

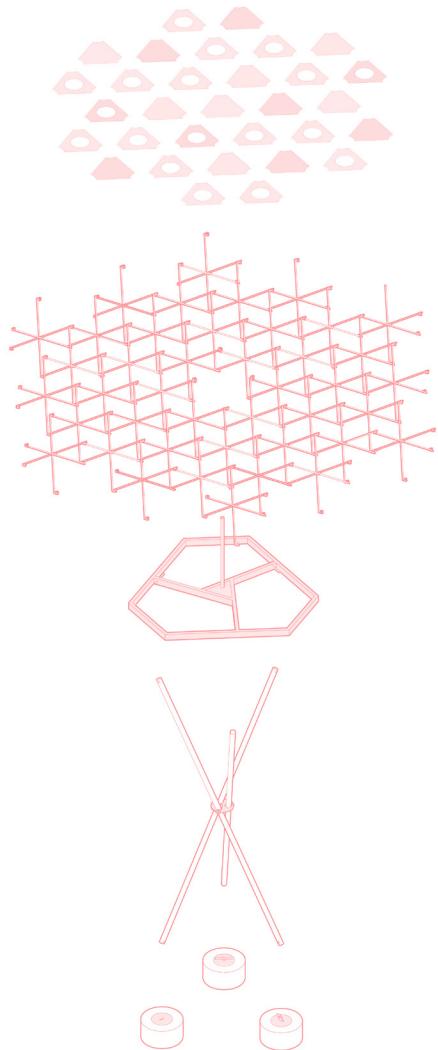
# GRADIENT

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Deploy 2.0



Canopy details

## FACULTY PROJECT PAPER

Exploded Axonometric

TAUBMAN COLLEGE



Title

# DEPLOY 2.0

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Completed

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Deploy 2.0 moves beyond human-centered design towards an approach that takes into consideration **not only humans, but also draws attention to the complete biosphere**. As humans, we share our environments with other species and influence their lives in subtle and more impactful ways. From this approach, the project advocates to engage the needs of other agents of the ecosystem and non-human species as the “end users”, in particular plants. **Using a deployable structure as a prototype to mediate sun exposure and promote plant growth, the project draws attention to biodiversity preservation for the medicinal plant garden at the Matthaei Botanical Gardens.** In a time where there is a heightened awareness of the human impact on the environment, how can architectural practices alleviate and improve the spatial conditions for humans and nonhumans alike?

