

ELECTORAL MATTERS COMMITTEE

Inquiry into the Conduct of the 2022 Victorian State Election

Melbourne – Friday 11 August 2023

MEMBERS

Will Fowles – Chair

Evan Mulholland – Deputy Chair

Brad Battin

David Ettershank

Sam Hibbins

Emma Kealy

Nathan Lambert

Lee Tarlamis

Emma Vulin

WITNESS (*via videoconference*)

Associate Professor Vanessa Teague, Thinking Cybersecurity and Australian National University.

The DEPUTY CHAIR: I declare open the public hearings for the Electoral Matters Committee Inquiry into the Conduct of the 2022 Victorian State Election. All mobile telephones should now be turned to silent.

I would like to begin this hearing by respectfully acknowledging the Aboriginal peoples, the traditional custodians of the various lands each of us is gathered on today, and pay my respect to their ancestors, elders and families. I particularly welcome any elders or community members who are here today to impart their knowledge of this issue to the committee or who are watching the broadcast of these proceedings.

I am Evan Mulholland, Member for Northern Metropolitan Region. The other members of the committee that are here today are –

Nathan LAMBERT: Nathan Lambert, Member for Preston.

Lee TARLAMIS: Lee Tarlamis, Member for South-Eastern Metropolitan Region.

Sam HIBBINS: Sam Hibbins, Member for Prahran.

Brad BATTIN: Brad Battin, the Member for Berwick, online.

The DEPUTY CHAIR: I welcome Ms Teague, who is here today.

All evidence taken by this committee is protected by parliamentary privilege. Therefore you are protected against any action for what you say here today, but if you go outside and repeat the same things, including on social media, those comments may not be protected by this privilege.

The committee does not require witnesses to be sworn, but questions must be answered fully, accurately and truthfully. Witnesses found to be giving false or misleading evidence may be in contempt of Parliament and subject to penalty.

All evidence given today is being recorded by Hansard and is also being broadcast live on the Parliament's website. You will be provided with a proof version of the transcript for you to check as soon as possible. Verified transcripts, PowerPoints and handouts will be placed on the committee's website as soon as possible.

I invite you to proceed with a brief 5-minute opening statement to the committee, which will be followed by questions.

Vanessa TEAGUE: Thank you. Good afternoon. My name is Vanessa Teague. I am a cryptographer with a special interest in the technical details of securing elections. I am not a political scientist or a social scientist; I am a geek and I understand about securing electoral processes with computers. I live in Victoria. I am a Victorian voter and have been for many years. In fact I think I have been making submissions to this inquiry for about 15 years, which have mostly said the same thing.

I think it is important for the committee to remind yourselves of Victorian elections actually being pretty good, right? Australian elections are actually pretty good compared to the rest of the world – I mean, the United States at the moment – and Victorian elections are actually pretty good compared to the other states. We have a huge number of voters who vote on paper and whose votes are processed through a highly transparent and trustworthy process. This is a good thing. And we notably have not had the stuff-ups that we have seen in other states. For example, the ACT miscounted – they got the right people elected, but they got the wrong numbers in the distribution of preferences. We have not seen that kind of thing here. You know that the New South Wales local government elections suffered a substantial electoral failure following on from the unreliability of the iVote system. I believe, although I am not a historian, that it is the worst electoral failure in Australian history, both in terms of the number of people disenfranchised, which I think was upwards of about 10,000, and in terms of the number of elected positions that were left in doubt as a consequence, which was probably 30 or 40-ish.

We have not had any of that. We have basically had a series of well-run, dull elections, and dull is a good thing when it comes to election conduct compared to what it could be. However, there is always scope for improvement, and our submission details some strong recommendations for improving the integrity of Victorian electoral processes. And when I say improving integrity, I really mean making it harder to fiddle the votes and making it clearer to the public that it has been hard to fiddle the votes. We are pretty good, but we are not perfect.

