From voting theory to public elections

Lessons from approval voting, and the first US approval election with ballot-level records.

34,945
ballots

48,908
approvals

1.4
approvals per ballot

Felix Sargent

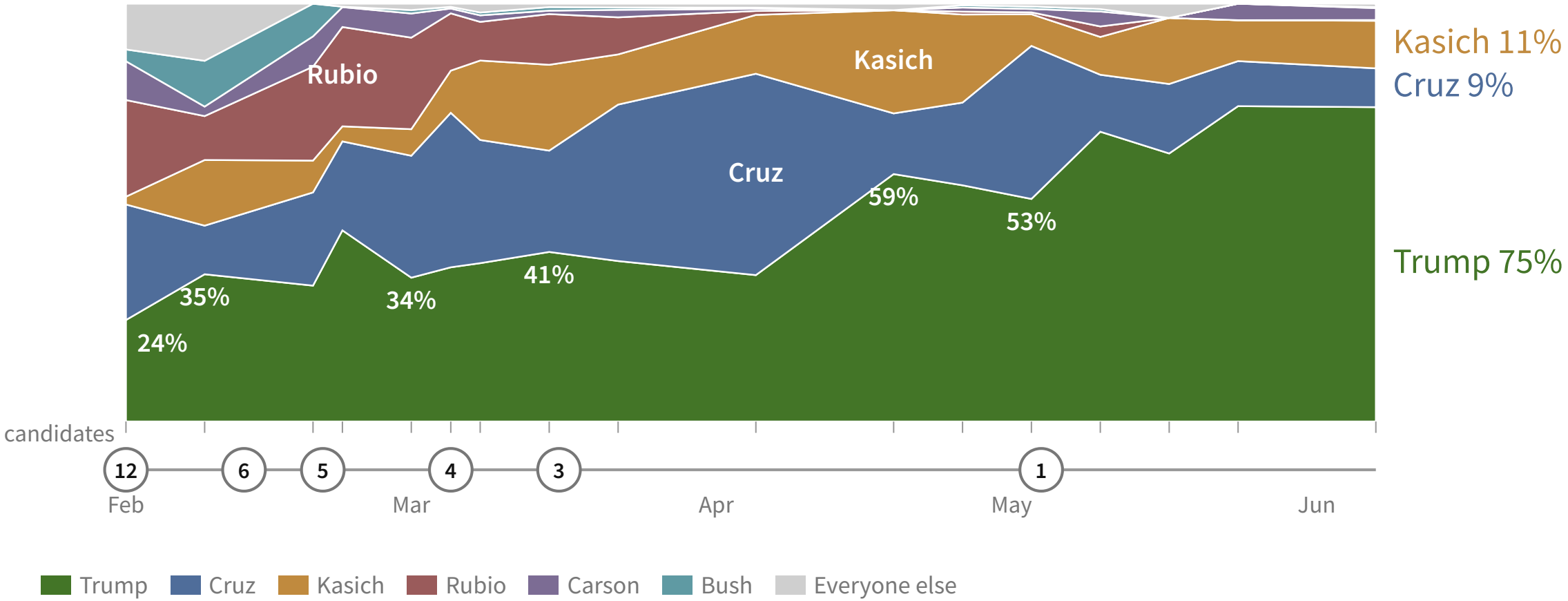
Economics and Computation Seminar · University of Oxford · 13 November 2026

From carbon taxes to ballots

- **Economics, San Francisco State.** Game theory, in a department focused on environmental economics and carbon taxes.
- **Varsity debate.** Years of arguing over which policy was right.
- **Software engineer, then engineering manager.** The job is root cause: treat it as a system and find the bug, not the symptom. Now at Snyk.
- **Center for Election Science.** Joined the board in 2017; board chair for five years from 2018.
- **approval.vote, ranked.vote, stv.vote.** Public reports built from official results and cast vote records.

> We could design the right policy. Getting it adopted was the hard part, and the voting rule decides who gets to adopt it.

2016: a third of a split field was read as support



Seventeen candidates entered. By 15 March Trump had **37.1%** of the votes and a delegate lead nobody overturned.

2016 Republican primary results · vote share by date, same-day contests pooled · omits PR, VI, DC, WY (under 50,000 votes) and conventions

2016–2017: an explainer, then a phone call

2016

Nicky Case, *To Build a Better Ballot*. An interactive guide to vote splitting and the alternatives. Approval looked like the simplest fix.

