

The topic of my thesis is focused on creating a bio-inspired method for early stage structural form finding. The method is aimed at architectural designers and helping them contribute to material savings within the construction industry, achieve sound structural performance design at an early stage and explore a different aesthetic of architecture. To that extent this thesis heavily relies on Design Informatics and Structural Mechanics.

There are two distinct ways in which bio-inspired design and research can take place. The first one involves beginning with a real life problem and then finding a model, organism or system in nature which solved that problem, while the second one starts off by looking at a phenomenon in nature and then tries to seek out a suitable challenge which could be solved by it. Since my research is concerned with the latter, it deviated from the standard methodology path which is required or encouraged by the University, and in which a student is required to first find a problem and then find a solution. This has led to struggles in defining several aspects of the research such as Research problems.

The combination of various fields such as computational design, structural mechanics and biomimetic design in architecture proved to be quite a challenge. A successful integration of these three scientific fields into a single method necessitated coding. Thus, a large portion of time was spent learning how to code in Python, and how to use Python to manipulate geometry data and perform numerical analysis within Grasshopper. Thus the final code of the thesis is not optimal and could greatly be improved, which would certainly lead to a better performing method and more accurate results. However I am glad that I made the effort to learn how to code and realized how much this could extend the arsenal of tools used by architects and designers.

In the current state of development, the final tool is not ready for real life implementation so the initially set goal of developing a tool which could be used by architects has not been met. However, I do believe that a more useful outcome of this research is the process of the method development itself. Therefore the final value of the research is the process of the research, which I deem important since it contributes to the discourse of using bio-inspired computational methods in architecture.

One of the secondary objectives of the research was to make a tool which would be intuitive for the users. Due to time limitations the research hasn't reached that stage where user experience could be dealt with properly and tested to verify if the goal was met.