

Bringing Concepts to Life: Parametric Wall Creations at UDLAP

In the Parametric Design course at [Universidad de las Américas Puebla \(UDLAP\)](#), students have been harnessing digital tools like [Rhino](#) and [Grasshopper](#) to redefine the possibilities of decorative wall objects. The course emphasizes creative and technical mastery through projects where students translate abstract ideas into physical works via digital fabrication techniques.

Featuring projects *Deep Blue Resonance*, *Oceanic Rhythm*, and *Symphony of Rays*, this article delves into the varied artistic processes, challenges, and production techniques employed to bring each concept to life.

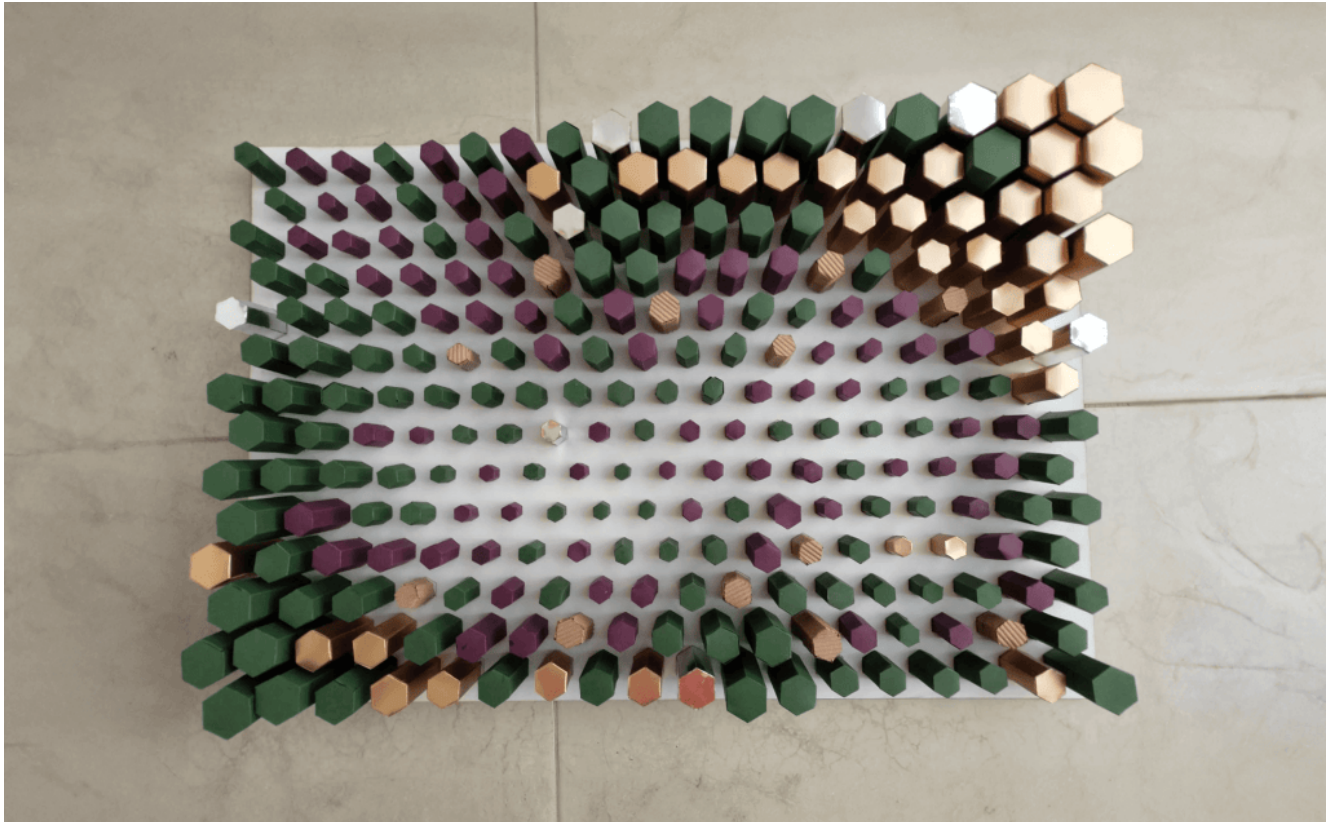


Geodal Lotus fabricated with a filament 3D printer by Johann Francisco Porras Martínez, Sofía Alejandra Domínguez González,

and Carlos Alberto Puertos Santoyo

COURSE FRAMEWORK & DESIGN APPROACH

Each student project in this collection was tasked with incorporating parametric techniques into decorative wall pieces, using methods like laser cutting, filament 3D printing, and resin 3D printing. Through the use of [OpenNest](#) and [IVY](#) plugins, students efficiently organized and unfolded model geometries, optimizing for specific fabrication processes.



