ISDS Research Committee

Data Visualization for Health Surveillance:
Current Concepts and New Horizons
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The GeoViz Toolkit:

An easy-to-use approach to ESDA

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Our Approach to Multivariate Exploratory Spatial Data Analysis

Multivariate → Small multiples, integrated views, data reduction

Exploratory → Foster interaction

Spatial → Link the spatial and other views

Analysis → Spatial structure (including cluster) detection and description
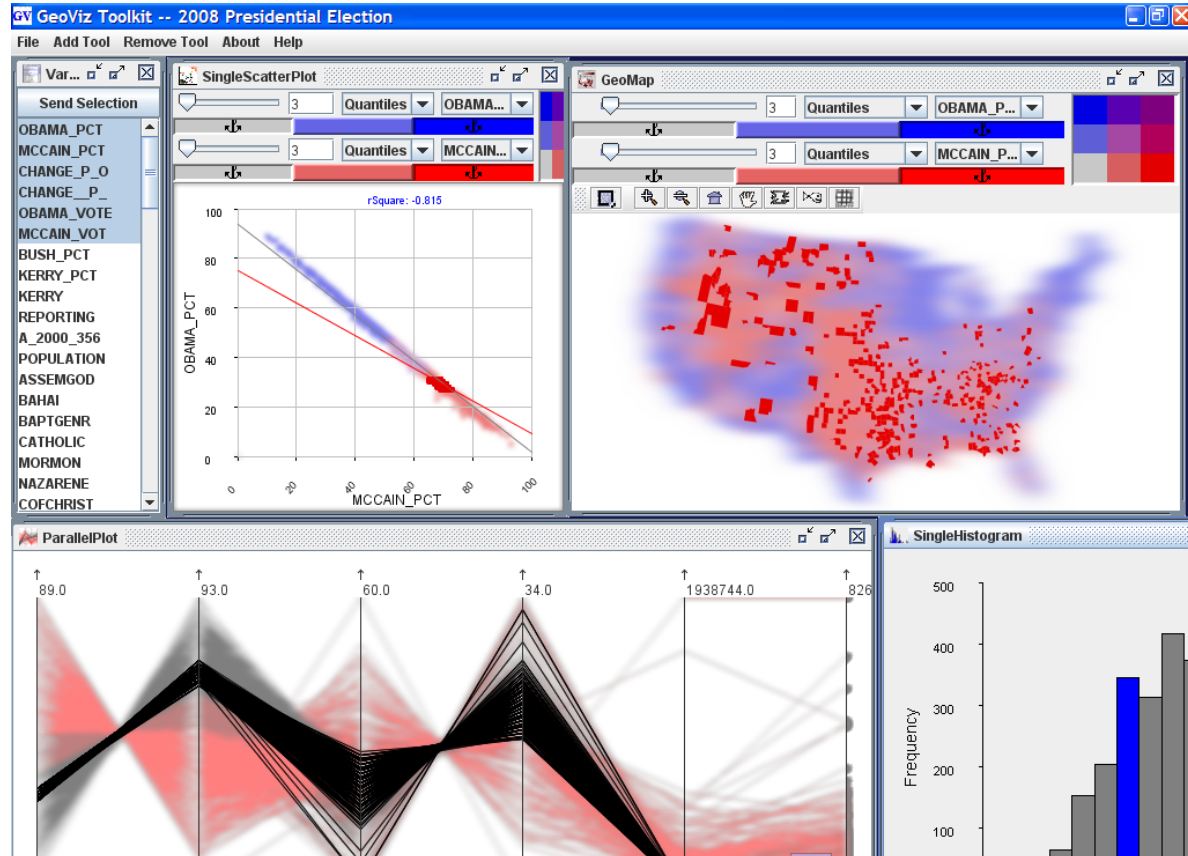
Software – The GeoViz Toolkit

- Open Source
- Web Delivered
- Video Intro

Applications (Agencies):

