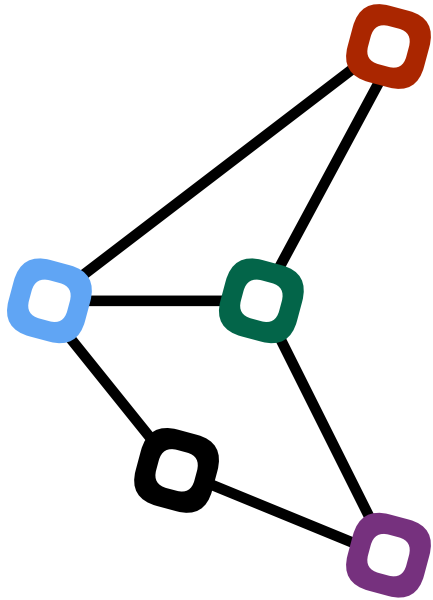


EPFL

dedis



Beyond voting: tool building for better democracy

Prof. Bryan Ford
dedis@epfl.ch – dedis.epfl.ch

Dagstuhl – October 8, 2025

We're facing **hard global problems**



Climate
change

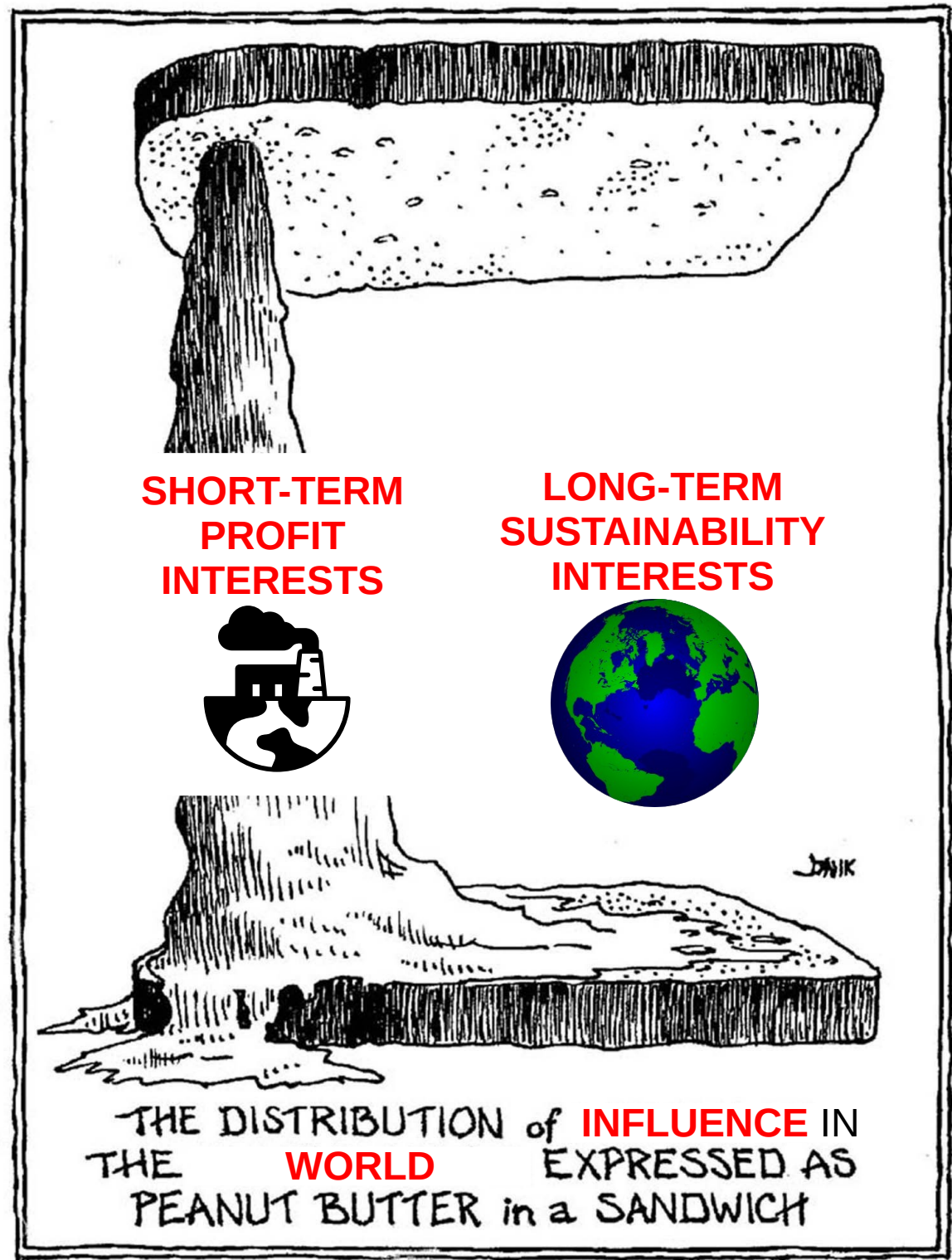


Exploding
inequality

A fundamental
meta-problem

“Money is power”