2017 · MY WEDDING

“You’re into this voting reform thing.” My wife’s cousin offers an introduction to Aaron Hamlin of the Center for Election Science, which is looking for board members.

2017 · HONEYMOON, ST. LUCIA

Two hours on the phone with Aaron. I join the CES board, and become chair in 2018.

DECEMBER 2017

Open Philanthropy’s first major grant to CES. About $600,000 of general support. Enough to fund a real ballot campaign.

Fargo: the first city to adopt approval voting

APRIL 2015

A six-candidate race for one commission seat. Tony Gehrig wins with 21.8% of ballots.

2016 – 2017

A city task force recommends approval voting. Jed Limke is a member. In December 2017 the commission declines to put it on the ballot.

NOVEMBER 2018

Reform Fargo's citizen initiative, Measure 1, passes with 63.5%. Local campaign by Jed and volunteers, with CES funding.

JUNE 2020

First approval election in the United States.

2023 – 2025

North Dakota bans alternative voting methods. The governor vetoes a first ban in 2023; a second becomes law in 2025, aimed mainly at ranked choice.

How St. Louis got here

MARCH 2017

Choose-one Democratic mayoral primary. Lyda Krewson wins with 32.0% in a seven-candidate field.

2019 – 2020

Local reformers approach CES. They had looked at ranked choice, but it would have meant new voting machines. Approval works on the ones the city has.

NOVEMBER 2020

Proposition D passes with 68.1%. Nonpartisan approval primary, top two to a runoff.

MARCH 2021

First approval primary. 1.6 approvals per ballot. Tishaura Jones elected mayor in April.

MARCH 2025

Second approval primary. The Board of Election Commissioners releases the cast vote records. This talk.

Sources: 2017 primary · Prop D · 2021 primary · STL Approves

From a paper to a ballot: four practical questions

1

Is it legal?

Fargo and St. Louis could change their own election rules by ballot measure. North Dakota then banned alternative voting methods in 2025, a ban aimed mainly at ranked choice.

2

Who will carry it?

Local campaigners with contacts and credibility, plus outside money for the campaign. Measures passed with 63.5% and 68.1%.

3

Which design?

Approval runs on existing machines, which decided St. Louis. Then the details: top-two runoff or not, and how percentages are reported.

4

What counts as success?

Winners with broader support, more candidates, voters using the ballot. You can only check if administrators release usable records.

One ballot, two rounds

Mayor · vote for as many as you approve of

- [x] Cara Spencer
- [ ] Tishaura O. Jones
- [x] Michael "Mike" Butler
- [ ] Andrew Jones

Illustration, not the official form

4 MARCH 2025 · PRIMARY

Approve any number of candidates.

Each approval counts one vote for that candidate. The two highest totals advance.

