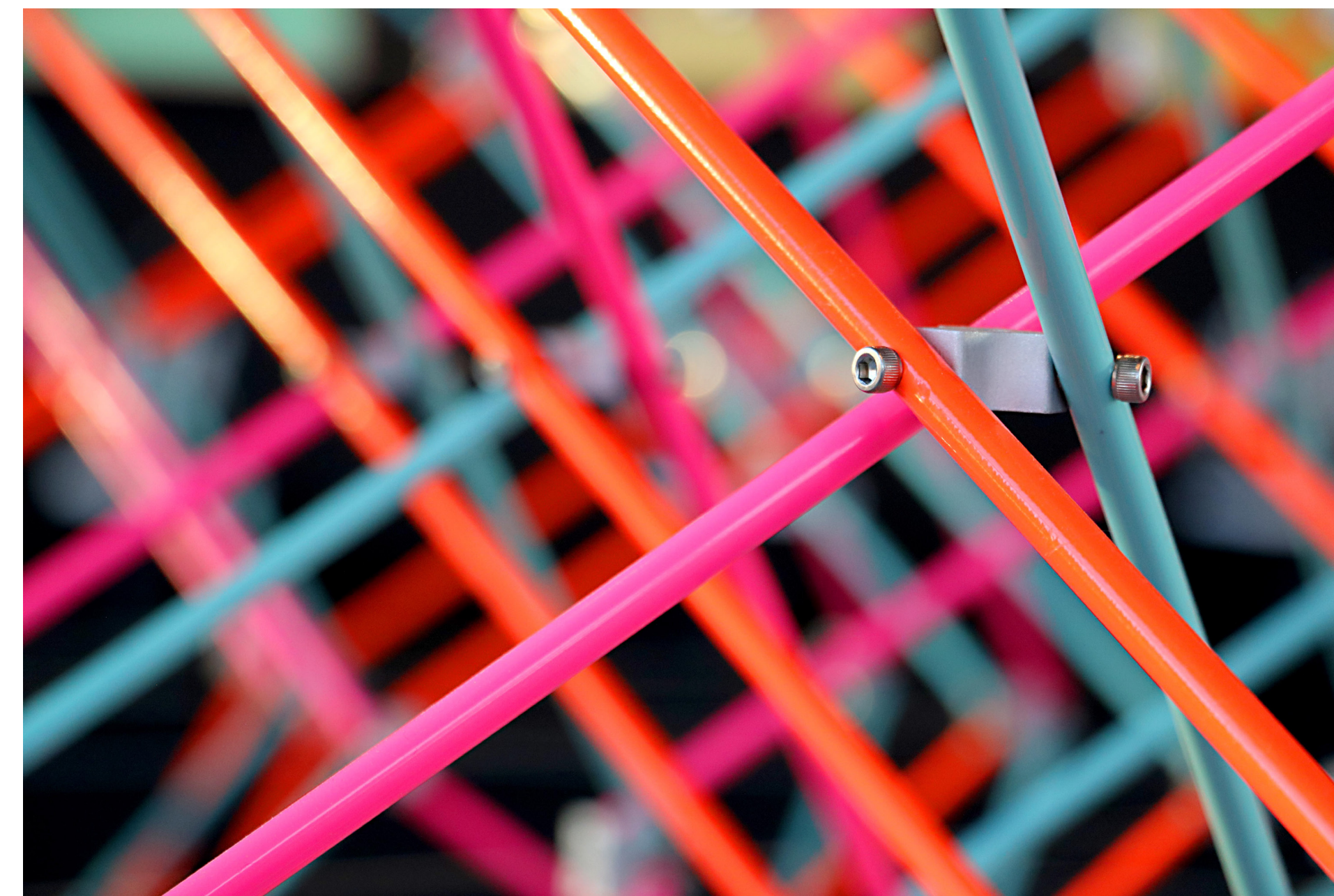


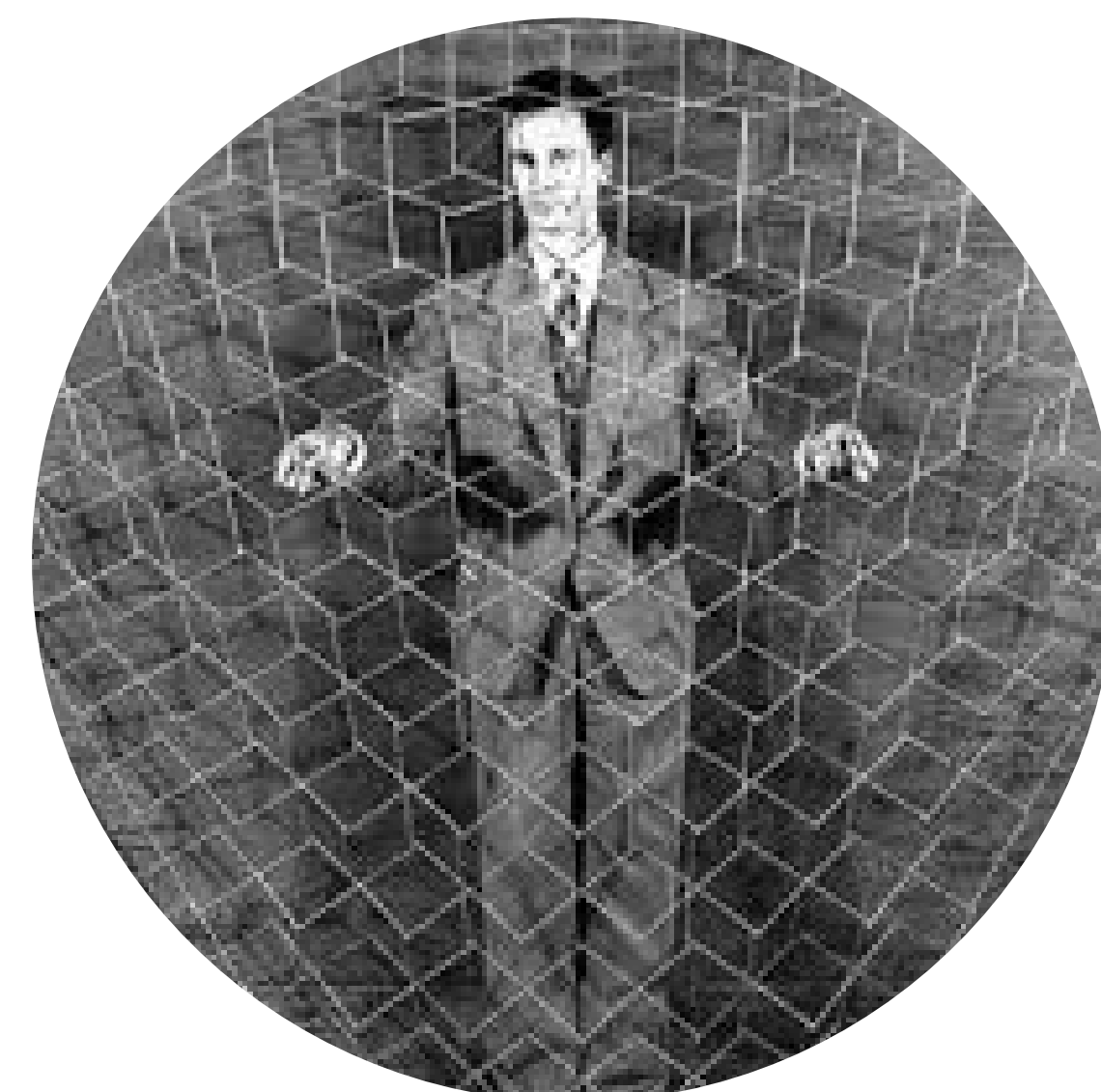
# DEPLOY:

## Spatial Patterns of Lightweight Landscapes



### ABSTRACT

Throughout history, designers have explored the concept of lightweight, collapsible and transformable environments. Ideas of such deployable structures first came into fruition during the 1950's and 60's by innovators such as Buckminster Fuller and Emilio Pérez Piñero. Today, these ideas have become especially relevant in our increasingly transient society and spaces. Such ideas have its roots in combinatorial design. Typically in architecture, part to whole relationships are emphasized. However combinatorial design introduces a paradigmatic shift in which part to part relationships are emphasized so that a more malleable and open-ended whole arises. This research consists in the very exploration of the kinds of the open-ended systems that arise in honing these part-to-part relationships. Ultimately, this research aims to express how combinatorial design essentially links malleability of structures to adaptability of space.