Real solutions
can't win votes
dominated by
entrenched power



An urgent need: borderless, permissionless democracy

A coherent, secure, inclusive “global town hall”

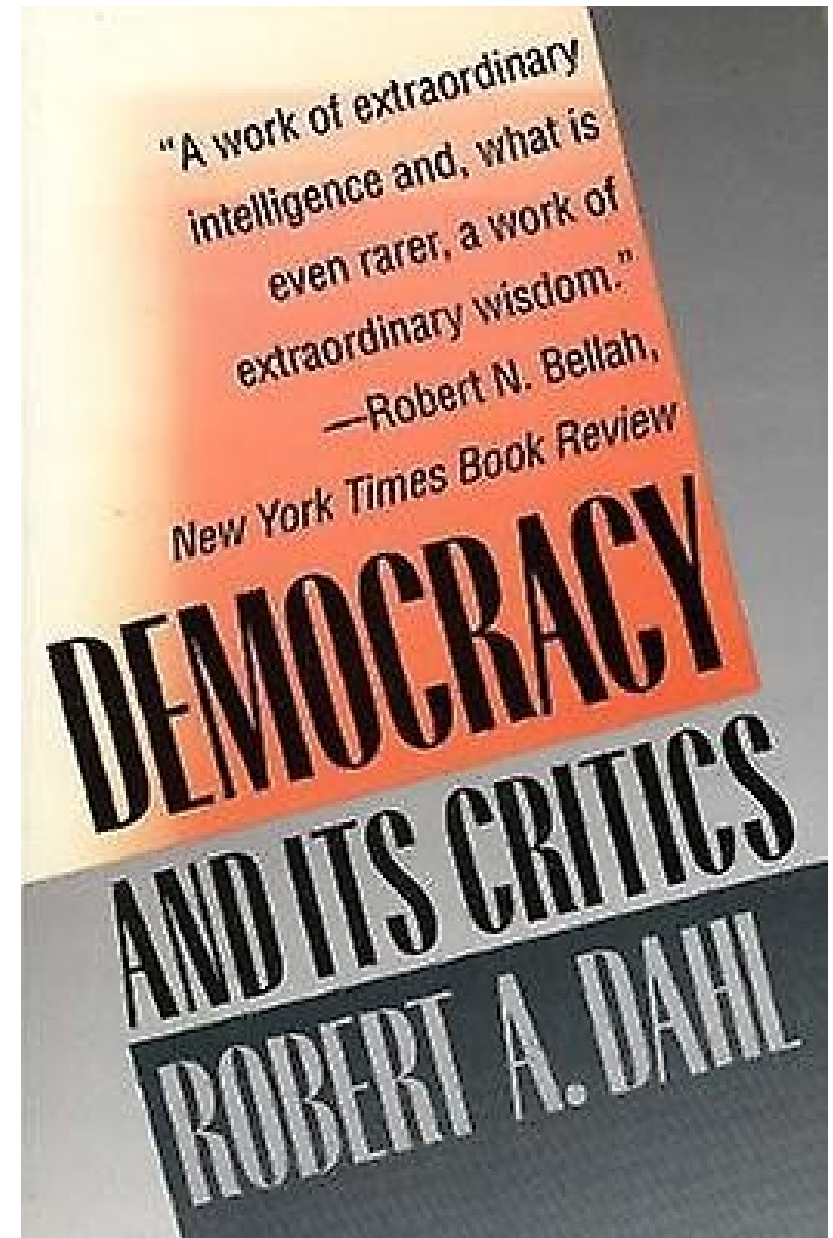


→ Decisions,
action plans that
transparently & security
represent *everyone's* interests

Key requirements for democracy

According to Robert Dahl,
Democracy and its Critics

- Effective participation
- Voting equality
- Enlightened understanding
- Control of the agenda
- Inclusiveness



Expanding our problem scope

From **trustworthy voting and elections**...

- Casting votes, counting votes, E2E verifiability, coercion resistance, etc.
 - Trustworthiness that the outcome genuinely reflects the collective **will of the electorate**

...to **trustworthy democratic decision-making**

- How do, how could, and how should voters *control the agenda* and *decide how to vote*?
 - Trustworthiness that the outcome genuinely reflects **enlightened understanding** of the issues & alternatives, informed by reliable vetted information & deep analysis

From E2E voting to E2E democracy

Can decentralized online systems ever help us **self-govern** in an egalitarian, democratic fashion?