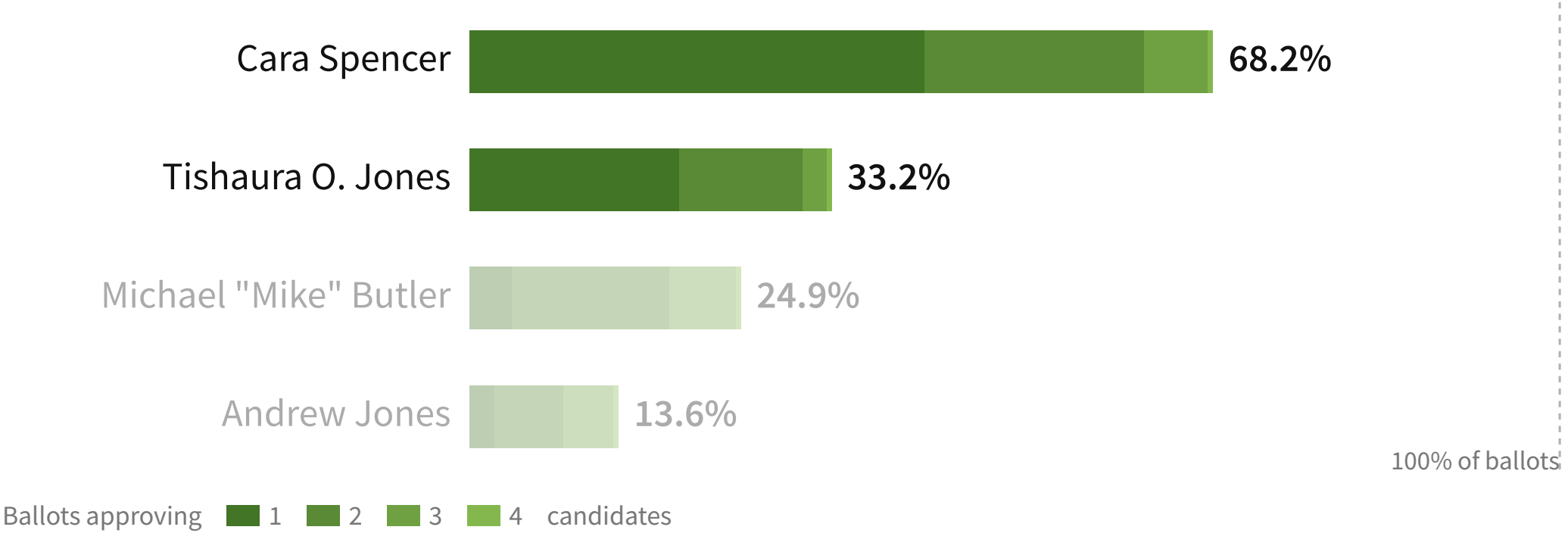
↓

8 APRIL 2025 · GENERAL

Choose one of the two.

Cara Spencer 64.2% · Tishaura O. Jones 35.8%

Mayor, 4 March 2025



There were **34,945** ballots, with **48,908** approvals: an average of **1.4** approvals per ballot. Spencer and Tishaura O. Jones advanced.

Cast vote records

A cast vote record (CVR) is an electronic record of the selections recorded on one ballot.

Ballot	Spencer	T. Jones	Butler	A. Jones
A	1	0	1	0
B	1	0	0	0
C	0	1	0	1
D	1	1	1	0

EXPORT
Hart Verity XML, one file per ballot, every contest

↓

PARSE
Ballot × contest × selection tables

↓

AGGREGATE
Totals, approvals per ballot, co-approvals

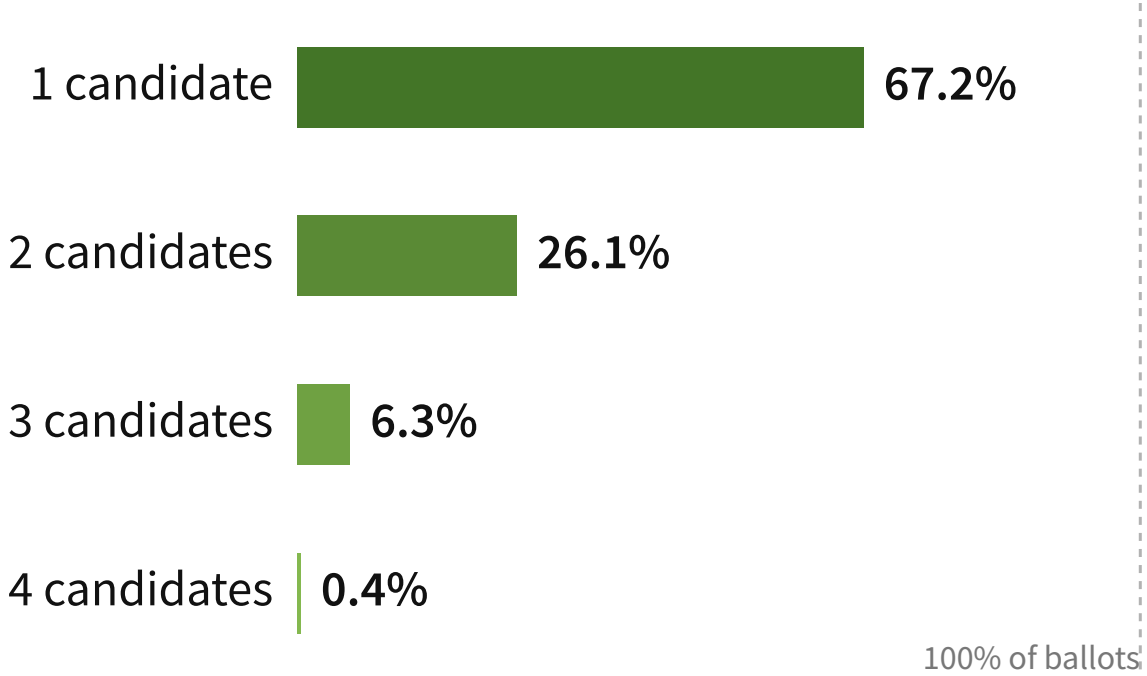
Illustrative rows: 1 = approved, 0 = not approved. The real export also covers the Comptroller and two Aldermanic contests.