Oscillation of Time fabricated with a laser cutting machine by Abigail Cuautle Ortiz, Elizabeth Morales Trejo, Noe Alejandro Avelino Jordan, Melanie Vivian Herrejon Carreon, and Keila Alejandra Marquez Santoyo.

Challenges arose in controlling each project's dimensions and volume count, as parameters were set to meet precise requirements for each fabrication technique. Students had to balance technical constraints with creative goals, often iterating multiple times to achieve the desired aesthetic without sacrificing structural integrity.

PROJECT HIGHLIGHTS

Deep Blue Resonance



Deep Blue Resonance by Jessica Lisbeth Aguilar Calvillo,
Nathalia Melissa Gómez Burgos,
Ana Betsabé Torres de la Luz

Inspired by the rhythmic motion of ocean waves, *Deep Blue Resonance* is a parametric piece that captures the fluidity of water. Through Grasshopper-generated algorithms, the students crafted undulating shapes and patterns that visually represent the ocean's constant transformation.

Each line and contour was meticulously adjusted to reflect the water's energy and depth, with a gradient of blues and turquoise adding dimensionality to the design. This project invites viewers to reflect on humanity's connection to nature, merging aesthetic beauty with a deeper environmental message.

Oceanic Rhythm



Oceanic Rhythm by Alejandra Rossano Martinez, Karime Vázquez Ahued, Isamari Martínez Mendoza, Jimena Vasquez Soberanes, Ana Sofía Guillen Campos

The *Oceanic Rhythm* project builds on the ocean theme with a wall decoration that incorporates both flowing motion and structural complexity. Using an attractor curve within Grasshopper, the students guided the formation of wave-like elements, breaking down complex geometries into triangular facets for a stylized and striking look.

This approach allowed them to maintain an organic, fluid motion while enhancing visual impact with angular shapes. Blue-toned paper was laser-cut and arranged into a unified composition that mirrors the vastness of the ocean, demonstrating how Grasshopper's parametric controls can guide both form and texture in a cohesive, captivating piece.

