**Introduction to Urban Science.**

**Assignment 5: Scaling Residuals Clustering or Neighborhood Effects Discussion**

**Either:**

**Qualitative Exercise: Essay (< 500 words)**

Read Ch 2 of *Wilson’s* The Truly Disadvantaged (link The truly disadvantaged, Ch 2.pdf). You may also want to read this recent feature article (link The Neighborhood Effect\_CHE.pdf) and the relevant parts of Ch 6 of IUS, which are more recent summaries of ideas and discussions:

1. How does Wilson explain the rise of concentrated neighborhood poverty in the 1980s and beyond? What is the process? What was the trigger? [100 words]
2. Explain in detail the “vicious cycle” (self-reinforcing causal loop) nature of the dynamics. Draw a causal diagram, like we did in the first Assignment for Jane Jacobs' Park. [100 words + diagram]
3. Do you think that giving people rent vouchers to leave poor neighborhoods is a good systemic solution? What happens to the neighborhood they leave? [~150 words]
4. Can you devise a policy that turns the “vicious” cycle described by Wilson into a “virtuous” cycle? Describe it in terms of reversing the direction of arrows in the cycles in question 2, using the diagram you drew. [~150 words].

Or

**Quantitative Exercise: Scaling of Traffic Congestion and City Typologies**

Consider the data and code linked below for extra congestion in US Metropolitan areas. Data is originally from the [Texas Transportation Institute.](https://mobility.tamu.edu/umr/) (You may want to update it.)

In about 1 page of text (< 500 words, including figures and captions):

1. Run the python script (or write your own) to show that costs of congestion converge to a fixed fraction (linear scaling) of GDP (approximately) in recent years. Include the plot: for the last year in the data, if you take the exponent to be unity, what is the percent of metropolitan GDP lost to this measure of extra congestion (hint: use the intercept)?
2. Include the ranked histogram of residuals: Explain the diagram and state, according to this measure, what are the top 5 and bottom 5 most congested US Metro Areas? Do some detective work on a 2 of these and try to say why.
3. Look at the clustering of metropolitan areas by their congestion history. Pick a couple of cities clustered together and discuss. Change the measure of dissimilarity (lines 276-279), e.g. without normalization as we discussed in class: show the resulting clustering diagram and compare the two in terms of the two cities that were clustered together in the first approach (e.g. Chicago and NYC). Comment on the importance of measures of (di)similarity in creating typologies of cities: Are there general typologies?

**Individual files (data and python code):**

Code: link residuals\_and\_clustering.py

Data: link Real\_GDP\_Chained\_MSAs.csv population\_MSAs.csv output.csv allgmp.csv