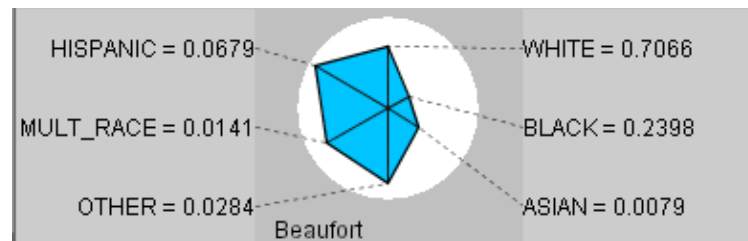   Research (NSF)

    Public Health (NCI, CDC)

    Public Safety (DHS)

Multivariate
Exploratory Spatial Data Analysis

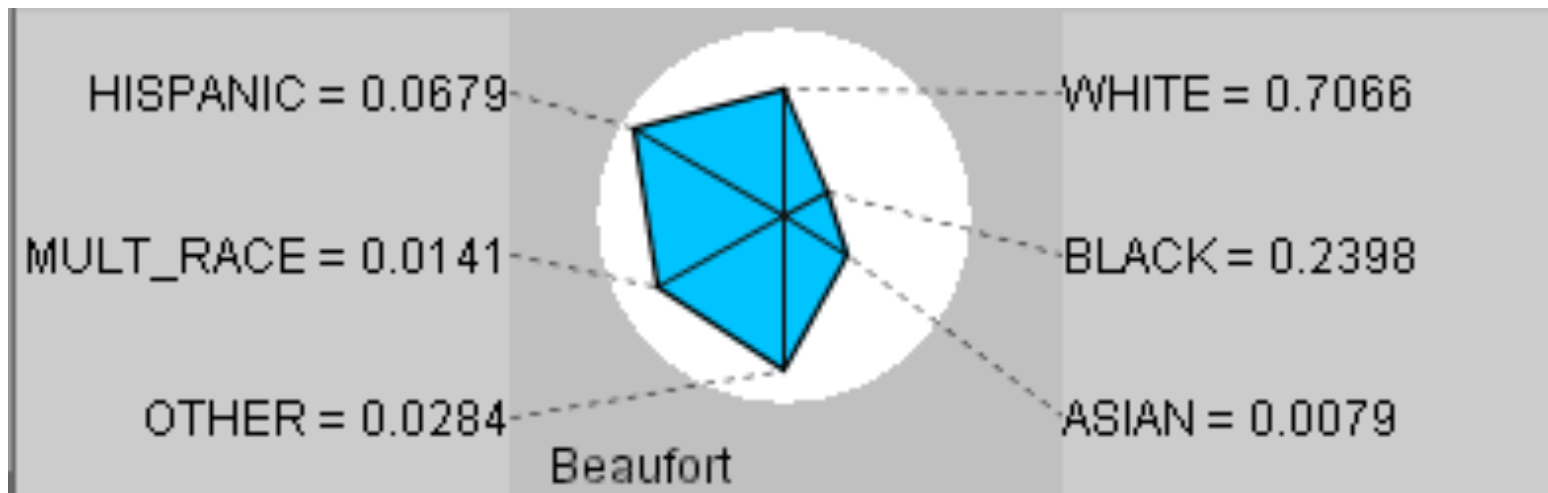# Multivariate Data - Integrated Views – Starplots, Parallel Coordinate Plots
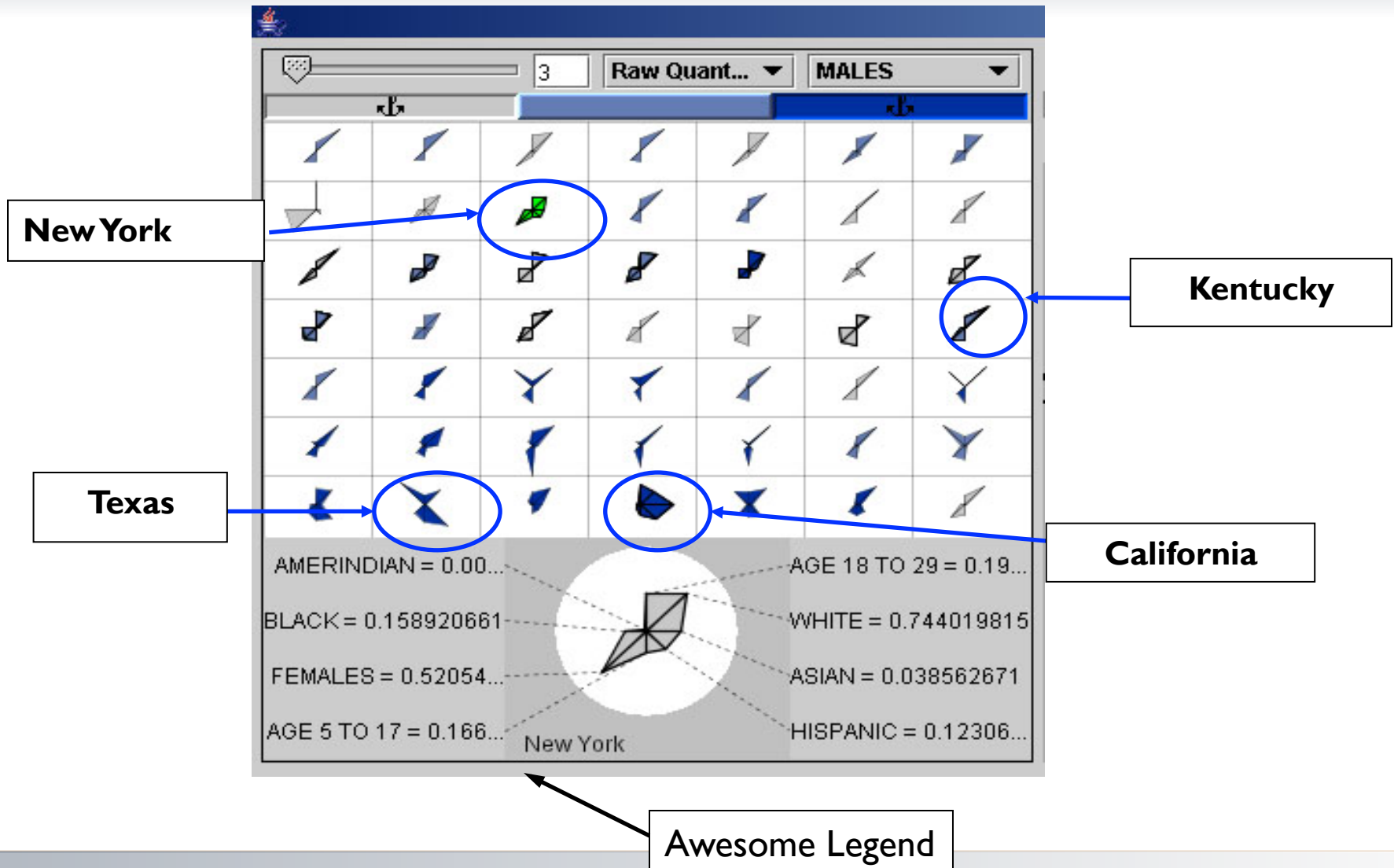
Starplot Maps

Why Starplots?