[Kenneth Hacker, The Progressive Post]

Promising democratic innovations

There are scalable democratic processes that can potentially help “*make voters more trustworthy*”

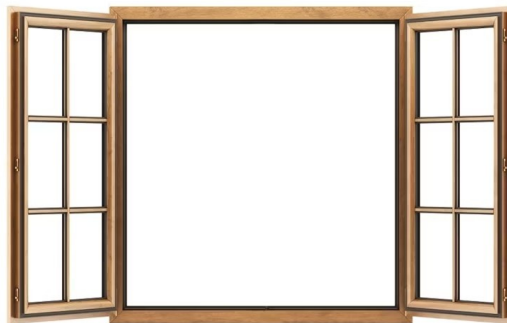
- Deliberative citizens’ assemblies, mini-publics
 - Civilized discussion in a *diverse-by-construction* group: exposure to perspectives beyond social “echo chamber”
 - Group vetting and evaluation of external information from a *representative-by-construction* perspective
- Liquid or delegative democracy
 - Large-scale, regular/continuous form of direct democracy, mass online deliberation by anyone on many topics
 - Use vote delegation to manage limits of human attention, find deep but accountable expertise on complex issues

“Open Democracy... is based on the simple idea that, if government by the people is a goal, the people ought to do the governing.”

– Nathan Heller, *The New Yorker*

Open Democracy

Reinventing Popular Rule
for the Twenty-First Century



Hélène Landemore

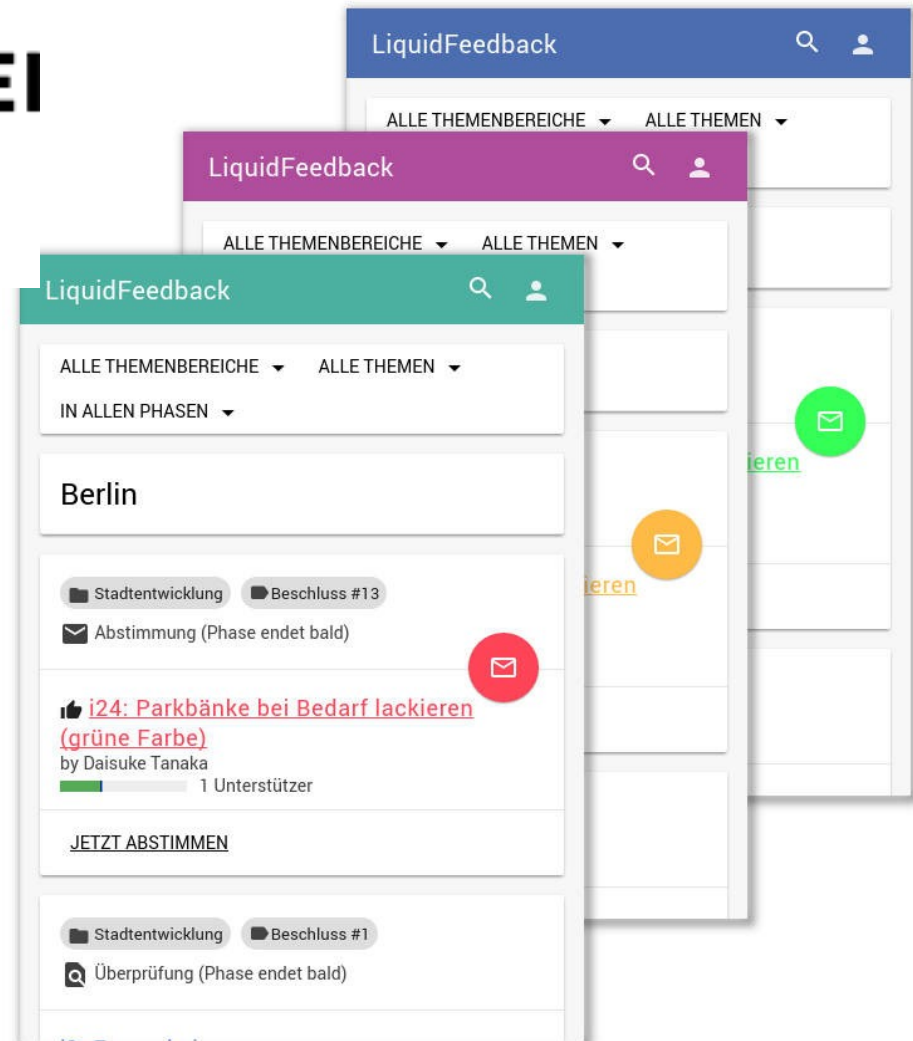
Liquid/Delegative Democracy

- Bryan Ford, “[Delegative Democracy](#)” (2002)
- Dennis Lomax, “[Beyond Politics](#)” (2003)
- Joi Ito, “[Emergent Democracy](#)” (2003)
- Sayke, “[Liquid Democracy](#)” (2003)
- James Green-Armytage,
“[Direct Democracy by Delegable Proxy](#)” (2005)
- Mark Rosst, “[Structural Deep Democracy](#)” (2005)
- Mikael Nordfors, “[Democracy 2.1](#)” (2006)
- ...