Approvals per ballot

32.8%

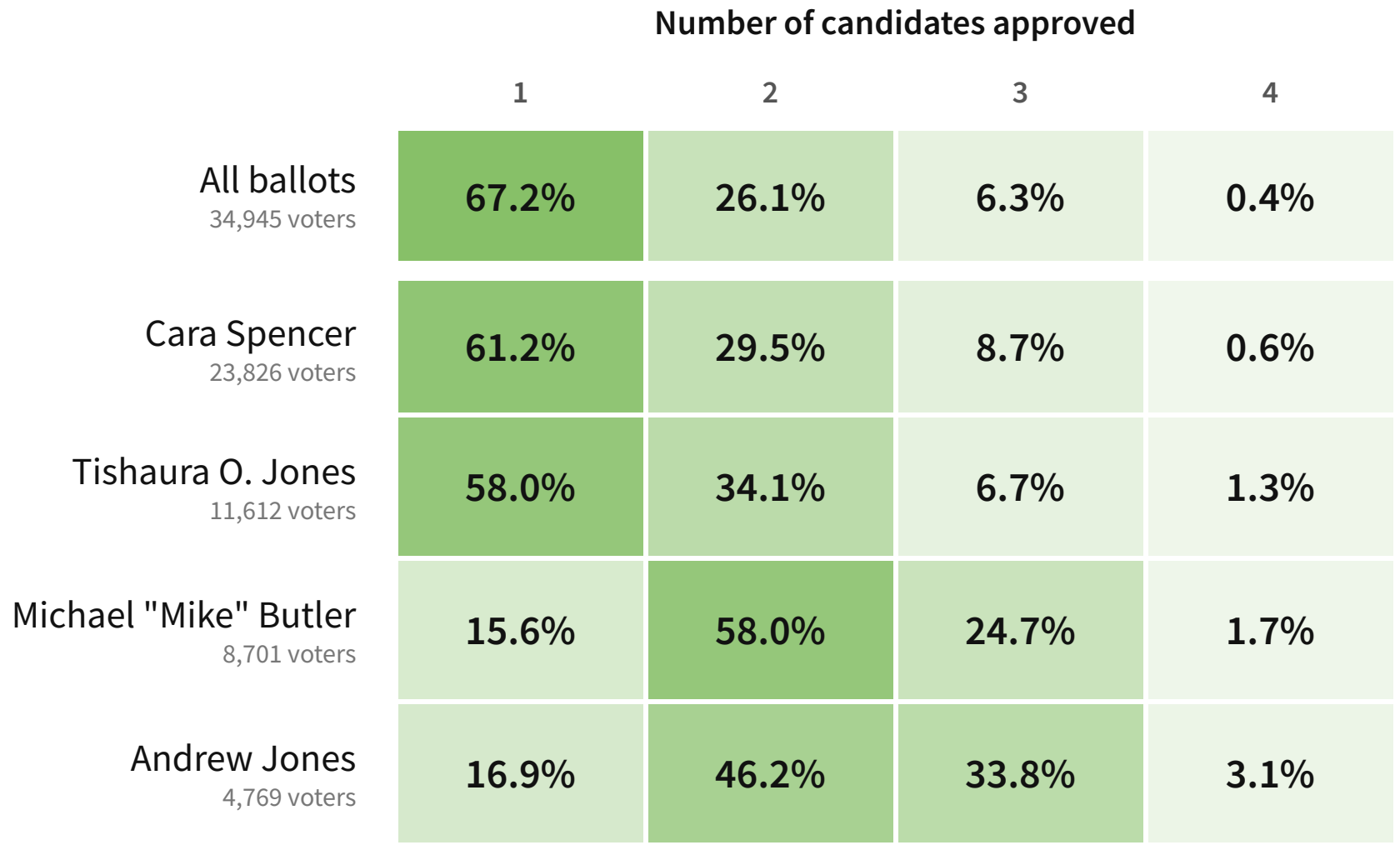
of ballots approved more than one candidate