- Multivariate Exploratory Mapping (Geovisualization)
- Good for: a large number of attributes
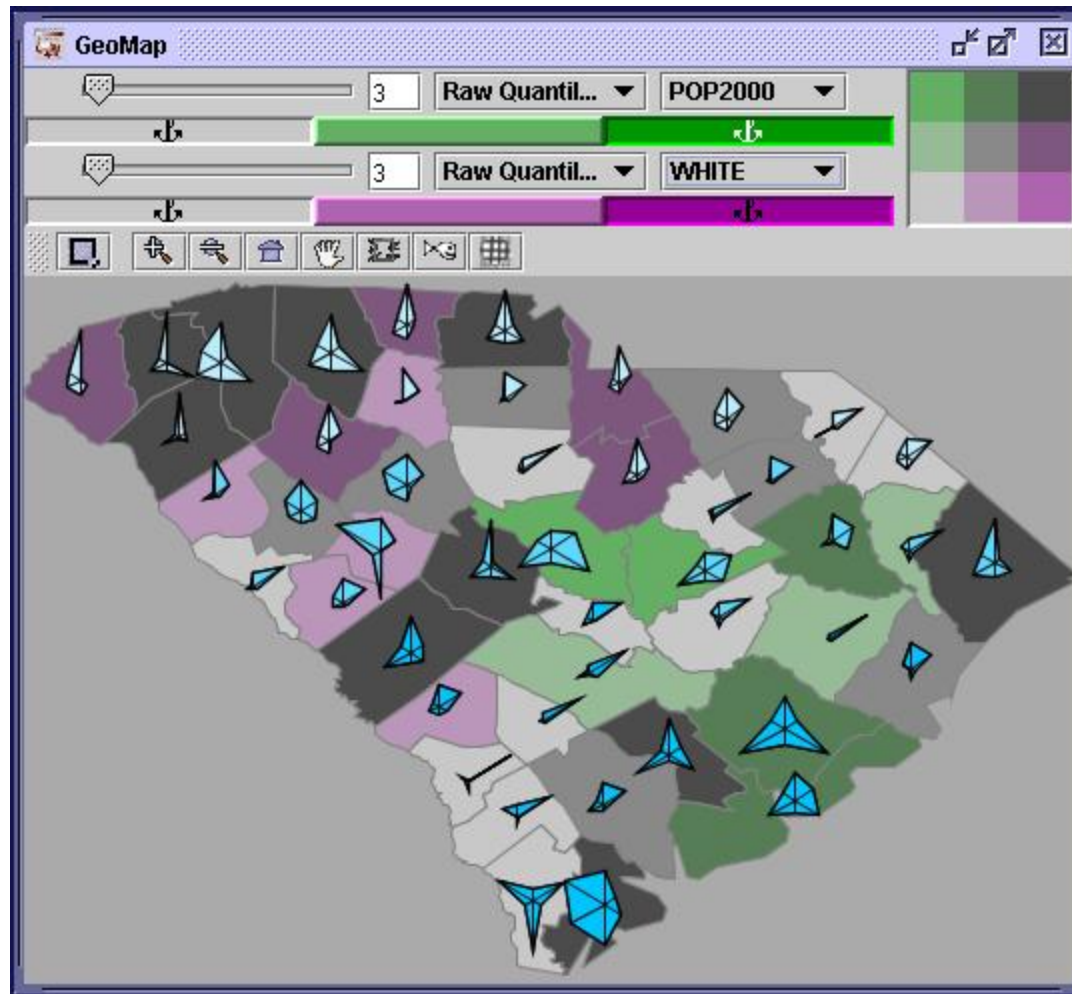- Bad for: a large number of observations

What are Starplots?

What are Starplots?