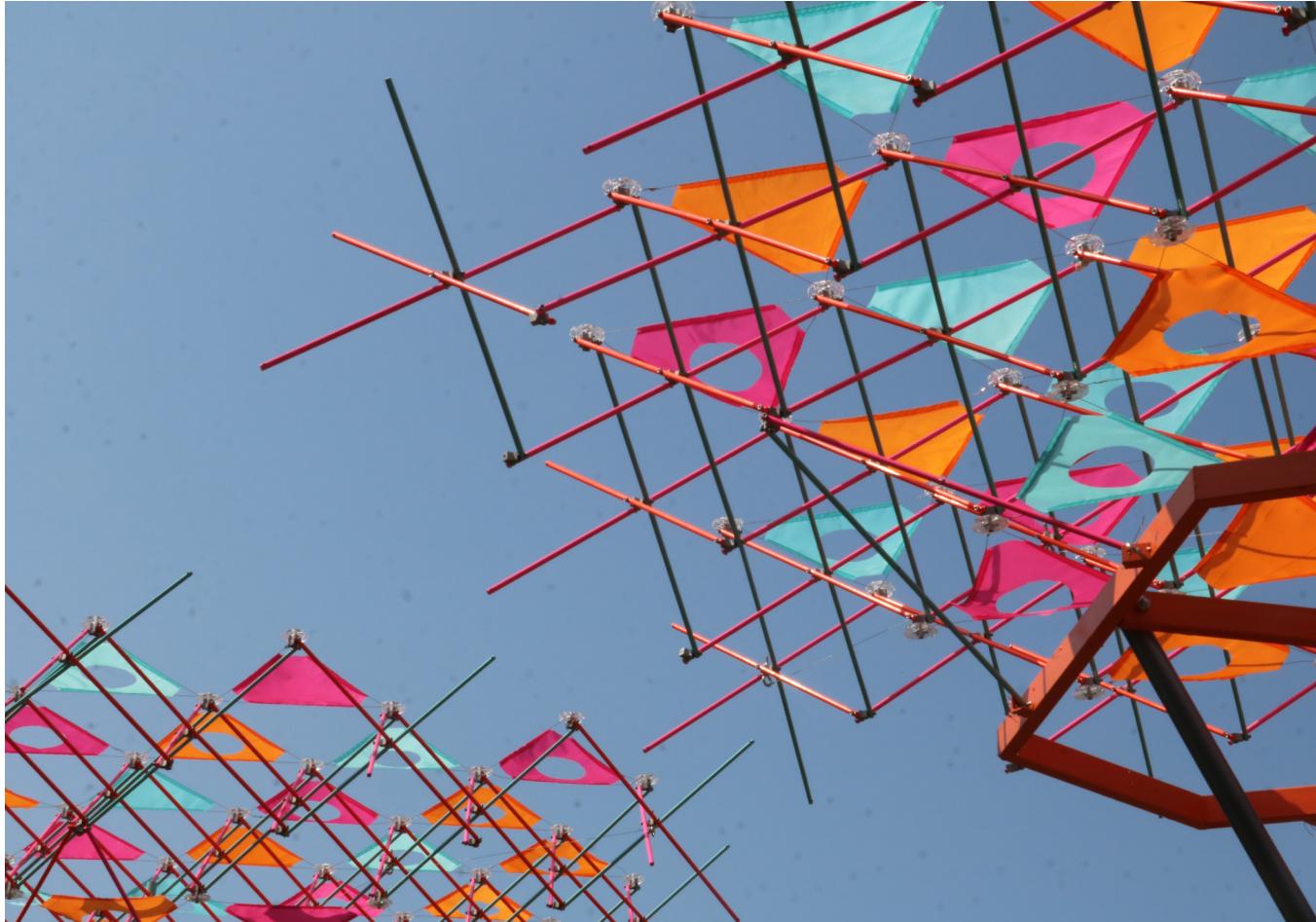
The installation presents a dynamic spatial canopy inspired by the deployable scissors mechanisms of the Spanish architect Emilio Pérez Piñero (1935–1972). Piñero’s work participated in new trajectories of the time that were concerned with future thinking and utopian visions of non-permanence in the collective realm. Piñero and his contemporaries all speak to a time where flexibility and user-centric customization was the dominant thread in disciplinary discourse. The design for flexibility and ephemerality is a response to the desire for a new kind of improvisational architecture that can adapt to the shifting cultural and social conditions of the time and place.



[Fig. 1] Aerial view, medicinal garden and Deploy 2.0



The prototype by Piñero manifested flexibility and ephemerality through a spatial structure. The system envisioned a collapsible set of rigid aluminum rods that form a compact, transportable bundle. The mechanism is formed by a central node connecting three rods that, when opened, cause two inverted equilateral triangles at the top and bottom of the three dimensional structure to appear. These units are further aggregated together to form a wide range of canopy configurations. The singularity of this idea is that the mechanism only achieves a rigid state once the end nodes are triangulated (by tension cables) to restrict their opening when the structure is deployed. In Piñero's words, the material structure