11,463 of 34,945

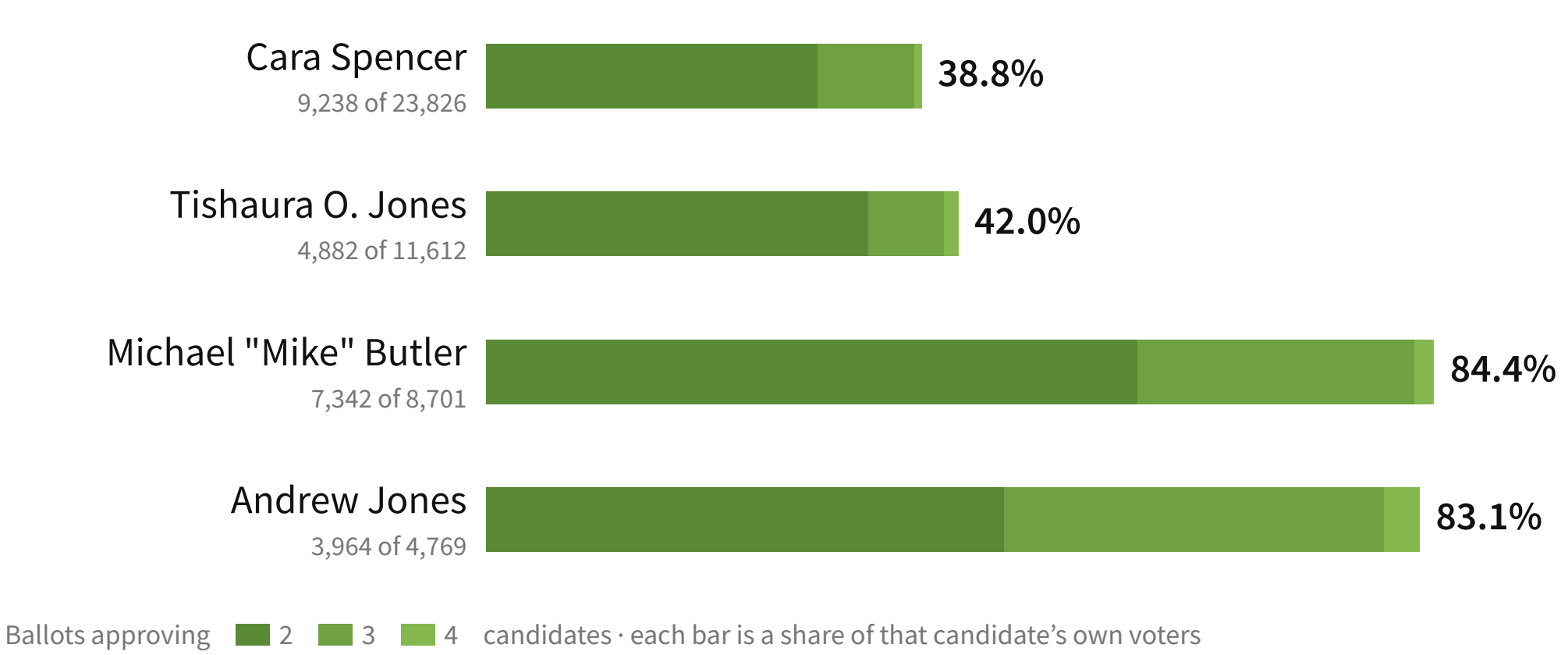


1: **23,482** · 2: **9,113** · 3: **2,200** · 4: **150**

Approvals per ballot, by candidate



Voters who approved more than one candidate, by candidate



Co-approval matrix

	Also approved			
Approved	Spencer	T. Jones	Butler	A. Jones
Cara Spencer 23,826 voters	—	**13.1%**	**22.1%**	**13.4%**
Tishaura O. Jones 11,612 voters	**26.9%**	—	**20.1%**	**4.3%**
Michael "Mike" Butler 8,701 voters	**60.6%**	**26.9%**	—	**25.1%**
Andrew Jones 4,769 voters	**67.1%**	**10.4%**	**45.7%**	—

approval.vote/report/us/mo/st_louis/2025/03/mayor · 34,945 ballots with at least one mayoral approval · of the voters who approved the row candidate, the share who also approved the column candidate

