The problems of DRE are not unique
- Typical of public access information systems
- Need to look to the professionals:
  - Human-Computer Interaction (HCI)
  - Information Visualization (InfoVis)
- These fields create innovative design/interaction solutions and evaluate this work with qualitative and quantitative user studies.

Our goal should be “better than paper”
What is paper?

University of Maryland, Human Computer Interaction Laboratory

Paper Ballot – page 2

University of Maryland, Human Computer Interaction Laboratory
What are computer interfaces?

- Many companies don’t advertise the interface
- When they do, they don’t describe usability studies
- There is no overview
- Navigation is often a challenge
Information Visualization

- Visualization helps users see patterns and detect outliers in large data sets.
- A ballot is a large dataset:
  - Most DREs show less than 4 races per screen.
  - How do voters understand how they voted?
  - How do voters build trust in these systems?
- Show more than fits on the screen by:
  - Good, dense information design.
  - Overview+detail.
  - Abstracted representations.
  - Simple navigation mechanisms.

Navigating Large Spaces

- Imagine driving from NY to CA with only street maps.
- You need abstracted overview maps – that show states and highways.
- We have the same problem with voting systems:
  - How do you get an overview of the state of your ballot?
A Motivating Example

- Zoomable User Interface (ZUI)
  - Single screen interface
  - Overview + Detail
  - Natural navigation and progress indication

Follow-up

- Where do we go from here?
  Learn from the HCI/InfoVis communities:
  - Build designs to support range of tasks:
    - “understanding” tasks
    - Intangibles, including voter comfort and trust
  - Evaluate with representative users
  - Usability studies to find interface errors and understand user satisfaction
  - Quantitative empirical studies to measure performance data: speed & accuracy