Experiments in Liquid Democracy



Widely used for
policy debates
within Pirate Party
for several years



A few key challenges

Scalable *borderless, permissionless* participation

- Inclusion of “anyone anywhere” interested
- Blockchain DAOs often reflect this ambition

Securely & privately enforce *voting equality*

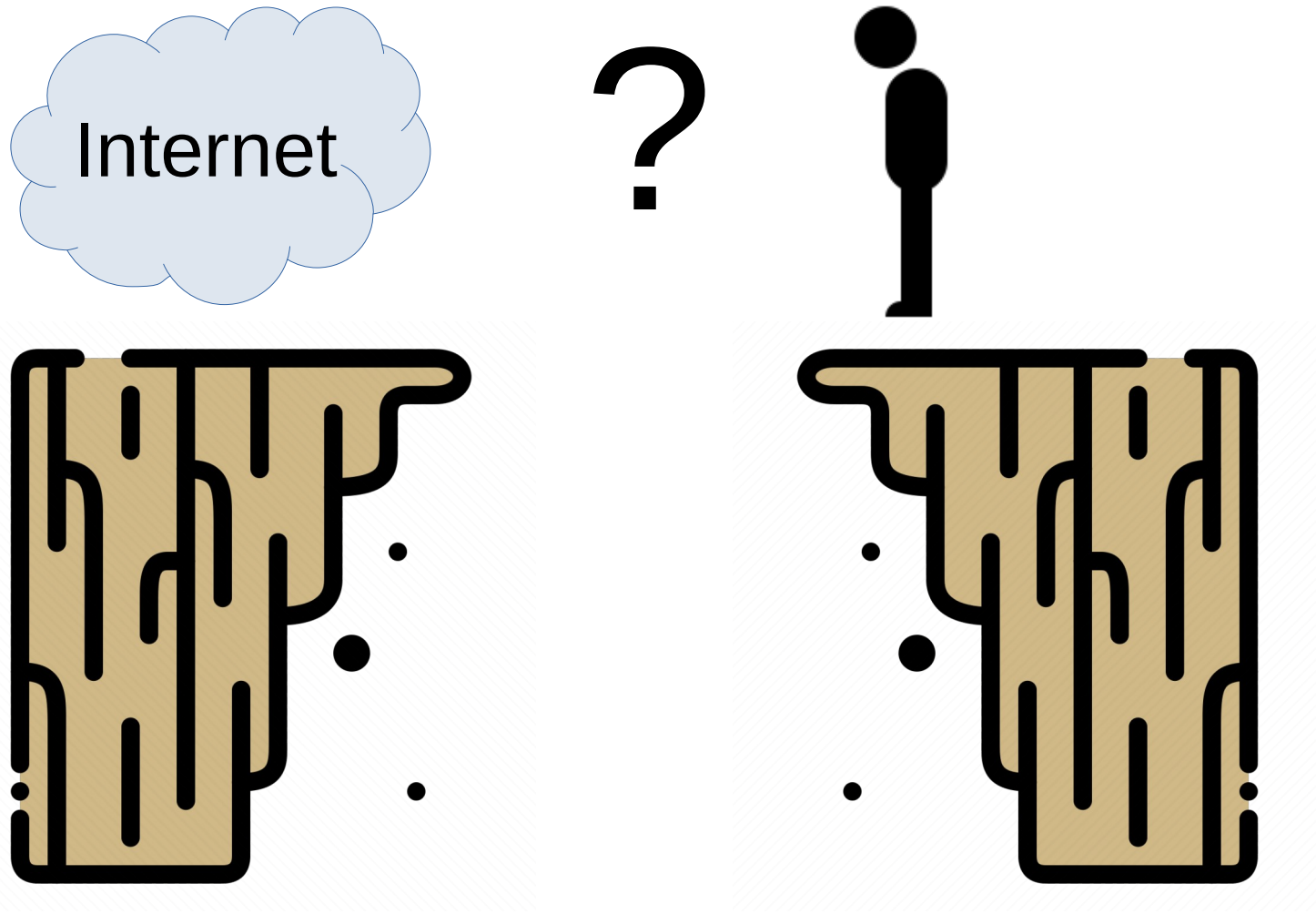
- Proof of personhood: one person, one vote
(*not* one dollar/watt/token/scamcoin, one vote)

Ensure participants *represent their own interests*

- Coercion-resistant decentralized systems

A Fundamental Problem

Today's Internet doesn't know what a "person" is



Fakery is exploding, especially w/ AI



[Ian Sample, The Guardian]

Online society: missing a foundation?



