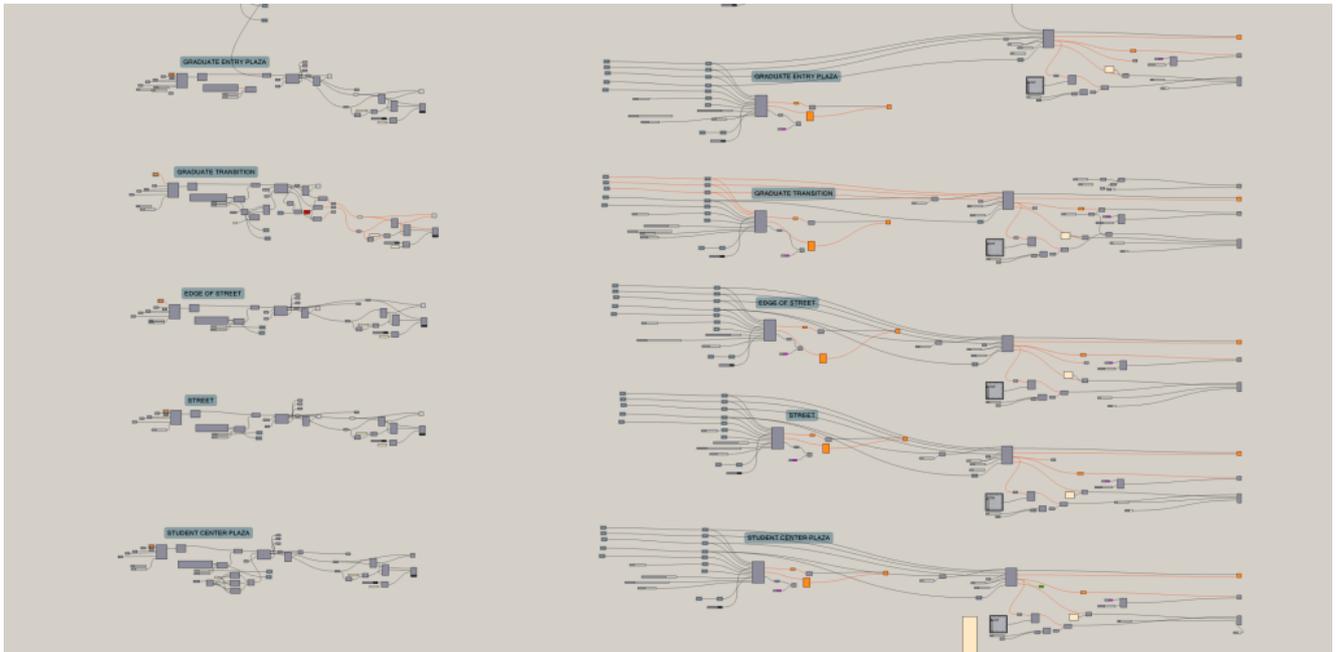


Parametric Paving: A New Layer of Design

The Parametric Paving project, executed by [LANDAU](#) for landscape architect Crowley Cottrell, is a remarkable case of overcoming complex design constraints with precision and creativity. The goal was to enhance the paving design across five areas with a randomized matrix of pre-ordered pavers in three colors, all while adhering to strict constraints: no increase in total paver area and no alteration to the established color ratios.