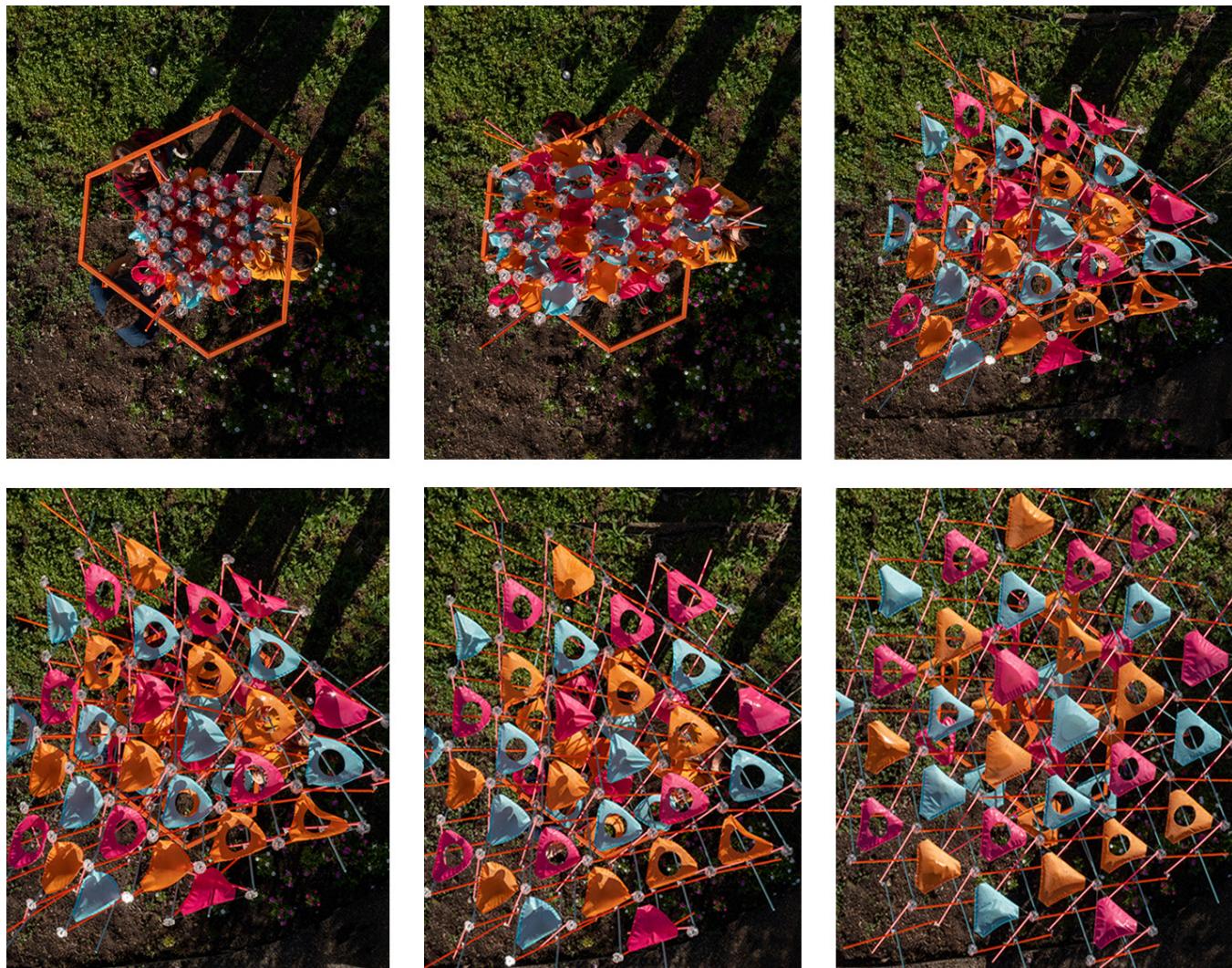


[Fig. 2-3] Canopy Details

<sup>1</sup> Oloriz, Clara. "On the Search for Spatial Patterns: Repetition as the Crystallization of a Design Method." *MasContext Journal*, Issue 21, March 2014. <https://www.mascontext.com/issues/21-repetition-spring-14/on-the-search-for-spatial-patterns-repetition-as-the-crystallization-of-a-design-method/> (Accessed February 15, 2022).

parallels the behavior of a "vertebrate body,"<sup>[1]</sup> the rods representing the skeleton in compression that channels the forces, and the tension cables an analogy of the muscular system that surrounds and maintains the skeleton as a living structure.

Deploy 2.0 revisits lightweight architectures as non-permanent and flexible catalysts for the collective experience. The colorful modular system is designed to expand and contract, imitating the annual cycle of a deciduous tree. During the spring and summer, the structure blooms and provides shade through a colorful arrangement of structural and fabric elements. The canopy's modular system allows for the density of the shade to be tuned to the needs of the plants below. In addition, the structure facilitates a new sensorial experience in the garden creating a focal point and space for gathering. During the fall and winter months, the canopy collapses, allowing for maximum sunlight to reach the plants below.