[All About Healthy Choices]

Preprint: <https://bford.info/pub/soc/personhood/>

Identity and Personhood in Digital Democracy: Evaluating Inclusion, Equality, Security, and Privacy in Pseudonym Parties and Other Proofs of Personhood

Bryan Ford

Swiss Federal Institute of Technology in Lausanne (EPFL)

November 4, 2020

Key desirable (required?) goals

Can we achieve Proof of Personhood that is:

- **Inclusive:** open to all *real people*, not to bots
- **Equitable:** all *people* get equal power, benefits
- **Secure:** correct operation, verifiable by *people*
- **Privacy:** protects rights & freedoms of *people*

“We must act to ensure that technology is designed and developed to serve humankind, and not the other way around”

- Tim Cook, Oct 24, 2018

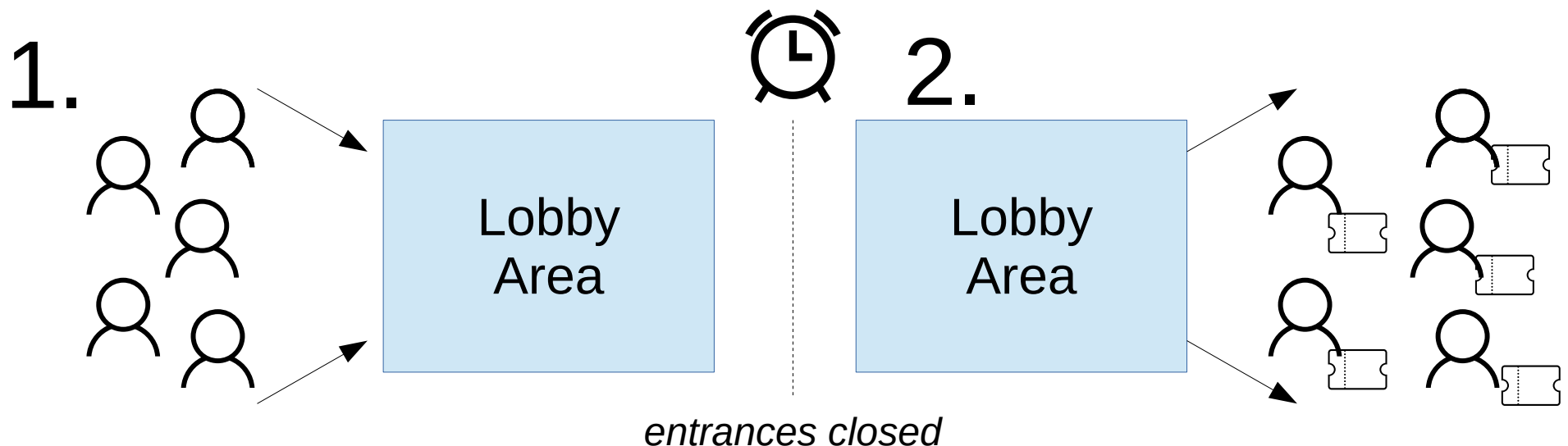
A few Proof-of-Personhood efforts

- Pseudonym Parties [[Ford, 2008](#)]
- Proof-of-Personhood [[Borge et al, 2017](#)]
- Encounter [[Brenzikofer, 2018](#)]
- BrightID [[Sanders, 2018](#)]
- Dunitier [[2018](#)]
- Idena [[2019](#)]
- HumanityDAO [[Rich, 2019](#)]
- Pseudonym Pairs [[Nygren, 2019](#)]
- DFINITY Virtual People Parties [[Williams, 2021](#)]
- Worldcoin [[Worldcoin, 2023](#)]