The main thing that I want to talk about is instituting an audit of the paper ballots that are digitised and electronically counted, and it is probably the case that most Victorians do not actually realise that their Legislative Council ballot, in particular, is actually mostly not counted by hand. It is digitised and then counted electronically, which introduces a cyber risk at the point where the data moves from the paper realm into the electronic realm and gets counted. We have seen at a federal level recent legislation mandating that the Australian Electoral Commission after their Senate counting process, which is pretty similar to our Victorian Legislative Council counting process, conduct an audit of some randomly selected paper ballots and compare them to their corresponding digital record in order to estimate the overall error rate. There is a report about that in the case of the Senate that is openly available online. I believe very strongly that we need to mandate an equivalent process in Victoria. That would require publishing the digitised preferences, which at the moment the VEC does not do. They would need to be published and then there would need to be a scrutineer-visible, randomised selection process to compare those published digitised preferences against the paper ballots. That becomes particularly important given the discussion about reforming the voting process to allow above-the-line voting, because it is a good thing – people will be voting in a more expressive way if you choose to adopt that reform – but it also means that the first preference count contains less information about how the votes are going to figure out, how the seats are going to come out, and the importance of accurately recording all of those preferences rises.

So those are really my two things: number one, do not do what New South Wales did and mess up, throw integrity away in the name of convenience and vote over the internet; and number two, do what the federal Parliament did and mandate an audit of the paper ballots for the Legislative Council count.

The DEPUTY CHAIR: Thank you so much for your insights and expertise in providing this to the committee. I want to ask about the part of your submission that talks about the email PDF voting system and telephone voting systems that we have in place in Victoria, if you could talk to us about what you see are the issues and whether there are alternative models that we can look at from other states that might find better solutions to address disability concerns and overseas voters.

Vanessa TEAGUE: Yes, that is a really good question. There are two issues: the lack of a secret ballot and the ease of manipulation, and both of those systems represent serious problems for both of those issues. I mean, both of them are essentially voting over the internet, and they come with all the risks that voting over the internet comes with. There is a risk that the person sending the email or calling up on the phone is not who they say they are, and although that risk exists somewhat in a polling place and in the post, it is a lot harder to detect and a lot easier to attack at scale when we are talking about doing it over the internet.

There is obviously a risk to the secret ballot, which I think is intuitively obvious to everybody, but most importantly there is a risk to the alteration of the result. I mean, email is not a secure method of transferring data anywhere. There is a risk that intermediaries along the email train alter the contents of that ballot. And even with the phone voting: even though there is a person sitting there, there is still not really any evidence that the audio is being accurately transcribed. So none of those systems really meet the privacy or integrity requirements that we would like to see.

I think there are different, better alternatives for different groups of voters. If we are talking about people with disabilities and other special needs who are here in Victoria, then a computerised voting experience in a polling place that prints a voter-verifiable paper record is a much better solution for many people. It may not be a more convenient solution, but it is a solution that gives them some evidence that their ballot is what they wanted. And if we are talking about people who are able-bodied and living overseas, then I think rather than the two-stage postal voting solution, a much better solution would be to allow those people to download effectively blank ballots, fill them in and mail them back, because then you do not have to wait for the mail to go all the way out and come all the way back; you just have to wait for one direction.

The DEPUTY CHAIR: Yes. That is very interesting about, particularly, overseas voters. I had a lot in my electorate that had issues with that, so that is quite insightful. That is all from me for now, but I might go to Mr Lambert.

Nathan LAMBERT: Thank you, Deputy Chair, and thank you, Associate Professor Teague, for your submission. I was pleased to see some object-oriented programming in there, which I had not expected to see in a submission to this committee. Turning to that actual reference, when you talk about static class variables in the code that generates the random seed, is there not an easier solution there – just to, like, roll a dice?