2,180 ballots approved both Butler and Andrew Jones

as a share of Andrew Jones's voters

45.7%

2,180 of 4,769

as a share of Butler's voters

25.1%

2,180 of 8,701

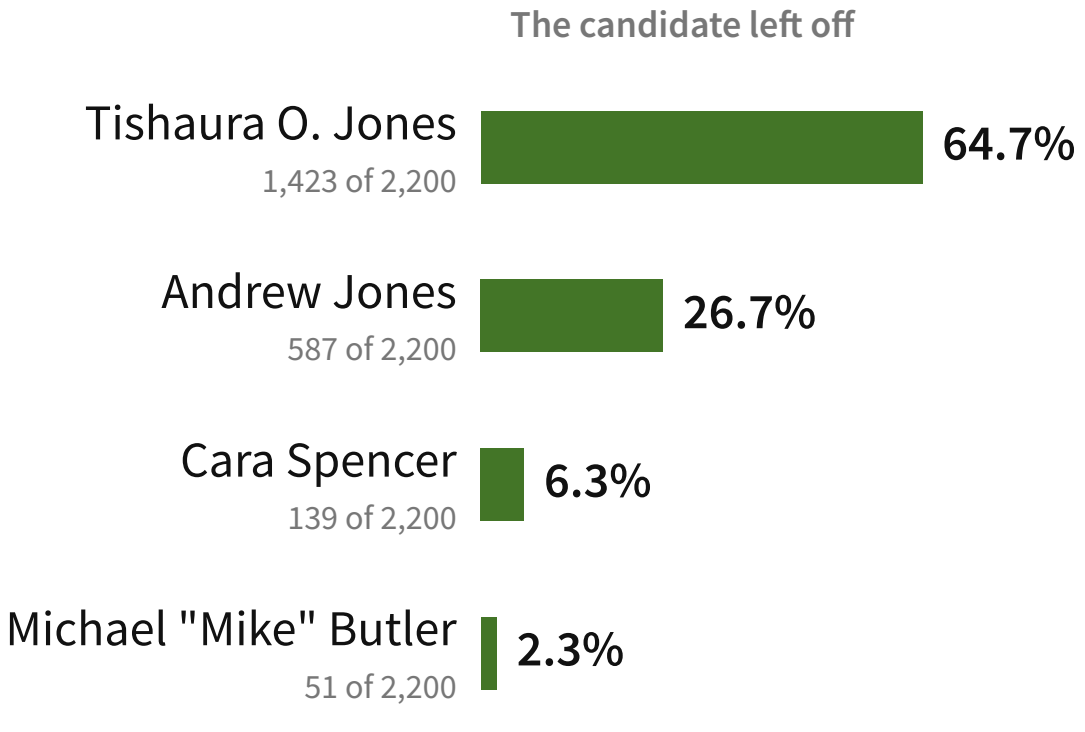


Ballots that approved three of the four

2,200

ballots approved all but one candidate

6.3% of 34,945



As a share of all ballots: T. Jones **4.1%** · A. Jones **1.7%** · Spencer **0.4%** · Butler **0.1%**

What the records show, and what they don’t

In the record

- Which candidates each ballot approved
- How many candidates each ballot approved
- Which approvals sat on the same ballot
- The same for every other contest on that ballot

Not in the record

- Which approved candidate the voter liked best
- Where the voter drew the line, or why
- Whether a second approval was sincere, tactical, or both
- What the voter would have done under another rule

The public dataset

RAW

Hart Verity cast vote record export, as released by the Board of Election Commissioners