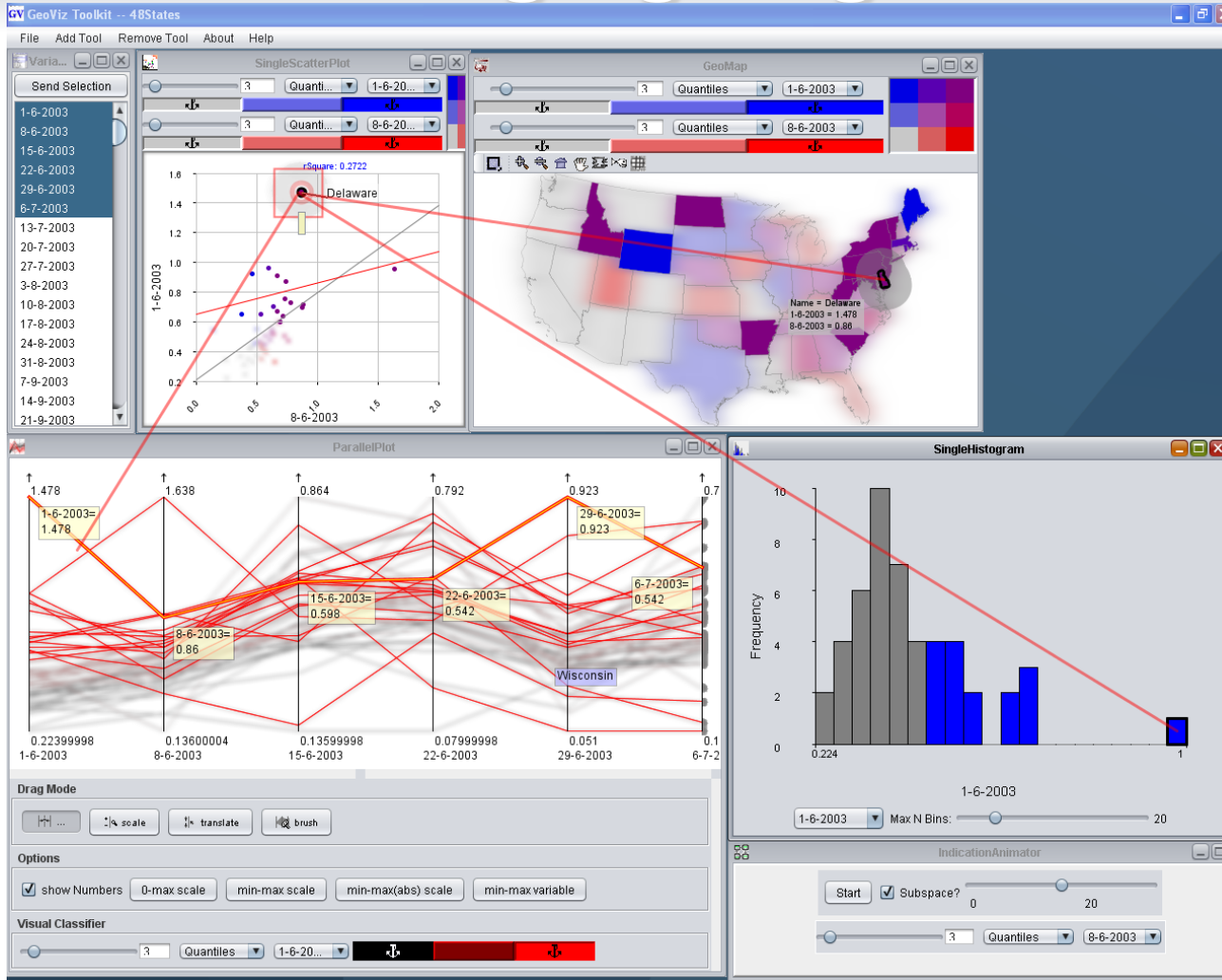# Geography: Starplot Maps

Data Reduction – Linkgraph, RadViz, PCA

Linkgraph

Multivariate Exploratory Spatial Data Analysis

Interaction – Automatic coordination, novel highlighting

Multivariate Exploratory Spatial Data Analysis

- Genetic GAM Geographical Analysis Machine (GAM)

- Openshaw's GAM

- Case point-centered searching (proposed by Besag and Newell)