[Fig. 4] Bloom sequence

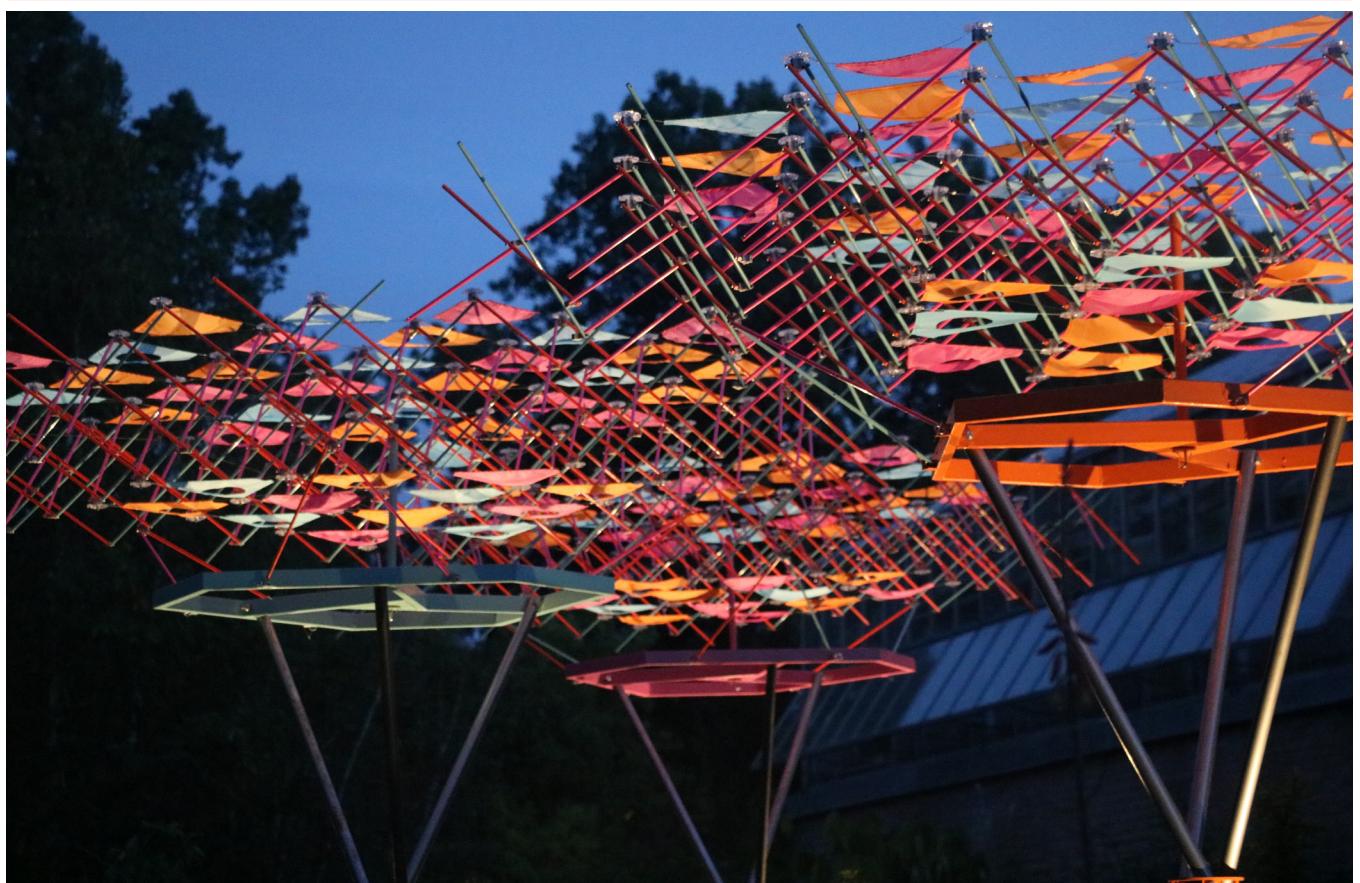
As a design/research exercise, the project's dynamic, playful, and sensorial presence encourages learning about the affordances of medicinal plants and lightweight deployable structures. In addition, it serves as a demonstration of principles for sustainability through passive systems and simple actions that promote environmental awareness. The understanding of geometric and structural combinations in the system allowed us to reflect on their aggregation possibilities as a way to define space and play a role in the necessary multiplicity, impermanence and flexibility of an ever-changing environment. As a design of aggregated parts, the structure relies on the definition of the most basic element or "building block," which allows for an undetermined series of linkages to like elements. As these units are coupled together to produce larger assemblies, it is possible to describe new performative and functional possibilities at various scales of configuration. Since the system is based on a common unit, it will always remain open-ended, malleable and tunable to the needs of the garden.