↓

SCRIPTS

XML-to-SQLite parser and an end-to-end pipeline

↓

DERIVED

Candidate totals, co-approvals, approvals per ballot, anyone-but counts

↓

OUTPUTS

The approval.vote report, the working paper, and every chart in this talk

34,982

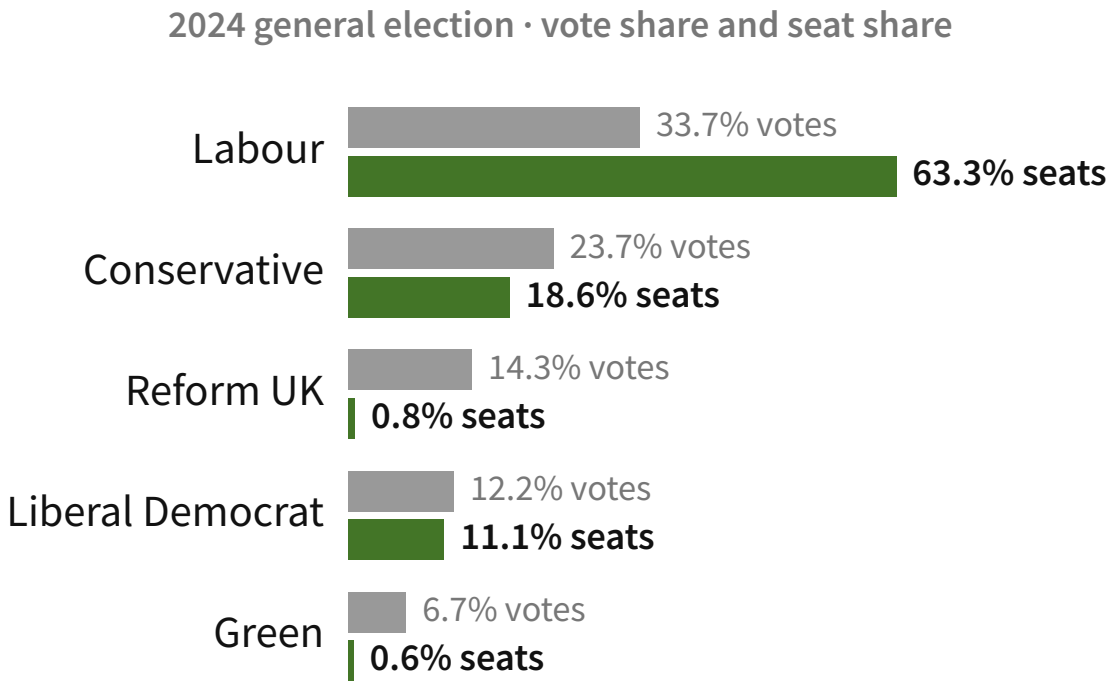
mayor-contest records in the export

Every chart here rebuilds from the bundled tables

Bundle: approval.vote/papers/st-louis-cvr-paper · raw export, scripts, derived tables and manuscript draft