PoP based on physical presence

Principle: real people have only one body each

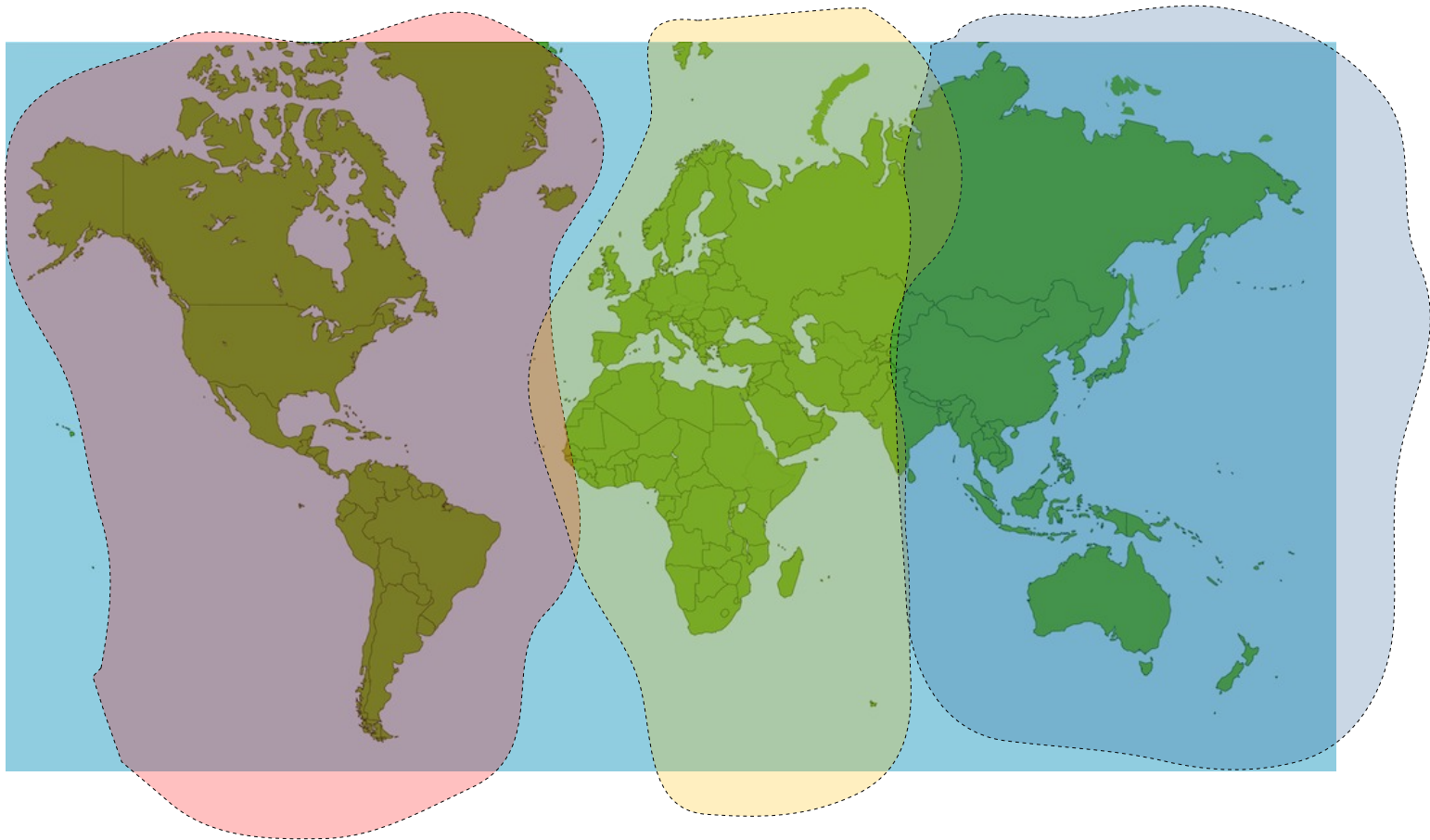
- Attendees gather in “lobby” area by a deadline
- At deadline: doors close, *no one else gets in*
- Each attendee gets one token when *leaving*



Scalable via *simultaneous* events

Potentially at many grassroots-organized events

- Even globally, in a few “timezone federations”



Encounter: in-person PoP in Zurich

- Uses periodic synchronized **encounters** to verify personhood in-person, mint coins, ...



Idena: virtual pseudonym parties

- Account holders (hopefully real humans) participate **online** in **synchronized events**
- Must solve several **reverse Turing tests** (“FLIP” puzzles) in 2 minutes
- Run validation nodes, earn “crypto-UBI”, ...



Towards borderless democracy

Can PoP enable online robust self-governance?

- Adds missing “one-person-one-vote” foundation

But...

Whose interests
do participants
represent?



How PoP can go wrong

Case study of the **Idena** PoP network, 2019-2022

Compressed to 0:

