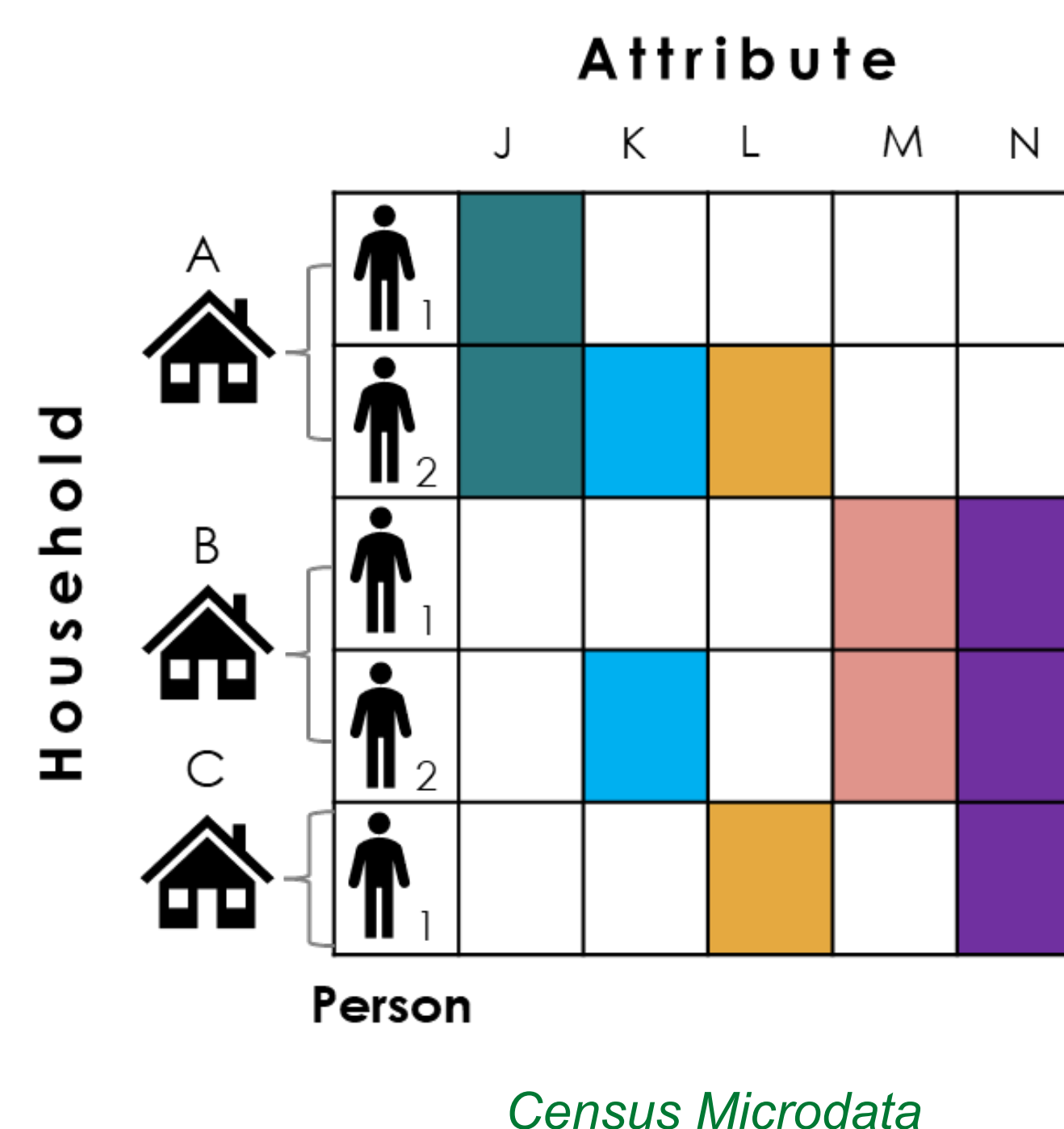


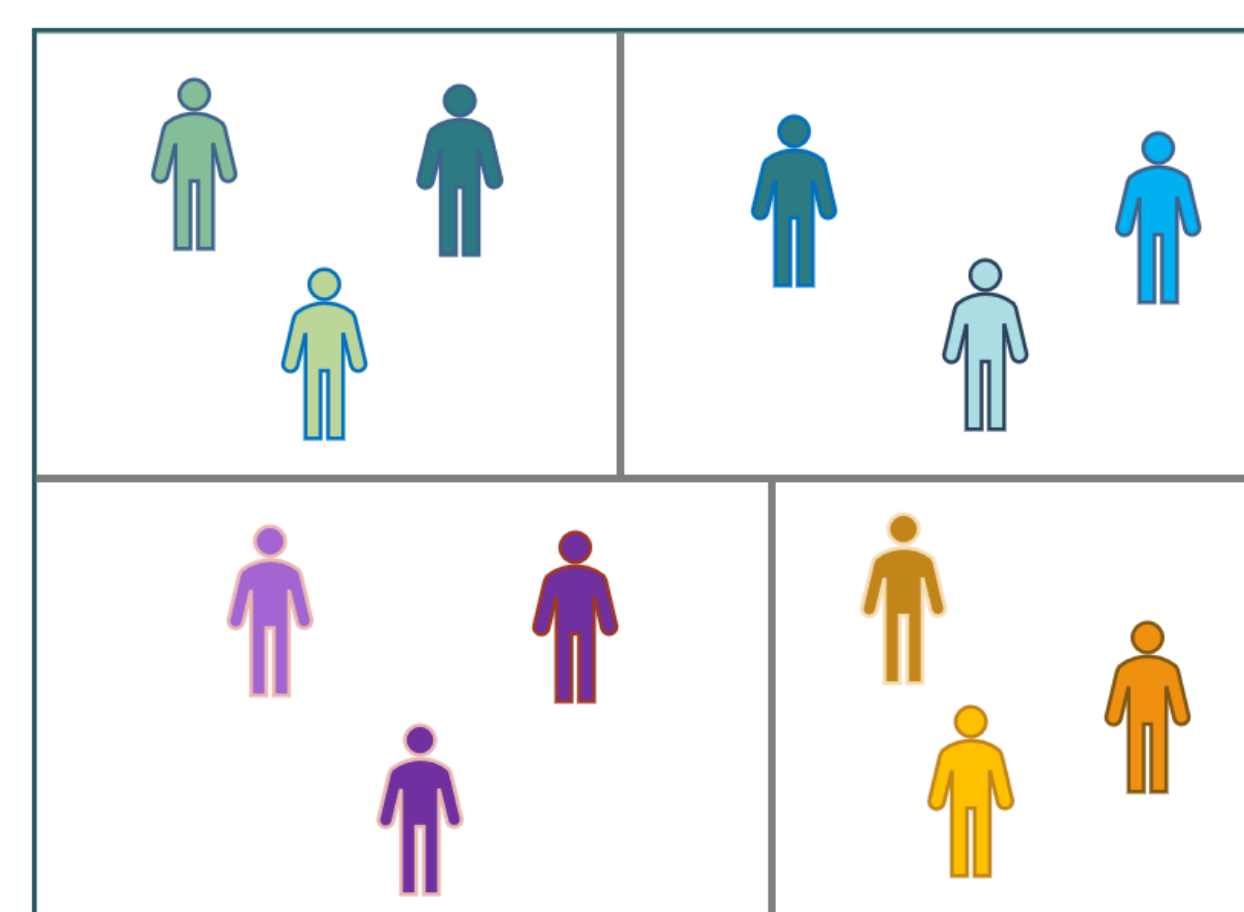
What is Likeness?

- Model **human dynamics** at scale for **human security**
- Novel insights with “**atomic**” **representations** of population
- Create **synthetic populations** from **public-use census microdata** that preserves **respondent privacy**

