Public Radio (*All Things Considered*, *Morning Edition*, *Weekend Edition*), CNN, NBC, FOX National, CBS-TV, *New York Times*, *Boston Globe*, *Los Angeles Times*, *Washington Post*, *Wall Street Journal*, *San Jose Mercury News*, *The Guardian*, *New York Daily News*, *San Francisco Chronicle*, *Columbus Dispatch*, *Cleveland Plain Dealer*, *La Presse* (France), AP National and Ohio, *Toledo Blade*, *Cincinnati Inquirer*, *Cleveland magazine*, *McClatchy*, *The Hill*, POTUS XM Radio, NPR affiliates for Los Angeles, San Francisco, Akron-Canton, Cleveland, Columbus-OSU, Memphis, Louisville, Baltimore and others; local TV affiliates for NBC, FOX, and ABC; and *Marketplace*.

CONTRACT & GRANT SUPPORT

EXTERNAL

FOUNDATION

National foundation consortium, to provide strategic leadership of national, state and local nonprofits working in Ohio 2008 election cycle to achieve successful, fair election administration (recruited by the foundations); included Carnegie Corporation, Open Society Institute, Rockefeller Brothers, Quixote, Tides, and Democracy Alliance. Grantee: Center for Election Excellence, 2008.

FEDERAL

U.S. Election Assistance Commission (EAC) to the CSU Center for Election Integrity (Abigail Horn, P.I., Candice Hoke, Center Director) to evaluate and develop best practices for recruiting and training college poll workers, published as http://www.eac.gov/assets/1/Page/A_Guidebook_for_Recruiting_College_Poll_Workers.pdf.

INTERNAL UNIVERSITY

Faculty Research & Development Grant for scientific investigation: The Significance of Human Factors in Cyber Risk Assessment Tools, 2016-17.

Numerous legal research grants.

GRADUATE & PROFESSIONAL COURSES TAUGHT

Cybersecurity & Privacy Protection I

Data Protection and Privacy Law

Employment Law

Constitutional Federalism/Structural Constitution

Federal Jurisdiction

Regulatory Law

Election Law

Unincorporated Business Associations

Administrative Law

Civil Procedure

SUPERVISOR OF GRADUATE RESEARCH PROJECTS (SELECTED)

- Regulation of Security and Privacy Vulnerabilities in Autonomous Vehicles
- Effective Regulation of Supply Chain Risks for U.S. Cybersecurity Policy Objectives
- Educational Methods for Reducing Police Violence Toward Racial Minorities
- Building Security In vs. Building in Backdoors: Assessing Regulatory Alternatives
- Regulatory Approaches for Reducing Seismic Activity Correlated with Fracking

UNIVERSITY SERVICE

SELECTED ACADEMIC SERVICE

Executive Committee, Yale Law School, four-year term, 2007-10.

CURRICULAR AND EDUCATIONAL PROGRAM DEVELOPMENT

M.S. in Cybersecurity: led inter-college workgroup to develop interdisciplinary M.S. degree with 5 concentrations, Cleveland State University, 2015-16.

First-year law school curriculum, to introduce Legislative & Regulatory law into core coursework, 2009.

UNIVERSITY COMMITTEES & TASK FORCE WORK

Cleveland State University includes:

Faculty Senate Academic Computing Committee (formerly chair)

Member, CSU Administration's Information Technology Advisory Committee, which included business interruption and contingency planning

PERSONAL

Orlando, FL resident; one son; spouse (University of Pittsburgh law professor *emeritus*).