The Silent Strings of Proof of Personhood¹

Puja Ohlhaver², Mikhail Nikulin³, Paula Berman⁴

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4749892

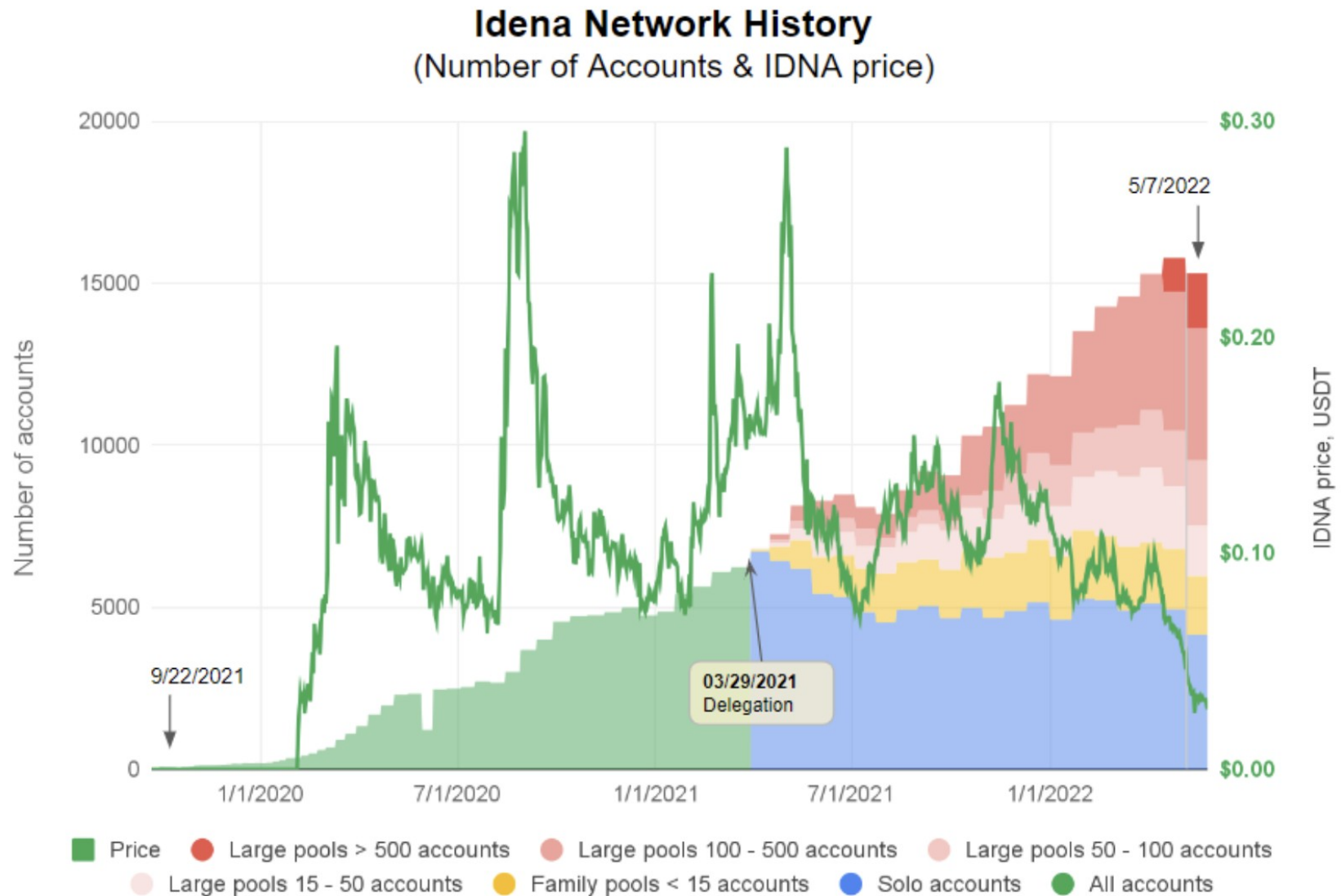
Ikena: the Puppet Pool Takeover

Key lessons from “[Compressed to 0](#)” report:

- FLIP challenges technically **appeared to work** to filter and/or deter automated abuse
- But network increasingly dominated by **pools** paying **real people** to serve as **puppets**
- Pool operators exploit economies of scale, information asymmetry