Symphony of Rays



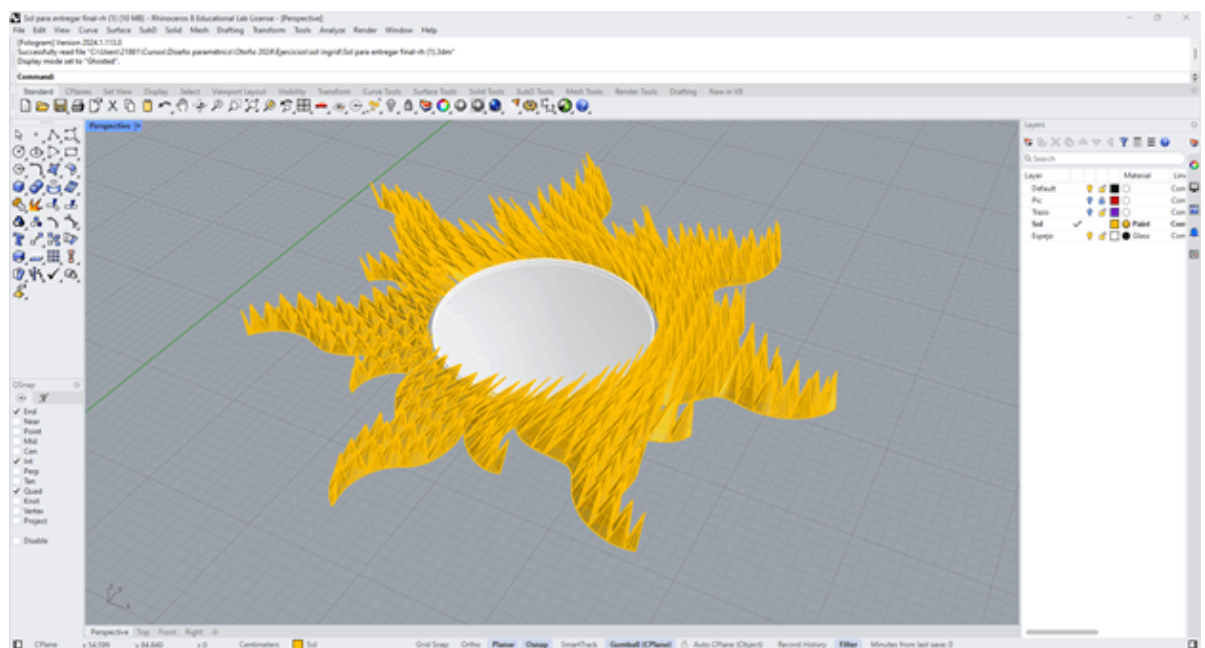
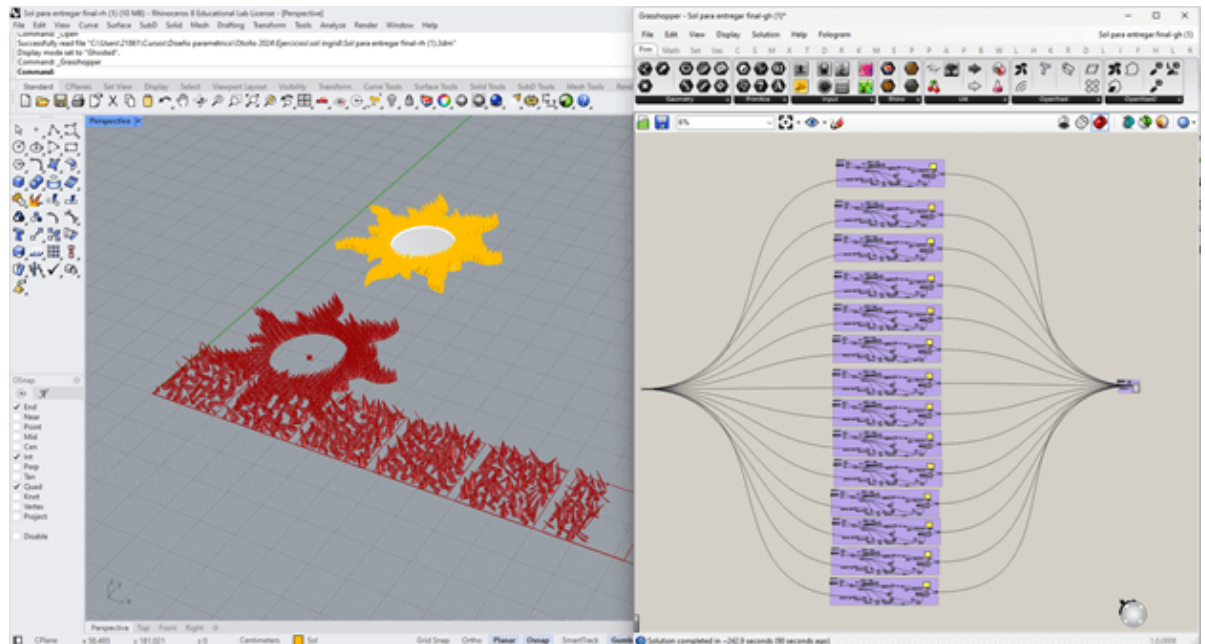
Symphony of Rays by Ingrid Mandujano Aguilar, Angelica Michelle Díaz Campos, Dariana Cariño Olivier

Representing solar energy through parametric design, *Symphony of Rays* combines art and science, with a stylized sun motif crafted from layered triangular structures. This design showcases Grasshopper's power to generate radiating forms that suggest movement and warmth, symbolized by a mirror core that reflects light from its surroundings.