Vanessa TEAGUE: Yes. Okay. I was not going to talk about this, but since you asked, this is another thing that I have been on about for about 15 years. Yes, they should be just rolling dice. I do understand – and I have argued with the VEC directly about this specific issue – why they want to do it with a computer. They will have all this fancy software for taking the output of that process and then auto-generating all of their ballots and everything, which is fine. But the thing that is wrong with their current process is transparency, because you can look at that code and say, ‘Oh yeah, that looks like a random number generator’ – that is fine – but that is actually not the same as looking at the screen when they run the code and knowing whether or not that code is running. Although the new code is much better than the old code, for reasons that we can probably skip right now, unless you want to know, it still has not solved, as you say, this problem of transparency. If they were rolling dice, you would be able to see that the specific example that got written on the ballot today was the result of a random process that you had watched. With the computerised version there is no equivalent to that, and although looking at the code is better than not being able to look at the code, you still do not actually know for sure that that output printed on the screen came from properly running that code.

The compromise that I have suggested for many years, which is commonly used in the United States for risk-limiting audits, is that they have their code, and their code rather than taking the random seed from the random generator inside the computer instead takes a random output from some dice that people can roll in the election centre. So scrutineers or candidates or anybody could go into the election centre, roll some dice and then input the result of that dice roll into the program, and the program could then pseudo-randomly generate the candidate draw from that randomness. That is much better, because then everybody can double-check that pseudo-random draw and we can all see that it was actually randomly chosen.

Nathan LAMBERT: Yes. I think of TrueCrypt back in the day where you could just scribble a mouse on the screen and run a random generator off that. At least it would be in the moment and people could watch it. It is probably easier to just roll the dice and then enter the data. I certainly take your general point. We know that information technologies are fantastic because you can store data microscopically and change it in an instant, but of course with elections that is a very significant downside, because people like to cheat in elections and always have, and they can cheat easily online. I was just wondering – we have talked for a long time about finding a way to solve the problem of not being able to observe data that is sitting on a chip. There was a lot of talk a few years ago about how a blockchain would solve this problem. Some of us were sceptical about that. I just thought I would check in. Have there been any developments on that front? Did any of it manage to solve the problem?

Vanessa TEAGUE: It solves a problem but not all of the problems. It potentially gives you a public transcript of the votes, right – in the ideal. There are two things about that. One is that the actual blockchain implementation is going to have some assumptions about how many people control how much of the work or stake or whatever. But, more importantly, it does not really solve any of the inherent problems with internet voting. I can put my ciphertext up on the bulletin board or blockchain or whatever, but we still lack a good usable protocol for people to be able to get evidence that their vote accurately reflects their intentions without them then being able to use that proof to sell their vote to somebody else. The combined difficult properties of (1) giving you proof of what your vote is and (2) making it hard for you to prove to somebody else that you voted in the way that they wanted are two things we do not simultaneously know how to do.

Nathan LAMBERT: Yes. And perhaps just one final quick question, if I can, Deputy Chair. It is just really interesting. It seems like a very good idea about the audit of the upper house ballots, which addresses something that has been a concern for exactly the reasons we have discussed, but I just wonder, would you extend that? We now do computerised rechecks of lower house ballots as well. It is a slightly different set of circumstances, but would you extend the process to that?

Vanessa TEAGUE: Yes. Yes, I would. I was actually just reading that before this hearing. I did not know about that until half an hour ago. Absolutely. Yes, you would. Interestingly enough, this is actually a research problem that I worked on with a team of people at the University of Melbourne when I used to work there. Michelle Blom, Peter Stuckey and I developed a whole series of techniques for risk-limiting audits for preferential elections with one seat. We still have not actually cracked the problem for the multiseat case, but for the single-seat case we have rigorous, open, efficient algorithms for auditing that process with a very specific security guarantee, which is the following: if the election result is wrong, then you can choose a failure probability arbitrarily – let us say 2 per cent – and you can audit until you are confident that, if you have had the wrong result, you would not have certified the election except with 2 per cent probability or whatever small probability you chose. I am actually now in the United States visiting Colorado, because Colorado wants us to implement algorithms for their risk-limiting audits, because they are adopting preferential voting. So here, this is actually exactly the technique to use, and it is a sensible use of computers, right. It is a good way of using computers to increase the efficiency of the electoral process without throwing integrity away.