**DESIGN &  
ENGINEERING TEAM**

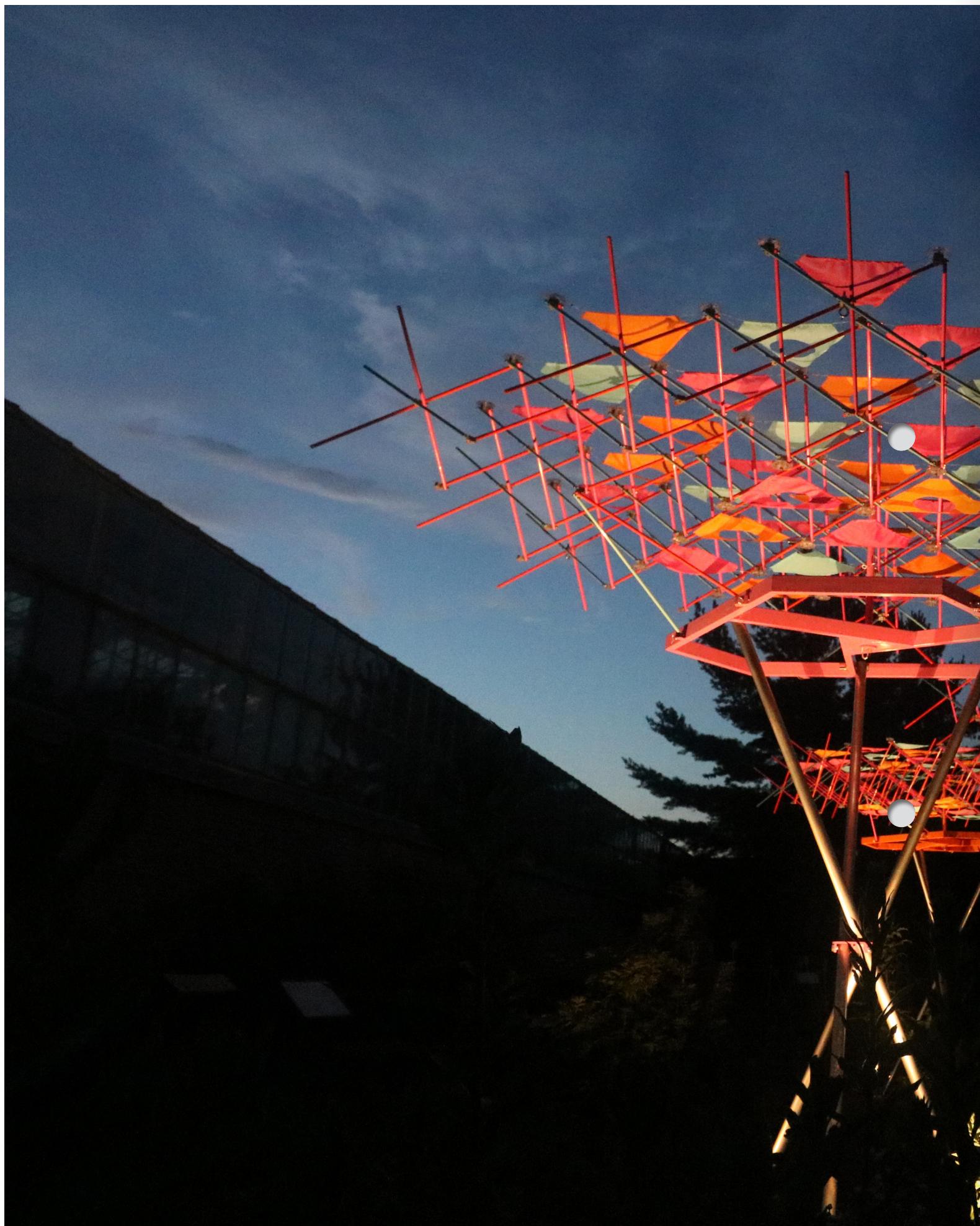
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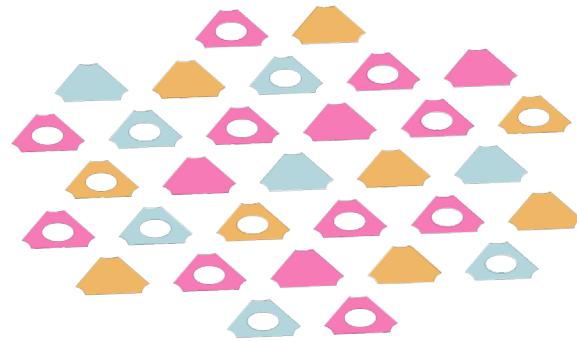
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Deploy 2.0 was generously  
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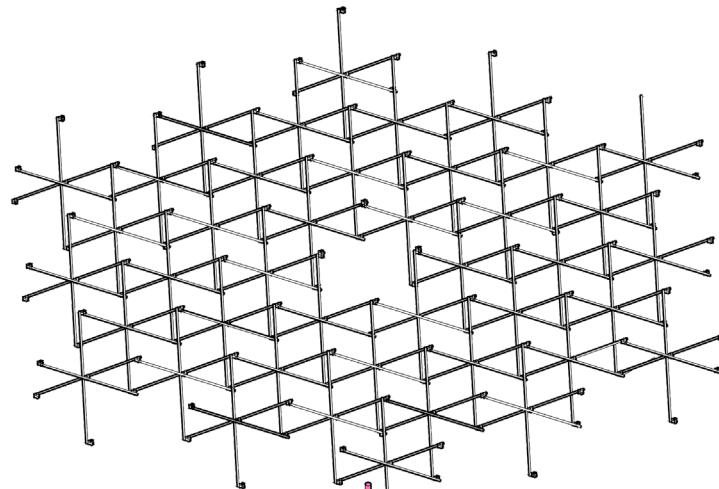
[Fig. 5] Deploy 2.0 at night