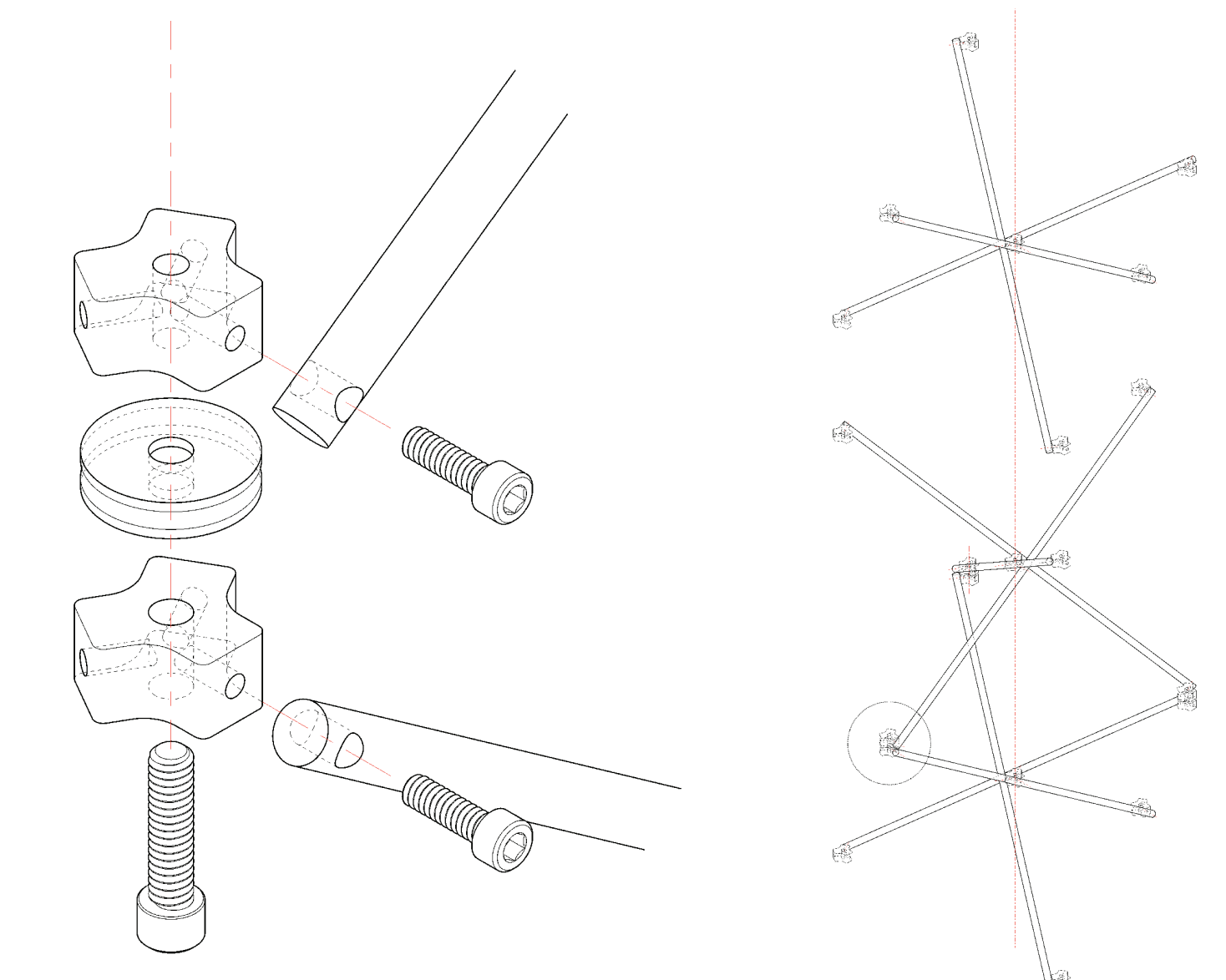
### BACKGROUND

- Both Buckminster Fuller and Emilio Pérez Piñero gave way to the modular approach to architecture, specifically in regards to projection and geometric principles with structures
- Fuller's geodesic dome results from a projected icosahedron onto a sphere
- This translates over to the Piñero model in that the equilateral triangle is present in both the Fuller model and Piñero model



### METHODS

- Researching precedents such as the works of Emilio Pérez Piñero, in particular his folding reticular structure
- Created 3D drawings to help visualize the union of many nodes in a more cohesive structure (e.g. large dome)
- Small scale models were made of Piñero's reticular structure in addition to scissor and trissor models. 3d prints of various joint types led to exploration of node design
- In building the final structure, powder-coated aluminum rods and nodes were refined, leading to final construction and presentation at the Research Through Making exhibition



### RESULTS

- Upscaling model to the intermediate model: begin to understand the joints at a larger scale and how that might be applied to a larger structure
- Varying joint types and hinge lengths affected the manner in which structures could open and close
- The resulting structure was able to support roughly 2,000 pounds given the structural integrity

### CONCLUSIONS

The final structure will be presented at future exhibitions and will also result in a published article on explicating the work of Piñero as well as our own results. The work will also be presented at future conferences, with plans to utilize and further develop practical uses for the structure within places such as Detroit.