CALL FOR PARTICIPATION: A Workshop on

Living Structure as a Scientific Foundation of Maps and Mapping

(In conjunction with AutoCarto 2020: https://cartogis.org/autocarto/autocarto-2020/)

Discovered by Alexander (2002–2005), living structure is a physical phenomenon, just like a tree, that has two distinguishing properties: *"more or less similar things"* at each scale, and *"far more small things than large ones"* across all scales ranging from the smallest to the largest. These two notions underlie the two fundamental laws of living structure: Tobler's Law (Tobler 1970) and Scaling Law (Jiang 2015). The Earth's surface is essentially a living structure, in which these two notions recur at different levels of scale, e.g., at the global scale, at the continental scale, at the country scale, at the city scale, at the building's facade scale, and down to the ornament scale (Jiang 2019b). In essence, it is these recurring living structures that make maps and mapping possible. Given the right perspective and scope, living structure can be pervasively seen in our surroundings: not only in nature, but also in the things we human beings make or build. In some situations, however, we are not able to see the kind of living structure, particularly if we are constrained by a certain perspective or scope. For example, a street network is not a living structure, when seen from the perspective of street segments or junctions. Instead, the street network is indeed a living structure if seen from the perspective of individual streets, because across all scales, there are *"far more short streets than long ones"* geometrically or *"far more less-connected streets than well-connected ones"* topologically, or *"far more meaningless streets than meaningful ones"* semantically, whereas at each scale, there are *"more or less similar"* streets. What underlies the phenomenon of living structure is the new *third view of space*: space is neither lifeless nor neutral, but a living structure capable of being more living or less living (Alexander 2002–2005), formed under the organic cosmology conceived by Alfred Whitehead (1861–1947). The third view of space is clearly different from the two traditional views of space: absolute space by Isaac Newton (1642–1727) and relational space by Gottfried Wilhelm Leibniz (1646–1716), both of which are framed under the mechanistic world view of Descartes (1596–1650).

In this workshop, we will attempt to challenge the current paradigm of our discipline, regardless how it is named, either geography or cartography or GIScience, by advocating a new mapping paradigm. We will use the two concepts – natural cities and natural streets – to demonstrate the ubiquity of living structure and Scaling Law, and further demonstrate the automatic generation of all small-scale databases from a single large-scale database. The generated databases are not only for discrete map scales, but also for any scale in between. Some hands-on work will be carried out with two tools: Axwoman (Jiang 2019c) and head/tail breaks.

Objectives:

- To advocate living structure as a new scientific foundation of maps and mapping
- To introduce two fundamental laws of geography or living structure in general: Scaling Law and Tobler's Law
- To discuss why objectivity is favored over subjectivity in map making under the new mapping paradigm (Jiang 2019a)

Tools to be used:

- Axwoman (http://giscience.hig.se/binjiang/axwoman/)
- Head/tail breaks (https://en.wikipedia.org/wiki/Head/tail_Breaks), and
- NaturalCitiesModel (http://www.arcgis.com/home/item.html?id=47b1d6fdd1984a6fae916af389cdc57d)

This one-day workshop will be organized through lectures, hands-on exercises, and discussions surrounding living structure. Interested participants are encouraged to have Axwoman installed on their

laptops, and run the natural streets tutorial (Guo 2018) themselves prior to the workshop. During the workshop, we will offer a large dataset of pre-generated natural cities and natural streets from the OpenStreetMap data. Participants will have an opportunity to explore these data to develop a better understanding of living structure and Scaling Law. For this purpose, all participants must bring their laptops with the following basic tools installed: Excel, Axwoman 6.3, and ArcGIS 10.x (Axwoman requires either 10.2.0, 10.3.1, or 10.4.0). Internet access is essential for the workshop.

Keywords: Third view of space, Tobler's Law, Scaling Law, head/tail breaks, big data

Workshop instructor:
Dr. Bin Jiang, Professor in GeoInformatics
Faculty of Engineering and Sustainable Development, Division of GIScience
University of Gävle, SE-801 76 Gävle, Sweden
Email: bin.jiang@hig.se

Discussant:
Dr. Terry Slocum, Emeritus Professor
Department of Geography and Atmospheric Science, University of Kansas, USA
Email: t-slocum@ku.edu
(Note: Prof. Slocum is the principal author of the widely used textbook: *Thematic Cartography and Geovisualization*, Pearson: Essex, UK.)

Audience:
We wish to attract 10–20 participants, and the workshop may be cancelled if there are less than 10 participants.

References:
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