Nathan LAMBERT: Got you, yes. Thank you.

The DEPUTY CHAIR: Mr Hibbins.

Sam HIBBINS: Thank you, Chair. What is the error rate generally found when there is an audit of ballots in other jurisdictions?

Vanessa TEAGUE: So in Victoria we do not know. In the Senate it varies greatly depending on the size of the ballot paper. For example, for ACT Senate ballots it is like 0.2 per cent or something because there are not very many candidates on an ACT Senate ballot. It is a simpler kind of a ballot, as Senate ballots go. For Victorian Senate ballots it is more like about 0.7 or 0.8 per cent, which is actually large. You know, that is kind of getting up to the point where you want to be going back and checking that they were not the errors that disadvantaged somebody who narrowly lost.

Sam HIBBINS: Yes. Do you know if that has led to any changes within the vote-counting process?

Vanessa TEAGUE: At the AEC?

Sam HIBBINS: Yes.

Vanessa TEAGUE: I do not know. This was the first year that they had to do that audit, so the legislation is very new. So I guess we will see whether they change anything the next time around.

Sam HIBBINS: Yes. And just in terms of recommendation 2 – publishing the full digitised preference data for the Legislative Council elections – I think you have referenced other jurisdictions. What is not being published now?

Vanessa TEAGUE: The AEC and the ACT Electoral Commission and the NSW Electoral Commission all publish the complete preference data. So you fill out your ballot – your Legislative Council ballot, let us say – in New South Wales. You write a series of numbers in a particular order and you put them on a piece of paper. All of that data gets published. So if we want to re-count the New South Wales Legislative Council election, we download the data and redo the count, and similarly in the ACT and similarly –

Sam HIBBINS: The individual ballots?

Vanessa TEAGUE: The individual ballots. Victoria does not do that. The argument is a privacy argument, which has some merit; it is not a non-argument. But I think the balance is wrong, because it means that it is impossible to recheck the count. It does not make any sense to do an audit if you do not have a kind of thing that you are counting to audit against.

Sam HIBBINS: Thank you. Thanks, Chair.

The DEPUTY CHAIR: I believe Brad Battin does not have any further questions to add. Mr Tarlamis.

Lee TARLAMIS: Associate Professor Teague, it is good to see you at another one of these hearings. I guess, with regard to electronic voting, we still constantly from time to time get an argument from people

saying, 'I don't understand why we can't vote electronically. We can do our banking and we can do so many things electronically, and it works in New South Wales.' With the iVote system, you spoke about one of the instances of the New South Wales iVote system. Can you tell us what other issues they have had associated with the time that they have been using iVote as well? Because there are still people who kind of hold that up as the model that people should be moving towards, but I do not think there is an appreciation of what has happened there.

Vanessa TEAGUE: I think for one thing it is important to remember that some of the media reports were quite inaccurate. Some of the media reports mentioned disenfranchisement numbers of maybe 50 or 100 people. That is just not true. I added up the NSW Electoral Commission's numbers about how many voters were disenfranchised in each local government area. The total is about 10,000. It is hard to tell exactly because it is hard to tell exactly how many people eventually got to a polling place anyway, but it was a large electoral failure. Thousands and thousands of people were unable to vote as a consequence of iVote's downtime, and I do not think that is fully appreciated. That was not emphasised or accurately represented in the media reports at the time.