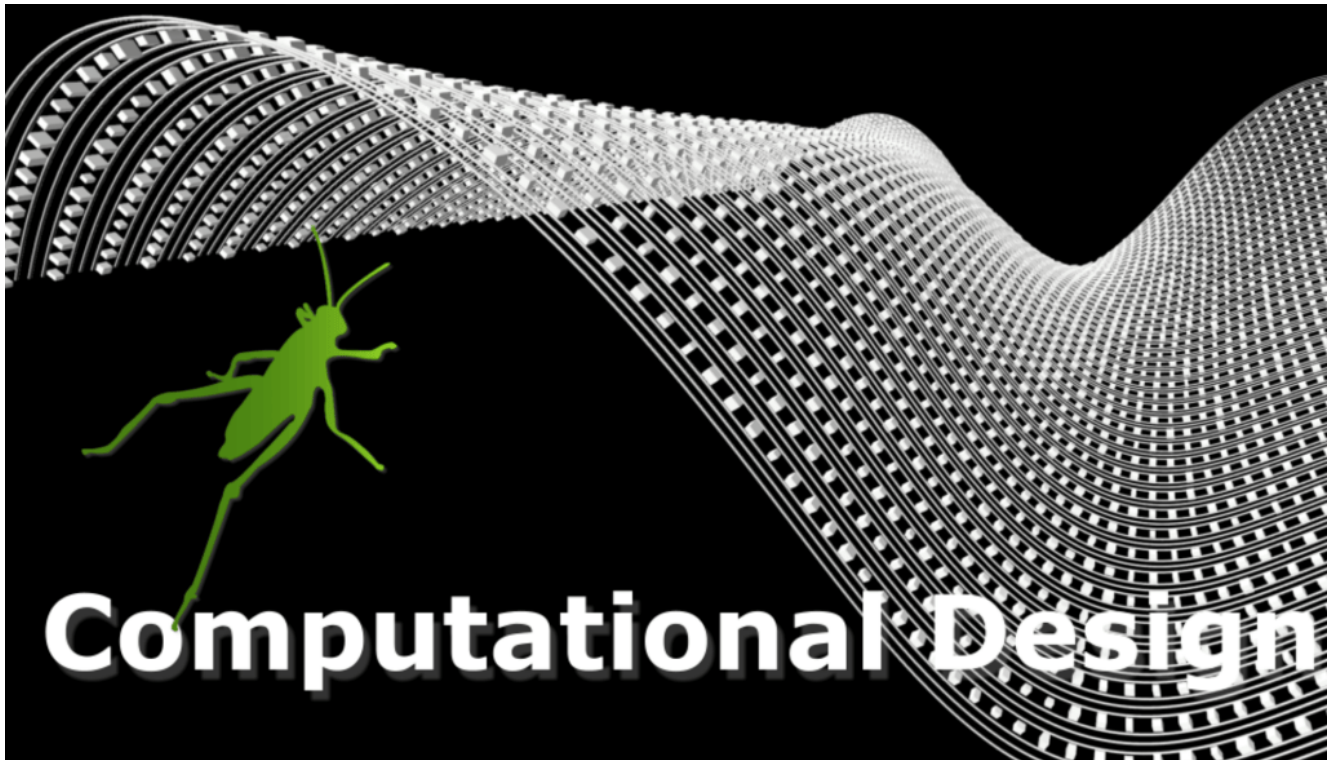
3D-printed in filament, the piece leverages digital techniques to achieve a form that feels both robust and delicate, echoing the energy of the sun's rays. This project demonstrates how advanced digital fabrication can push the boundaries of traditional design, inviting the viewer to contemplate the intersection of natural forms and digital artistry.

PROCESS & TOOLS

Each of these projects illustrates the creative potential of parametric design in decorative arts. By utilizing Rhino and Grasshopper's modeling capabilities, alongside plugins like OpenNest for piece arrangement and IVY for unfolding models, students navigated the technical demands of digital fabrication while achieving artistic visions that reflect natural inspirations.



This blend of aesthetic exploration with technological precision enables designers to create visually engaging works and inspire a deeper appreciation of the environment through art.



[See Also](#)

[COMPUTATIONAL DESIGN WITH GRASSHOPPER](#)

These UDLAP projects stand as a testament to the powerful role that parametric design and digital tools can play in fostering innovation at the intersection of art, nature, and technology.

CREDITS

Jessica Lisbeth Aguilar Calvillo, Nathalia Melissa Gómez Burgos, Ana Betsabé Torres de la Luz – Deep Blue Resonance Creators

Creators: *Alejandra Rossano Martinez, Karime Vázquez Ahued, Isamari Martínez Mendoza, Jimena Vasquez Soberanes, Ana Sofía Guillen Campos* – Oceanic Rhythm Creators

Ingrid Mandujano Aguilar, Angelica Michelle Díaz Campos, Dariana Cariño Olivier – Symphony of Rays Creators

PhD. Arch. Edwin González Meza – Professor of the course Parametric Design.

Eng. Jeny Elizabeth Chávez Martínez – Coordinator of the Model and Digital Fabrication Lab

Abigail Cuautle Ortiz, Elizabeth Morales Trejo, Noe Alejandro Avelino

Jordan, Melanie Vivian Herrejon Carreon, and Keila Alejandra Marquez Santoyo – Chronos: Oscillation of Time Creators

Julieta Becerril Figueroa and Tamra Figueroa Soulaïman – The Bloom of a Flower Creators

Johann Francisco Porras Martínez, Sofía Alejandra Domínguez González, and Carlos Alberto Puertos Santoyo – Geodal Lotus Creators