1173-05-306 **Jason Cory Brunson*** (jason.brunson@medicine.ufl.edu) and **Mark Terasaki**. *Spatial graph analysis of glomerular capillaries.* Preliminary report.

Blood filtration occurs in renal capillary tufts called glomeruli, the internal structure of which bears on questions of function, development, evolution, and pathology. Due to the low resolution and labor-intensity of imaging technology, only a handful of studies reaching back decades have examined the discrete topology of glomerular capillaries. Commonalities in their structure have been neither mathematically characterized nor developmentally explained.

Recent tools in serial scanning electron microscopy and virtual reality enabled us to reconstruct the capillary networks of twelve murine glomeruli and trace spatial graph models. We used circuit analysis and centrality analysis to represent these as Reeb graphs, via which we observed heretofore undescribed structure and symmetry. Separately, we built a random graph growth model based on two mechanisms, angiogenesis and intussusception, which provided evidence that both play a key role in development.

We are currently developing a measure of lobular structure, a feature commonly attributed to glomeruli and plausibly associated with filtration efficiency and robustness to vascular damage. Our objective is to determine whether spatial constraints alone produce this characteristic topology in a random growth model. (Received September 21, 2021)