Also, although only three local council elections were re-run under the orders the Supreme Court, our analysis – again, just taking those New South Wales numbers of how many people had been disenfranchised in each local government area and comparing them to the electoral margins for each of those local councils – found nearly 40 local councils in which the number of people who appear to have been disenfranchised was enough to have flipped at least the last seat in that council. Now, that does not mean that they did, because we do not know how those people were intending to vote, but there certainly could have been an argument made that another 30 or 40 councils also deserved to be re-run. We do not know for sure because we do not know how many of those people got into a polling place and voted anyway, but I do not think the magnitude of that electoral failure has been fully and clearly communicated in the media. It was not 50 or 100 people disenfranchised that messed up three councils; it was thousands and thousands of people disenfranchised, probably upwards of 10,000 people disenfranchised, leaving probably 30 or 40 local council results in doubt. But that is actually not the worst thing about iVote. That is not the worst thing about iVote by a long way. The worst thing about iVote is that even if everything seems to go okay, you do not actually have any evidence the election result is accurate. That has been, to me, the primary concern all along – not that it would go down, but that it would seem fine but not in fact provide adequate defence against manipulation. Although there were various promises at various times that there were certain kinds of verification, the truth is that they were broken, really. The most recent version of iVote's verification mechanism consisted of downloading an app from the same company that had made the voting system. So if you did not trust the company that made the voting system, you could download their app and ask them whether they had encoded your vote correctly, and if they said yes, then that was it; you had to go home happy. To me, the real problem is the total lack of opportunity for voters to verify that their vote is the one they wanted and for scrutineers to verify that whatever ends up in the count is the accurately recorded intentions of eligible voters.

Lee TARLAMIS: Thank you. In terms of the systems that provide that verifiable proof that the vote that you have put in comes out, I recall – it must have been around 2012, 2013 – the committee actually had an opportunity to see one of the voting machines in operation, where you could cast your vote in a voting centre on a standalone machine. Where you cast your vote, it could have overlays in terms of language and things like that to help people cast their vote, and once you had completed your vote it produced a card, which you could then look at and say, 'Yes, that is the vote that I put in,' and you could put that in the box. One of the benefits of this also was that come 6 o'clock on election night, you could press a button and get a result, but you also had that paper backup to verify against, so it just sorted out a number of issues. We are talking about 2012, 2013. I am sure those machines have come along and advanced many stages as well. Is that something that you think should be considered for rolling out at some or all polling places?

Vanessa TEAGUE: Yes. I agree very strongly with that. I think that is a really good model. That is a model that solves a lot of issues for a lot of people without throwing integrity away. I actually did a lot of work on that project, the Victorian open-source project, which ran during the Victorian 2014 state election, by the way. I completely agree. It is an intelligent use of computers in a way that does not throw away integrity or privacy.

Lee TARLAMIS: Thank you.

The DEPUTY CHAIR: Are there any other questions from the committee?

Nathan LAMBERT: I will just jump in with one. It is slightly outside of what you have submitted on, but I was just wondering. Antony Green referred in his submission to some challenges with legacy systems at the VEC. Do you have any familiarity with their systems?

Vanessa TEAGUE: No. I did not hear what he said, sorry.

Nathan LAMBERT: He was just reflecting that aspects of their IT system are outdated and thus made it hard to implement changes, whether they are for reasons of cybersecurity or for even more basic reasons of assisting the count. That is all right. I just thought if you had some familiarity with those systems, I would have had a few more questions. But if not, I am very happy to hand back to you, Deputy Chair.

The DEPUTY CHAIR: Thank you. Are there any other questions from the committee? I would very much like to thank you, Associate Professor Teague, for sharing your insights and expertise with the committee as we go about reviewing the Victorian 2022 state election and possible reforms, to input into our report. The committee passes on its thanks to you for your submission and for your witness testimony today.

Vanessa TEAGUE: Thank you for having me, and any more questions are always welcome.

The DEPUTY CHAIR: Thank you. I will declare the meeting closed.

Witness withdrew.