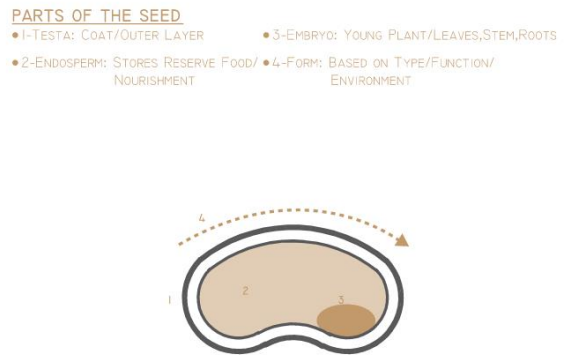
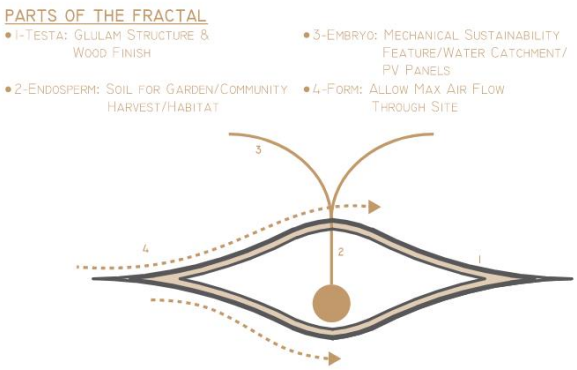
The Seeds We Sow

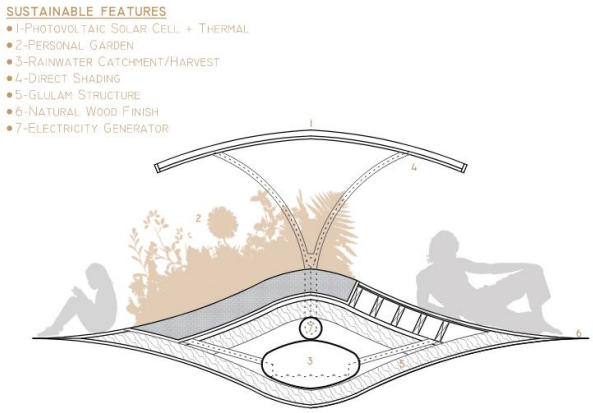
Mannheim has a history of innovation, ingenuity, and a diversity of the arts, pushing the progress of learning and cultivating a future with a higher quality of life for all. This sustainable land art encapsulates these quantitative and qualitative qualities starting with the very seeds found in this town. Fractals are naturally occurring patterns in nature when a geometric shape can be split into parts, each of which is a reduced size copy of the whole. From snowflakes to the human form, the fractal Fibonacci sequence has been translated into architecture throughout history. Fractals in nature are developed over millions of years, forming from the fundamentals of its respective environment. The fractal for this design is derived from the local flora, the indigenous flowers and wheats that are common and grown in Germany. Extracting the seed's basic structure and parts, a basic fractal shape is developed, which can serve multiple functions at various scales. This land art draws its form from the seeds of Germany and grows into an interactive and immersive experience at various scales while incorporating a combination of different and innovative sustainable features. The fractal first radiates out from the center, but then are specifically displaced throughout the site to better serve each of their functions. Garden, Play, Harvest, Habitat, and Learn each lead you from your home to throughout the park in various paths, experiences, and scales. Pathways extending from the Learning fractal out to the neighborhoods create a network of walking and bike paths, circulating visitors throughout the site to various destinations and experiences. The existing U-Hall will be partially torn down and partially reused to store the supplies and excess food from the Harvest fractal. The pond will remain as a natural asset and feature in the park. The large Habitat fractals create gateways from the major directions and collector pathways which visitors will be entering from. The Play fractal is grouped in two areas to encourage gathering of people and encouraging activity. The Garden fractals are dispersed around the entire park to create moments of rest and pause to relax and enjoy the surrounding nature. This shape is tailored specifically to allow for a diversity of sustainable techniques while not impeding on the air flow throughout the site. The idea of fractals directly leads to the implementation of scalable structures. From the personal garden to the civic center these fractals embody the symbiosis of mechanical innovation and biological beauty. The fractals rise and fall throughout the park, creating different space and experiences above and below. They provide a range of vantage points at various heights to observe the park and surrounding landscape, and even city beyond. Conversely the under sides create intriguing spaces of shelter and mystery. From dwelling nooks to great gateways, the fractals grow from the ground providing a landscape in motion, to be walked and wondered through, making this park an inspirational gateway to the Green Corridor.





