There has been a lot of interest in the so-called "knowledge economy". Innovative regions contain an agglomeration of knowledgeable people who can collaborate to create something new. In the initial stages of a product's life cycle, production will occur in these innovative regions, but as the product characteristics become fixed and the production process settles into routines, the site of production tends to shift out to regions with low-cost and willing labor.

One way to identify innovative regions is to look at the locations where patent-filers live. The data file *S:\TEFF\450\2020\arcview10\cbsapatents.xls* contains four sheets:

- ***cbsapatents*** – the rows represent 876 micropolitan or metropolitan statistical areas (CBSAs). The columns represent 250 different categories in which the patents are awarded. The figures give the number of patents filed in the period 2000-2015 by residents of the row CBSA for the column category.
- ***USPCcode*** – describes the categories in the *cbsapatents* sheet. There are 402 categories but only 250 of these were chosen (the 250 with the most patent activity). The column entitled "used" has a "1" if the category was one of the 250 actually used.
- ***cbsaSummary*** – gives the number of categories for which patents were filed in each CBSA, and the number of patents. The final column shows the number of patents "used" – the total found on the sheet *cbsapatents*.
- ***countyData*** – gives the total number of patents in each year 2000-2015 for 3019 counties. The column "patents" gives the total number of patents in the period.

We will once again look at specialization using the **location quotient** formula:

$$LQ_i = \frac{\left(\frac{X_i^r}{X^r}\right)}{\left(\frac{X_i^{US}}{X^{US}}\right)} = \frac{\left(\frac{\text{Patents filed in category } i \text{ in region } r}{\text{Total patents filed in region } r}\right)}{\left(\frac{\text{Patents filed in category } i \text{ in the US}}{\text{Total patents filed in the US}}\right)}$$

We will use two shapefiles:

1) *S:\teff\450\2020\arcview9\states.shp* This layer outlines each state. It's mainly used in this assignment to help us see where Economic Areas are located.

2) *S:\teff\450\2020\arcview9\tl_2012_us_cbsa.shp* This shapefile outlines each Core-Based Statistical Area (CBSA). There are two kinds of CBSAs: Metropolitan Statistical Areas and Micropolitan Statistical Areas.

Copy *S:\TEFF\450\2020\arcview10\cbsapatents.xls* to your computer. Calculate location quotients, following the procedure you used last week. Join the location quotients to the CBSA shapefile.

Here is your assignment: Try to find spatial clusters of patents of a certain type. These locations can be interpreted as centers of innovation for a particular industrial sector. Produce maps for five patent categories.

Next Monday, be prepared to give a group presentation to the class (no more than 5 minutes long), using these maps. Try to interpret your findings.