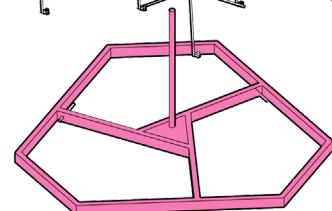




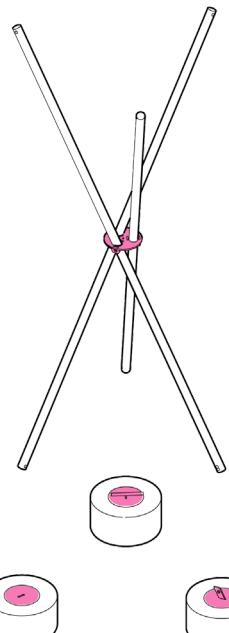
ALUMINUM  
DEPLOYABLE  
STRUCTURE



BASE CAPITAL

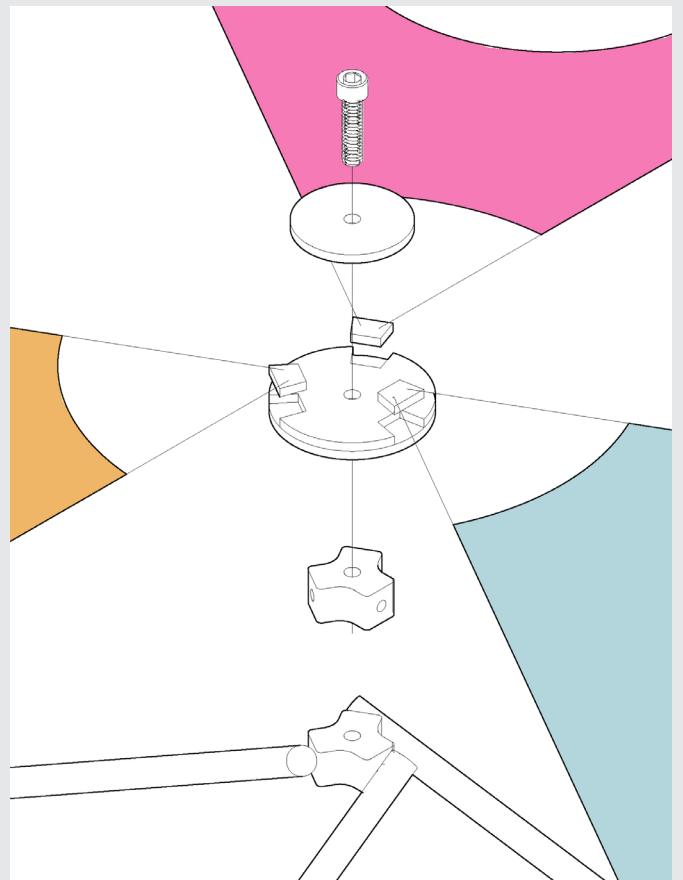


BASE COLUMNS

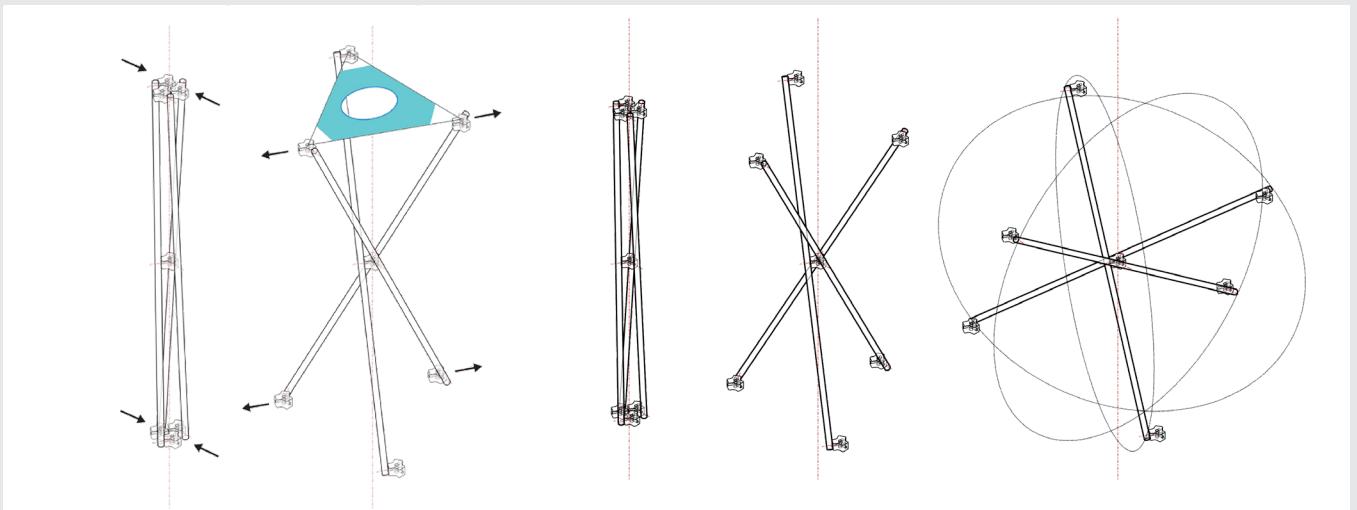


BASE FOOTINGS