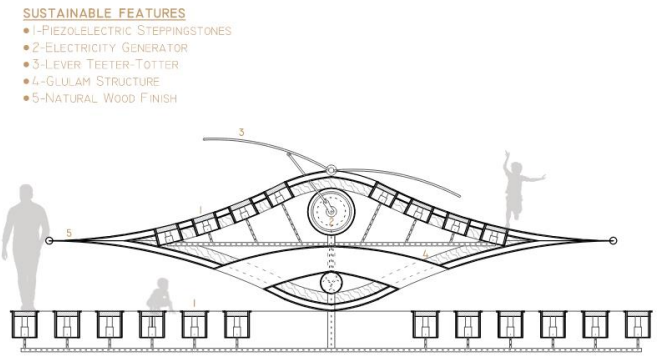
Garden

Fractal one is “Garden”, the smallest of the fractals which starts at the human scale. This provides a modular curved bench and garden to be incorporated in any individual’s backyard or used as a public resting stop. A photovoltaic canopy doubles as solar power generator to electricity for the home, as well as an immediate shading device. Constructed from an internal glulam frame, sheathed in wood, with a garden bed on top and water catchment at the base inside the exterior finish. The water can be harvested through a side access hatch. The direct solar panel absorbs energy and generated into electricity in the middle which can be used by the owner.



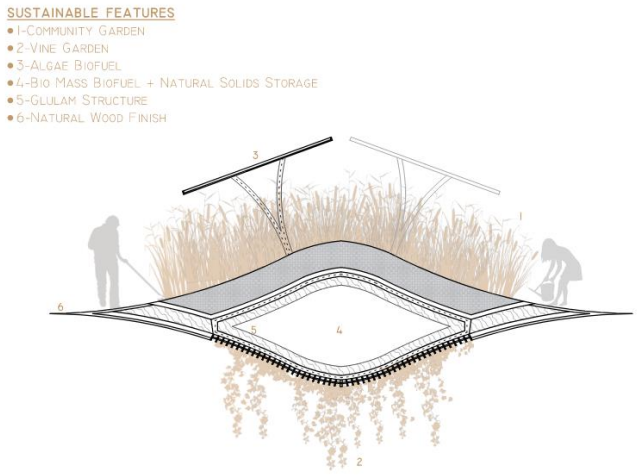
Play

Fractal two is “Play”, 1.66 times larger than the Garden fractal. At this scale the kids can use the structure as a climbing playground. Here the fractal starts to curve up and appear to “grow” out of the ground, allowing kids to pass over, under or through the structure. Using piezoelectric techniques, mechanical steppingstones in the ground and on the fractal turn the running and stomping of people into usable electricity. On top is a lever teeter-totter mechanically powering an electrical turbine in the middle of the fractal. This gives children a simple and familiar moving element which turns their physical energy into electricity.



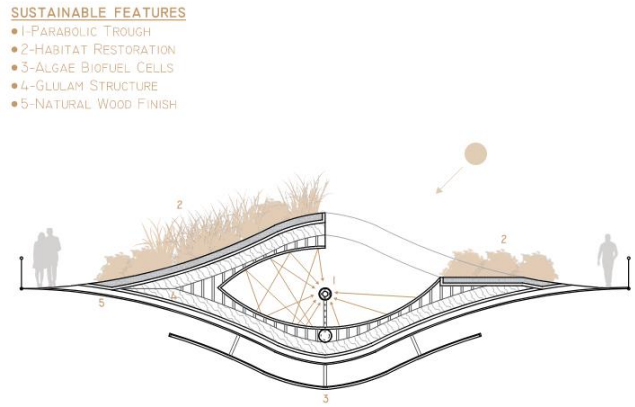
Harvest

Fractal three is “Harvest”, 1.66 times larger than the Play fractal. At this scale there is enough space to create large areas of community gardens and biomass to fuel production. This fractal grows even further out of the ground allowing for the gardening of vine-based plants underneath with enough space under that for tables and chairs, providing an experience of a shaded cave like seating area, shrouded in vines. The rainwater not used above and runoff from the walking sides, gets captured and trickles to the vine plants below. Above the harvest plants are circular canopies with algae biofuel cells in them, which besides producing fuel for emergency generators, these canopies sprout from the surface given its distinct designation of the harvesting fractal.