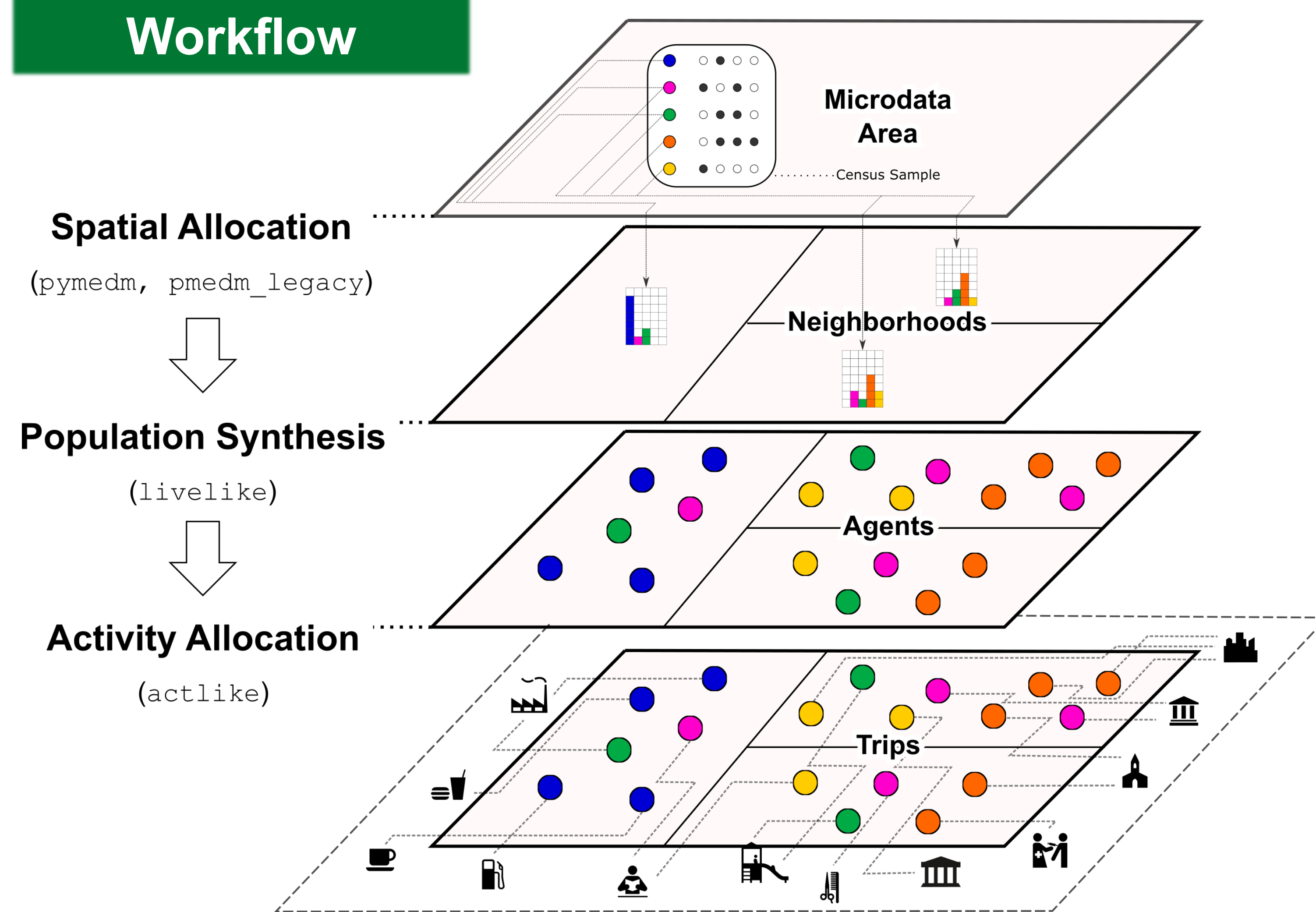


Vivid Synthetic Populations

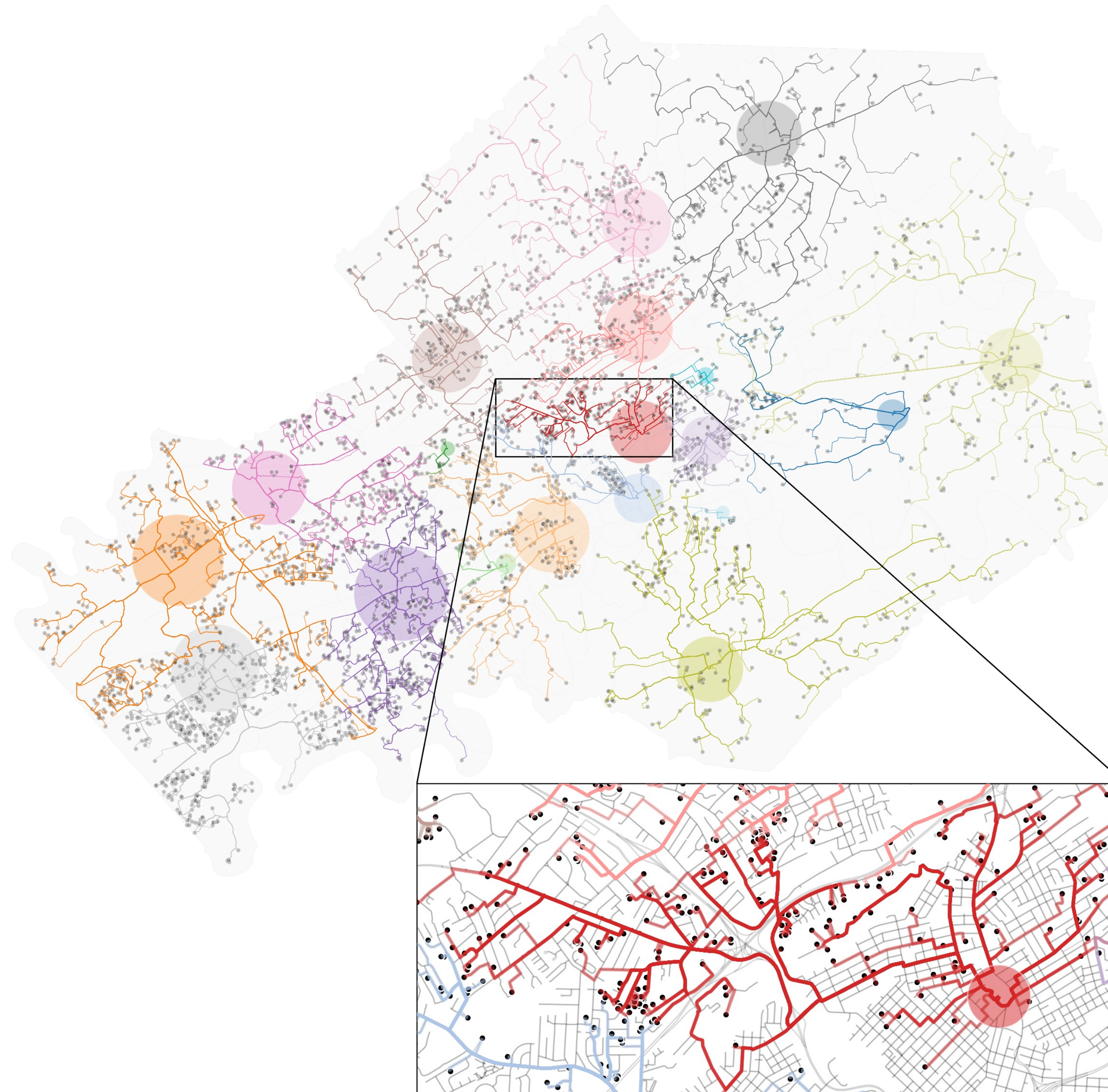
- Synthetic populations support spatial epidemiology, transportation, energy, & public health
- Vivid synthetic populations** → hundreds of attributes across demographics, socioeconomic status, housing, & health
 - More informed **geolocation** of individual profiles derived from **census microdata**
 - Deeper **individual & neighborhood characterization**



Workflow



Likeness Integrated Demonstration



School commutes for 10th grade public school students in Knox County, TN (single simulation)

- Knoxville, TN Metropolitan Statistical Area
- American Community Survey 2015–2019 5-Year Estimates
- Simulate worker & student travel to Knox County Schools
- 2010 Decennial Census
- OSM road network