- Randomized GAM (proposed by Fotheringham and Zhan)
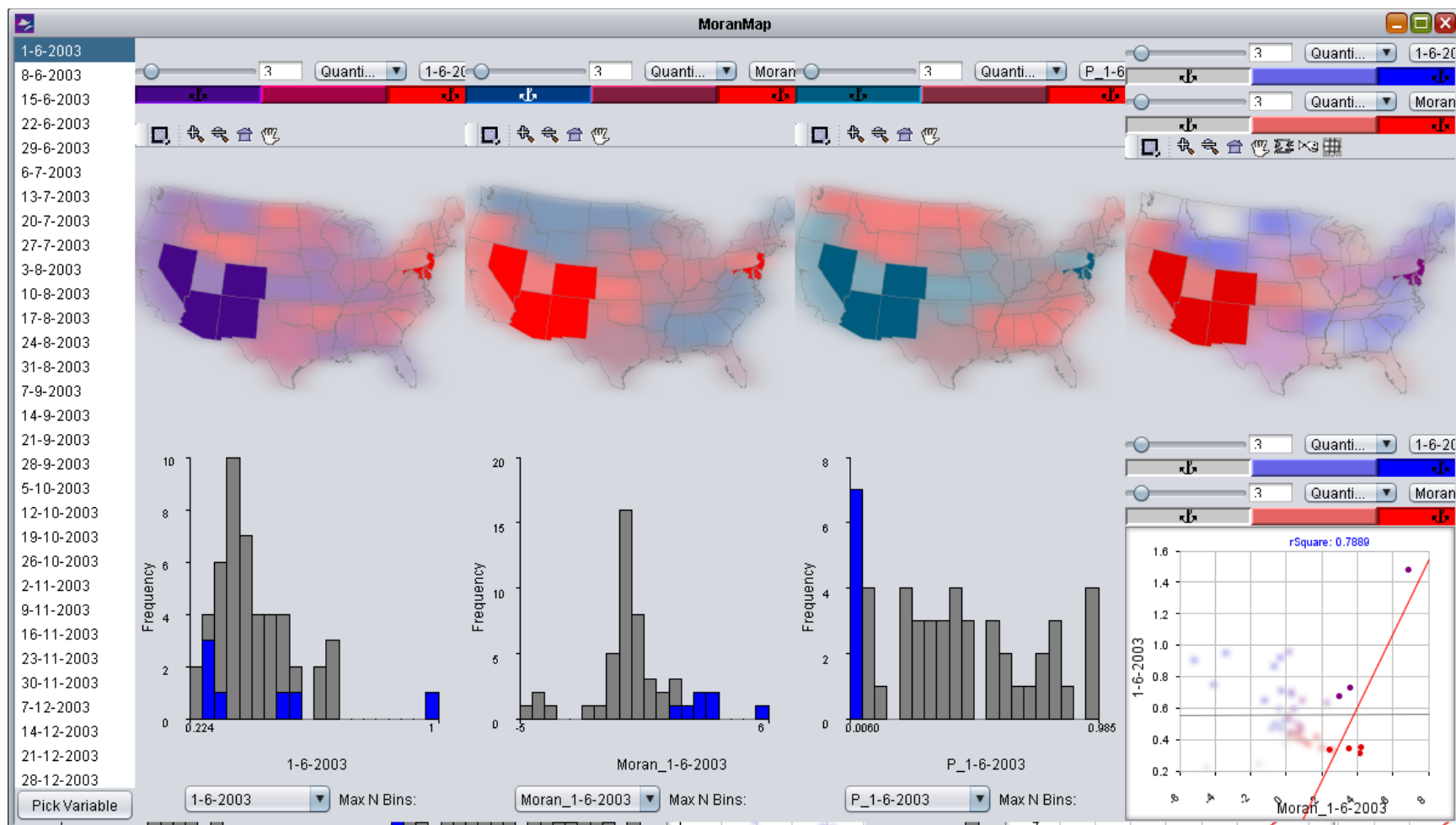
Integrating Proclude and the GeoViz Toolkit

- Clicking on clusters selects them in the rest of the GeoViz Toolkit

- Selections in the rest of the GeoViz Toolkit will have clustering measures provided (based on the Observed/Expected ratio)