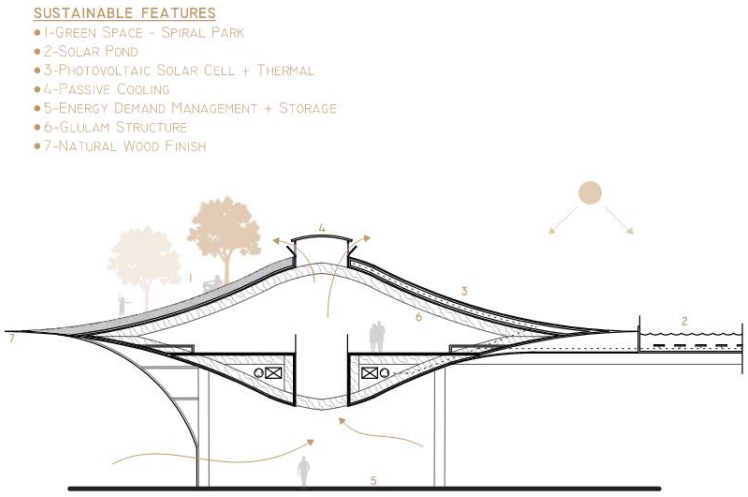
Habitat

Fractal four is “Habitat”, 1.66 times larger than the Harvest fractal. At this scale we can create larger areas for habitat restoration for the local fauna and flora. Here the fractal grows to 30 feet above the ground at the center. Creating a scenic bridge to walk over and get a high-level view of the grounds. These fractals are positioned at the major access points coming from the surrounding community, creating a gateway to pass under into the park. As you pass though the gateway the underside is algae biofuel panels, giving an ever-changing living green visual to welcome you. In the center of the fractal is a solar panel parabolic trough, capturing the sun’s power and converting it to electricity for the site.



Learn

Fractal five is “Learn”, 1.66 times larger than the Habitat fractal and is the largest scale. At this size we can in inhabit the fractal shape itself in its full building form. At the center of the park, this fractal creates the learning center for classes, demonstrations, and exhibits to take place. Room for a café which uses the very plants harvesting from fractal three. Here people can learn of all the variety of sustain practices used in the park. As the fractal grows from the ground it creates a spiral park on the outside slope and walkway of its own filled with trees and green space, at which at the top you can get a bird’s eye view of the whole park and surrounding area. The inside slope is a PV panel solar cell converting the sun’s power into electricity. The center void of the spiral is a solar pond which doubles as the roof of the center’s interior and brings the presence of water into the fractal.



This park and learning center would be an energy plus site generating more power than it uses and giving the extra back to the grid. This would satisfy all parameters and metrics of sustainable benchmarks such as LEED, WELL, Living Building Challenge, Passive House, as well as incorporate the principles of biophilic design fulfill nearly all the goals of the United Nations sustainable development. The techniques incorporated throughout the fractals are a combination of innovation and progress for the development of generations to come. Power and food production, a growing and adventurous landscape, with learning at the heart of it. Embodying the goals of the United Nations, the seeds we sow is to plant the ideas of who we are and how we are to move forward with designing our communities throughout the world for a better tomorrow.

Environmental Impact

The fractals come together to create a cohesive and imaginative experience, while also each having a particularly different set of sustainable techniques unique to their scale. The fractal shape and bridging above ground allow air flow to continue throughout the site nearly unobstructed. The fractals four and five on the site combine to add 70,000 sf of habitat and 117,000 sf of additional park on the central learning fractal. The natural bowing of the shapes off the ground and 100% permeable surfaces allows for 100% rainwater catchment and retention on site. Fractals one and three combine for 36,900 sf of community gardening space on top, and an additional 28,950 sf of gardening for hanging vines plants underneath the Harvest fractal. Together these fractals could potentially produce an annual yield of 90,000 lbs. of food on site. Photovoltaic panels, parabolic troughs, algae cells, a solar pond and piezoelectric generators dispersed between all the fractals create 2,500 MWh of electricity a year. Enough to run the learning center and bioluminescent site lighting, and still give back to the grid for the surrounding town to use. Generations to come can learn about all these various sustainable techniques so to be better aware of the possibilities that ingenuity and design can produce when thoughtfully combined for the advancement of the neighborhood and larger community.