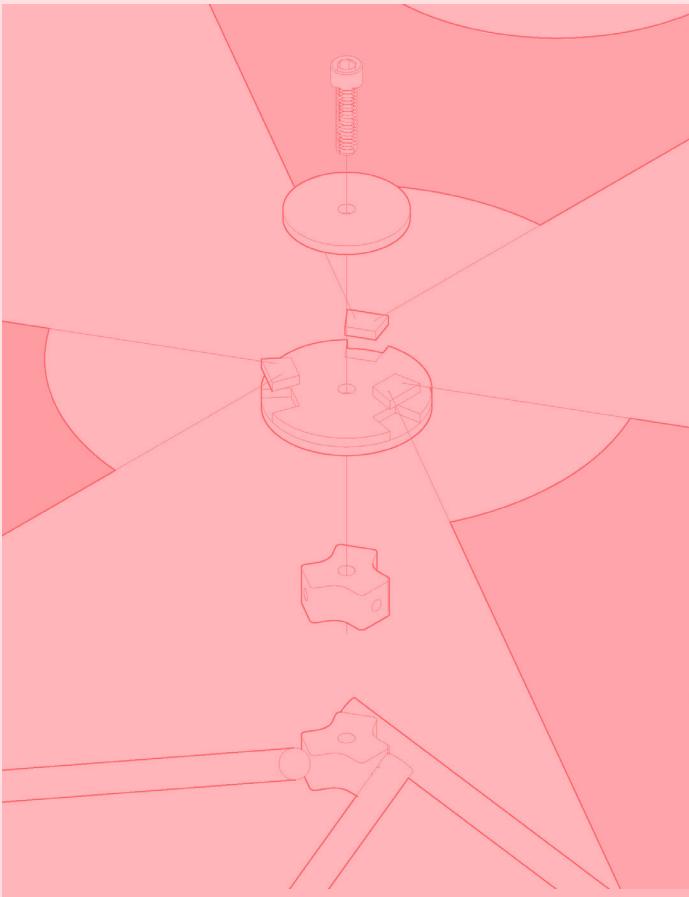
[Fig. 6] Exploded Axonometric



[Fig. 7] Shade to structure node detail



[Fig. 8] Kinetic unit detail



Shade to structure node detail



Canopy details



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