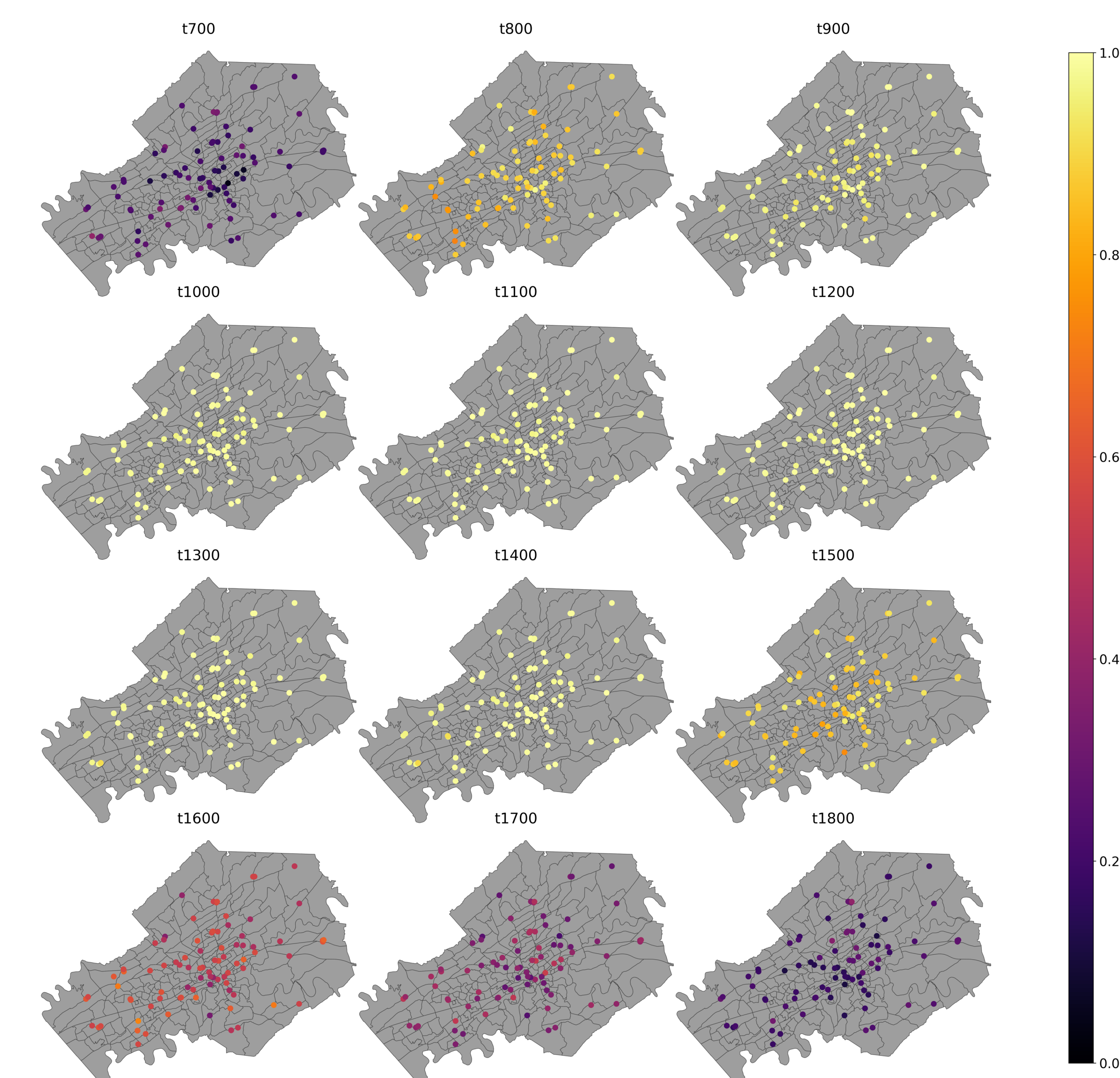
Student Composition & Social Contact Networks

K-12 Students by Grade | True Network Distance | 6 Student Profiles



Worker Commutes & Occupancy Estimates

K-12 Educators | True Network Time | Arrival Time vs. Hours Worked



Validation & Diagnostics

Are relative facility sizes preserved?

K12	R ² Type	Mean
Students	Between-Destination CCA	0.9973
	Within-Destination CCA	0.9896
Educators	OLS Linear Regression	0.9983

Coefficients of Determination (R²) for 30 Likeness simulations

Recommended Resources

- Ballas, D., Clarke, G., Döring, D., Rigby, J., & Wheeler, B. (2006). Using geographical information systems and spatial microsimulation for the analysis of health inequalities. *Health Informatics Journal*, 12(1), 65–79. DOI: 10.1177/1460458206061217.
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- Tuccillo, J.V. & Gaboardi, J.D. (2022, June). Likeness: a Python toolkit for connecting the social fabric of place to human dynamics. *GeoPython 2022*. DOI: 10.5281/zenodo.6685086.

Scan this QR code for our associated manuscript in the Proceedings of the 21st Python in Science Conference