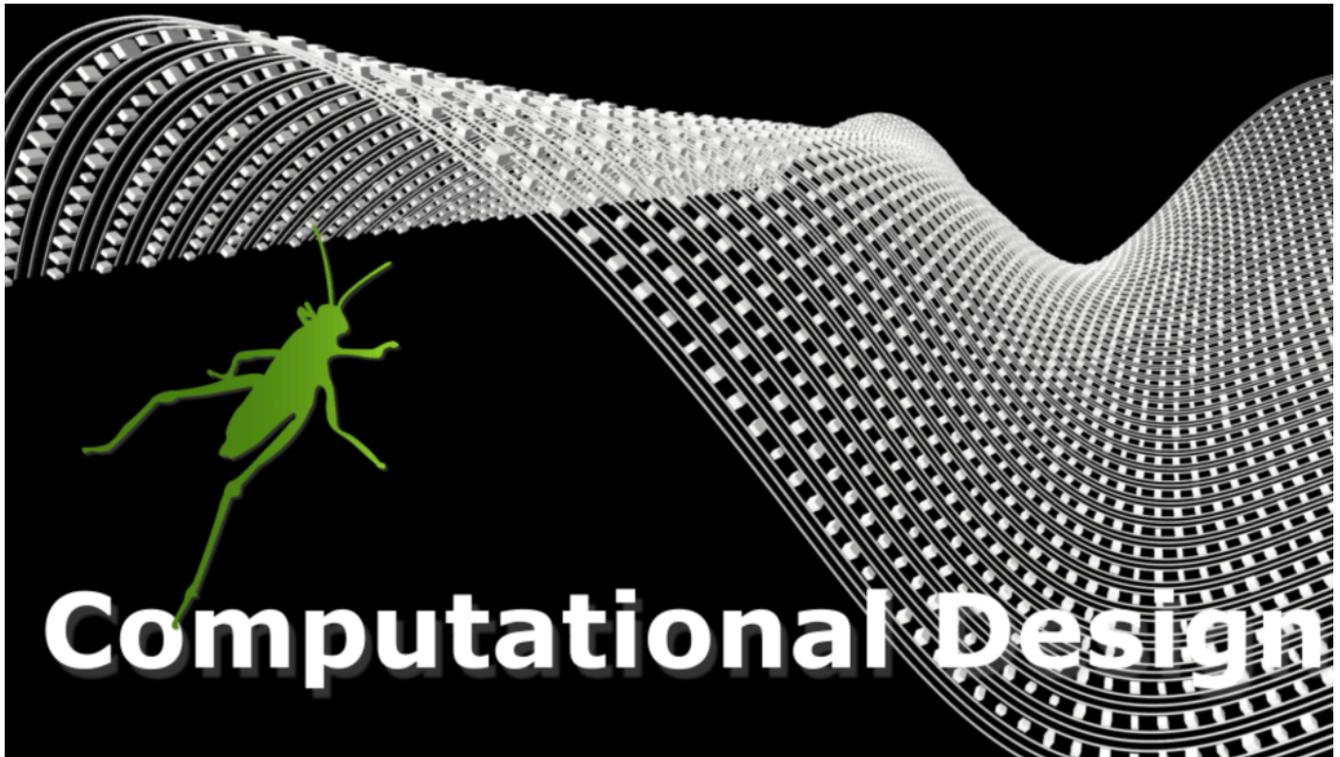


LANDAU took on this challenge using their [Grasshopper](#) plugin, [Land Kit](#), which enabled the rapid generation of multiple design options. The first major hurdle was designing and visualizing patterns within a limited timeframe.



Land Kit's capabilities allowed the team to quickly iterate, handling multiple design areas simultaneously while ensuring that each design was unique yet adhered to the overall project constraints.

A significant aspect of the project involved maintaining a precise balance of the three pre-selected paver colors across the site. To achieve this, LANDAU developed a custom script that calculated the color balance in real time as new iterations were generated. This feedback loop allowed the team to make quick design adjustments, ensuring that each change would still meet the 33% color ratio requirement. The process provided a way to maintain color harmony and offered the flexibility to adjust the design without affecting the overall balance.



[See Also](#)

[COMPUTATIONAL DESIGN WITH GRASSHOPPER](#)

During the collaboration with Crowley Cottrell, the design took on more depth. As Mark Warfel, a representative from Crowley Cottrell, explained, “working with them and their tools moved the focus of the design from balancing the paver percentages to focusing on what we wanted the paving pattern to communicate.



It gave the paving more meaning and I remember us having conversations like ‘the door landings should all be dark’ and ‘the main paths of travel be light,’ landing us on the concept of a gradient that highlighted paths as if there was wear from frequent travel.”

The design rationalization for construction presented another challenge. LANDAU’s approach involved breaking down the complex paving patterns into dimensioned cells within a grid, each tied to a specific location on the site.



By calculating the paver color percentages for each cell, the team was able to provide clear documentation for construction. This approach not only ensured accuracy but also facilitated a smoother installation process. The construction documentation was so detailed that no physical mock-up was required.



What made this project unique was the flexibility that came from using a parametric design process. Land Kit's capabilities allowed for quick testing and modification of design ideas. This led to the exploration of several design alternatives, which Crowley Cottrell could review and refine.



Ultimately, the team at LANDAU was able to deliver a complex yet constructible paving design that stayed true to the project's constraints while adding an unexpected layer of creativity and meaning.

This project highlights how parametric tools like Land Kit can push the boundaries of design. Instead of limiting creativity, these tools enabled the designers to explore new possibilities while still meeting practical constraints, resulting in a project that is both technically sound and visually compelling.

CREDITS

Architecture – Dimella Shaffer

Landscape Architect – Crowley Cottrell

Parametric Paving Design – LANDAU Design+Technology

Tools – Land Kit (Rhino+Grasshopper Plugin)

Project – UMass Amherst student housing