Ikena: the Puppet Pool Takeover



*Figure 8: Ikena Network History*⁴²

Ikena: the Puppet Pool Takeover

Egyptian Pharaoh 10.01.2022



3

TRIP: in-person credentialing

TRIP: Trust-limited Coercion-Resistant In-Person Voter Registration – SOSp ‘25

- <https://bford.info/pub/sec/trip/>

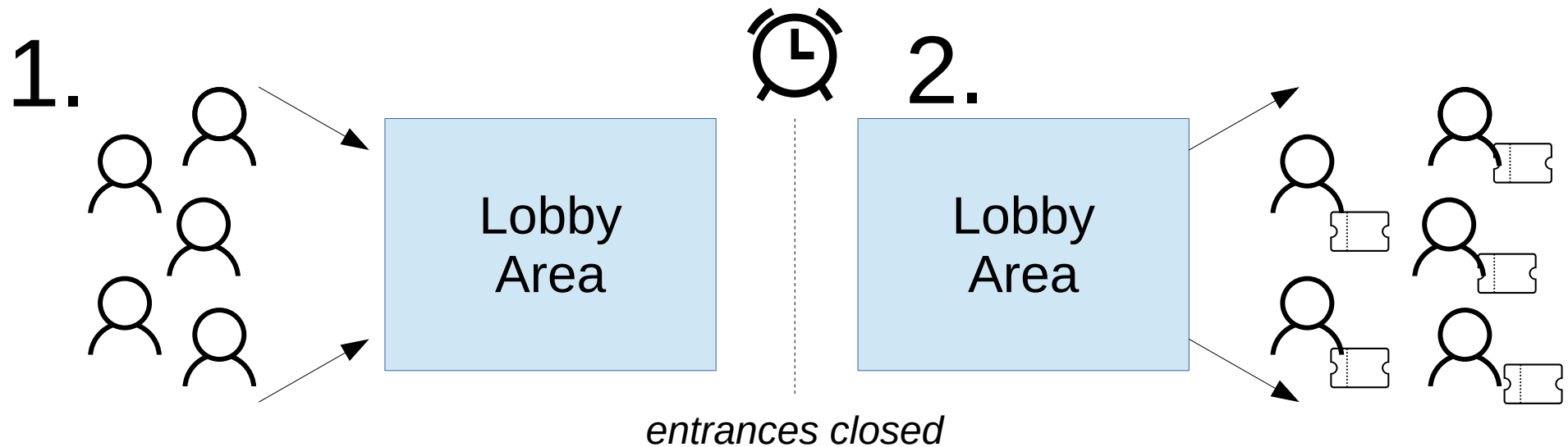
E-Vote Your Conscience: Perceptions of Coercion and Vote Buying, and the Usability of Fake Credentials in Online Voting – S&P ‘24

- <https://bford.info/pub/sec/trip-usability/>

Pseudonym parties, revisited

In-person attendees get short-term *tickets*

- Not (yet) long-term PoP credentials



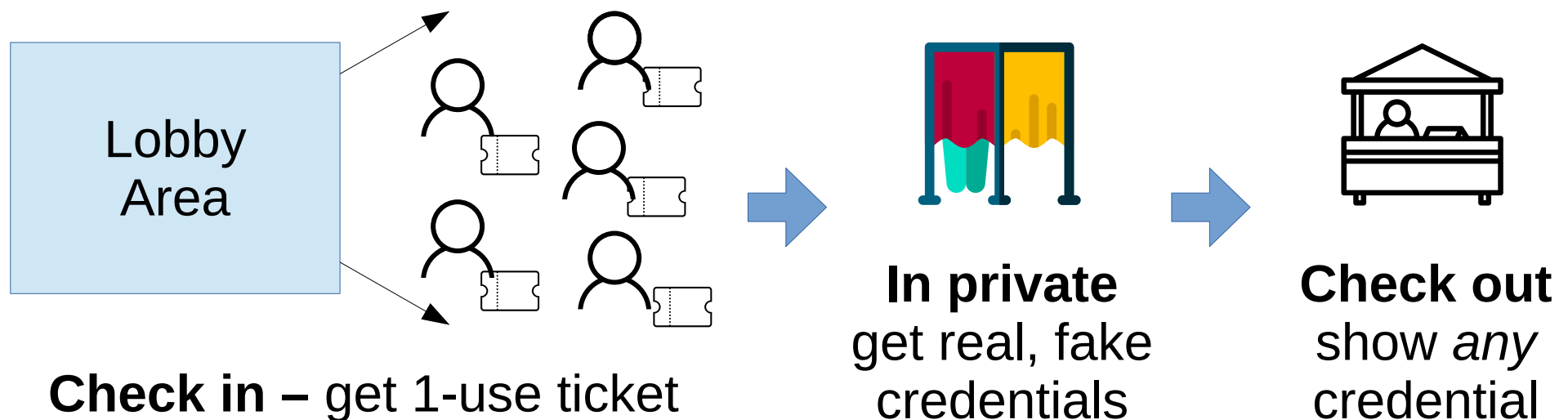
Coercion-resistant in-person PoP

In-person attendees get short-term *tickets*

- Not (yet) long-term PoP credentials

Use tickets in a supervised *privacy booth* nearby

- Create long-term real and fake PoP credentials



Towards secure, borderless, permissionless democracy

Can we build the “global town hall” we need?

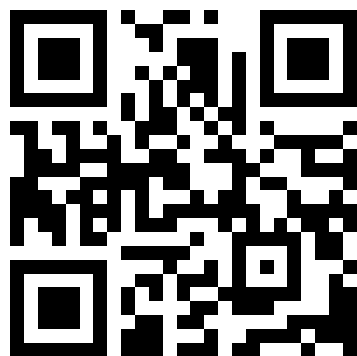


→ Decisions,
action plans that
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Beyond voting: tool building for better democracy

Further reading:



<https://bford.info/pub/>