

# Computational Shape Optimization for Designing Compression-Only Masonry/Earthy Buildings

## Background and aim:

Masonry/Earthy structures can be made with sustainable materials while offering strong structural properties, especially if designed as compression-only structures. Optimal masonry structures might take complex geometric shapes that present computational design and structural validation challenges. We aim to derive optimal shapes directly based on a gradient descent optimization procedure as a constructible structure.

## Research question:

How to computationally find optimal catenary forms and approximate them with modular brick/block structures?

## Design objective:

To design and prototype a computational finite element modeler for masonry structures.

## Methods:

- Shape Optimization (req. Calculus, Linear Algebra, etc.)
- Computational Geometry & Topology
- Finite Element Analysis
- Computer Programming (Python or C#)

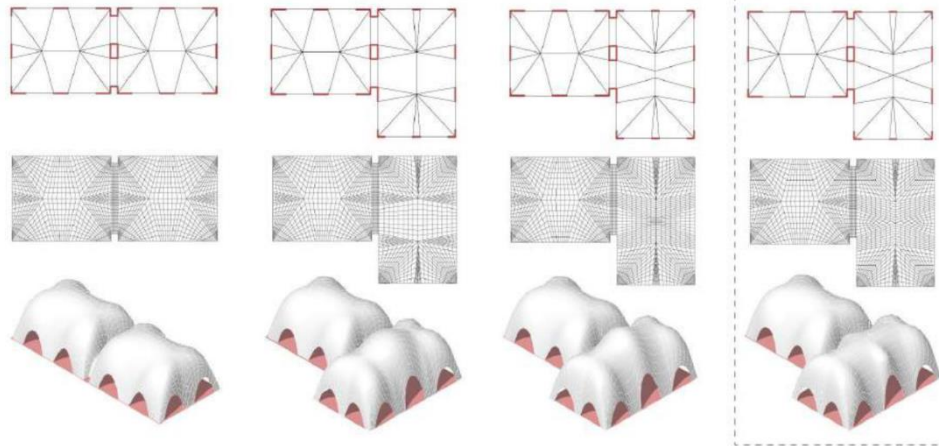


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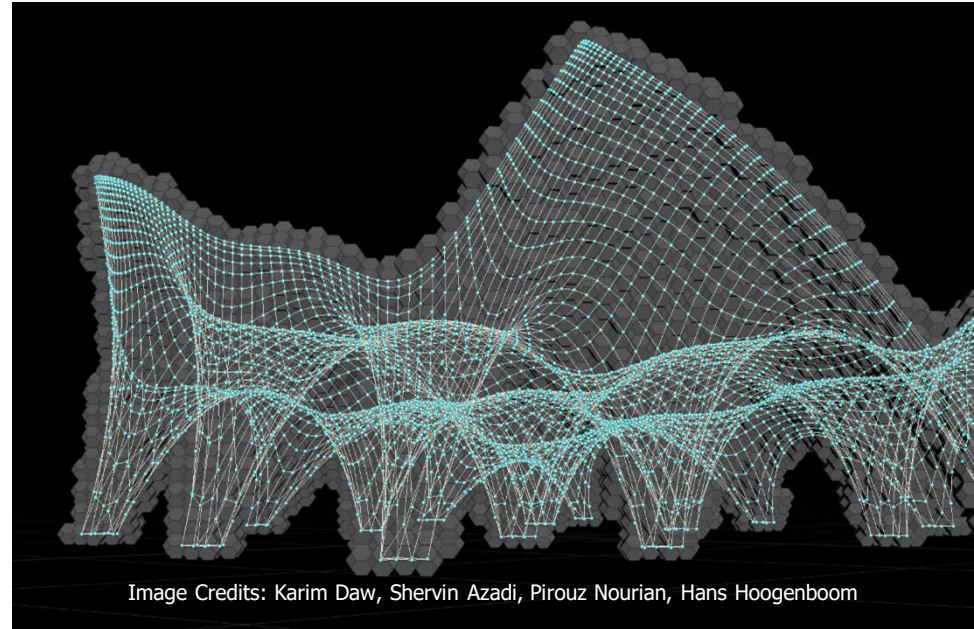


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Building Technology Graduation

Theme: Computational Design/Generative Design

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