Replication bundle README

Back home: Westminster runs on choose-one

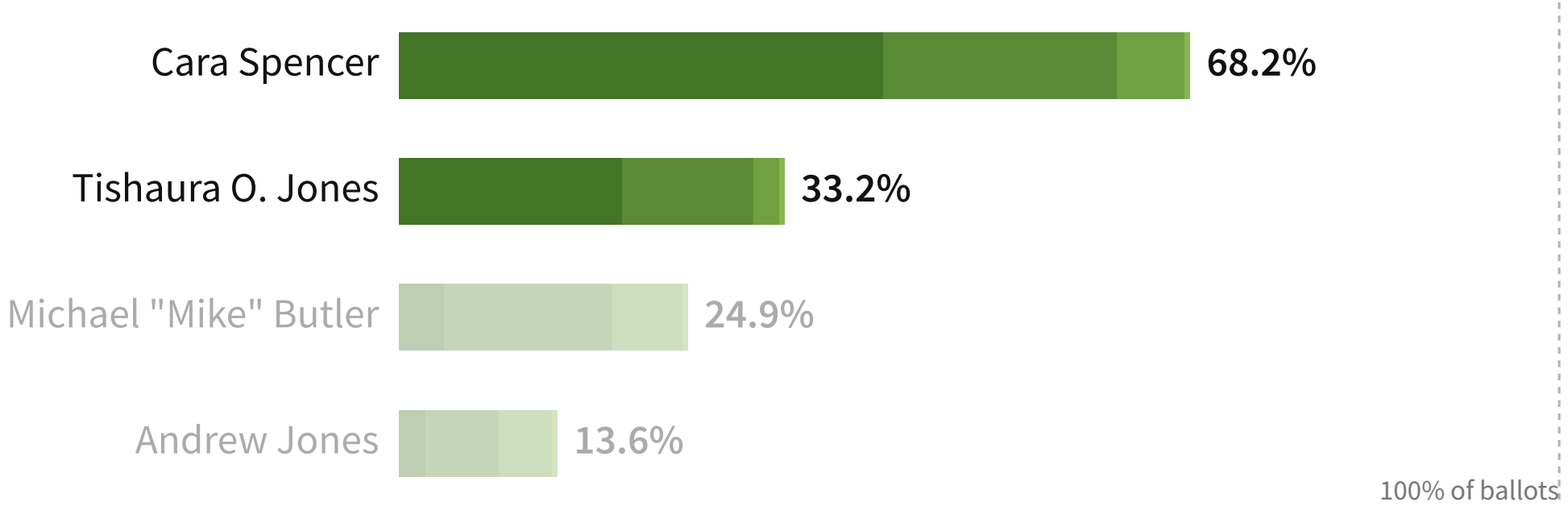


- **electionresults.uk**, with Make Votes Matter. Audits every Westminster seat and ten cycles of council elections: how small a plurality First Past the Post counts as support. In 2024, as low as 26.7% (South West Norfolk).
- **proportional.uk**. Putting approval-based options, from single-winner approval to proportional approval, on the table as the commission takes shape.

> **Now is the time to get involved.** The Prime Minister announced a national commission on electoral reform in September 2026. Join Make Votes Matter, Compass, Fairvote UK, the Electoral Reform Society and many others.

electionresults.uk/parliament · House of Commons Library 2024 results; seat shares of 649, excluding the Speaker · commission announcement, September 2026

Discussion



Report and data: approval.vote/report/us/mo/st_louis/2025/03/mayor

Essay: felixsargent.com/democracy/2025/08/29/st-louis-approval-voting

With thanks to the IT team at the St. Louis City Board of Election Commissioners for releasing the records.

Backup A · Denominators

34,982
mayor-contest records in the export

37
with no mayoral approval

34,945
with at least one

Measure	Ballots with ≥ 1 approval	All mayor-contest records
Mean approvals per ballot	1.3996	1.3981
Share approving more than one	32.803%	32.768%
Share approving three	6.296%	6.289%

Backup B · Definitions

Approvals for candidate i	$A_i = \Sigma_b \, x_{bi}$
Approvals on ballot b	$k_b = \Sigma_i \, x_{bi}$
Co-approval, row i, column j	$C_{ij} = \Sigma_b \, x_{bi} \, x_{bj} \, / \, A_i$
Multiple-approval rate for candidate i	$\Sigma_b \, x_{bi} \cdot 1[k_b \geq 2] \, / \, A_i$

$x_{bi} = 1$ if ballot b approved candidate i, else 0. All quantities are counts over the released records.

Backup C · Overlap and popularity

Expected co-approvals under independence $E[n_{ij}] = A_i A_j / N$

Lift $L_{ij} = n_{ij} N / (A_i A_j)$

Pair	Observed co-approvals	Expected if independent	Lift
Spencer · Butler	5,273	5,932	0.89
Spencer · A. Jones	3,201	3,252	0.98
Butler · A. Jones	2,180	1,187	1.84
Spencer · T. Jones	3,125	7,917	0.39
T. Jones · Butler	2,338	2,891	0.81
T. Jones · A. Jones	496	1,585	0.31

Computed from the bundled totals and pair counts · no fitted model

Backup D · Different records, different questions

Records	Directly observed	Needs assumptions
Approval CVRs	Approval sets and their intersections	Ordering within a set; sincerity
Ranked CVRs	Submitted orderings and transfers	Intensity; sincerity; truncation motives
Surveys and experiments	Stated preferences under controlled conditions	Behaviour in a binding election

Re-counting one kind of record under another rule assumes the ballots would not change.

Backup E · Sources

INTERACTIVE REPORT

approval.vote/report/us/mo/st_louis/2025/03/mayor

RAW EXPORT, PARSER AND DERIVED TABLES

approval.vote/papers/st-louis-cvr-paper/README.md

COMPANION ESSAY

felixsargent.com/democracy/2025/08/29/st-louis-approval-voting

ELECTION AUTHORITY

St. Louis City Board of Election Commissioners · results archive

Charts in this deck are rebuilt from the bundled derived tables. The accompanying manuscript is a working draft, not peer reviewed.