Integrating Proclude and the GeoViz Toolkit -- Demo
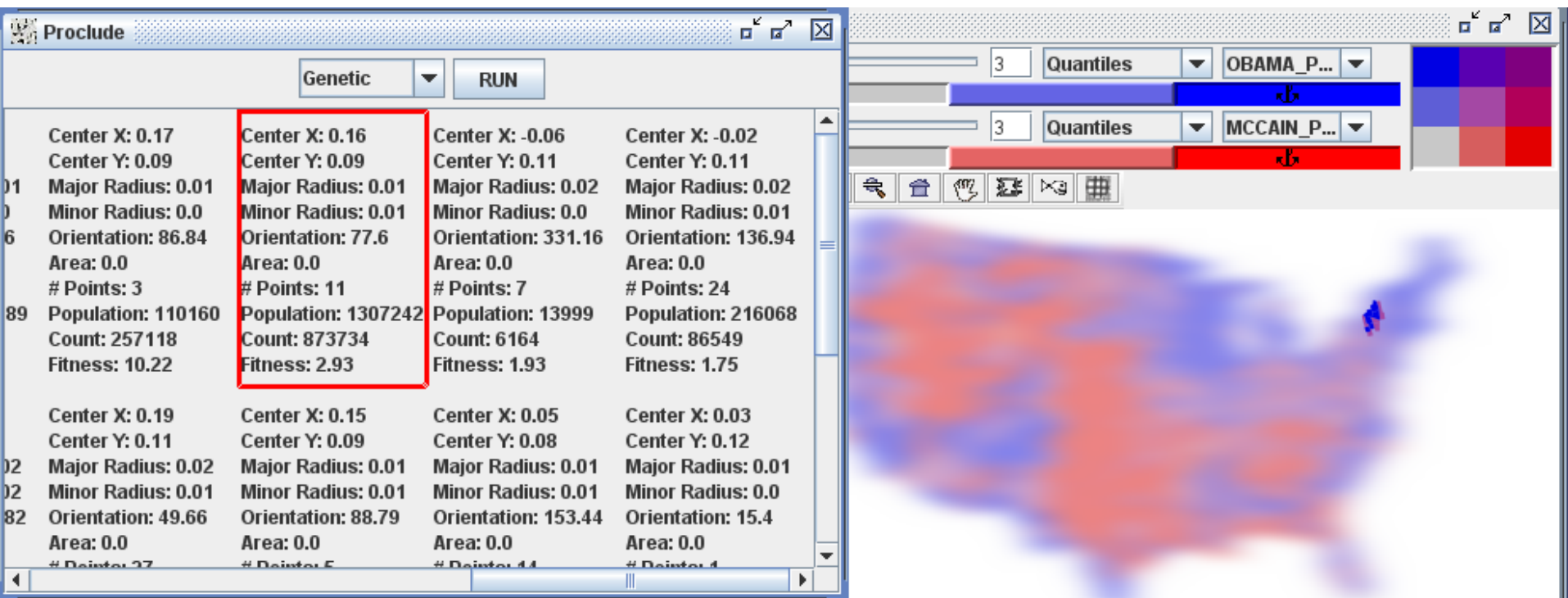
Spatial Analysis – Spatial Structure – Monte Carlo Moran's I

The Future

- Improved IO
  - Save to and restore from internet
  - Accept WMS Sources
  - Accept PostGIS sources
  - Better local data export
- Better support for categorical and text data
  - H1N1 data from Rhiza Labs
- More spatial analysis methods

Acknowledgements

- Other Developers at Penn State GeoVISTA Center and elsewhere
- NSF
- NCI Grant
- NEVAC (North-East Visualization & Analytics Center)

If you like this stuff

- Use the software with your data
- Examine and adapt the source code
- Contact us if you need help getting set up – we have some external funding for disease surveillance work from DHS

Thank you!

- We are looking for collaborators!
- Contact me at hardisty@psu.edu
- Visit the GeoVISTA Center Website http://www.geovista.psu.edu/