

Elective Course: Advanced Digital Design in Complex Geometries

University of Chile, FAU – Autumn Semester 2021

Professor: Angélica Videla C.

Link to the Specialization Course in Advanced Digital Design in Complex Geometries

YouTube: <https://www.youtube.com/channel/UC2hjFMBvhSCrz0lOYt1Hhnw>

Instagram: @complex_geometries



Figure 1 - Example of Procedural Polygon Modelling and Morphing Patterns, student Angela Rodriguez, Specialization Course Advanced Digital Design in Complex Geometries 2020, FAU, University of Chile.

General Purpose of the Course

The increasing advancement of digital technologies and manufacturing methods have significantly changed the way architecture is designed and made. The tools architects use influence design results and inevitably set boundaries for the architecture we create. This Advanced Digital Design in Complex Geometries course will focus on digital modeling and generative design methodologies primarily using Maya Autodesk.

In this course, students will explore how to design with an efficient procedural polygon modeling methodology, using a process that breaks down a complicated task into discrete modeling operations. In addition to procedural polygon modeling, students will also learn how to integrate topological patterns into the modeling workflow through transformation patterns. The ambition of this course is to develop formal and aesthetic qualities that are not indifferent to the design process itself. The course will use envelopes as the playing field for this exploration of digital design. The students will design highly expressive facades that integrate envelope, structure, and ornament in an irreducible and synergistic assembly.

Learning Results

The exercises developed in this course will be different from the conventional approach to design, in that we will propose unique design solutions through specific geometries. These projects will be designed by parametric systems that operate in a reactive and intelligent way and produce multiple iterative results that respond to the domain of the input parameters. These architectural systems will be used through a bottom-up approach to respond to the qualities of continuous differentiation with adaptive variations within the same architectural system.

By the end of the course, students will have developed an understanding and experience in designing procedural polygon models and organizational logic in Maya Autodesk, as well as workflows for creating three-dimensional patterns that could be applied to any architectural geometry. Students will present their work in a Final Submission through a series of diagrams, renders, and 3D models.



Figure 2 & 3 - Example of Topological Patterns, student Angela Rodriguez, Specialization Course Advanced Digital Design in Complex Geometries 2020, FAU, University of Chile.



Figure 4 - Example of Procedural Polygon Modelling, student Angela Rodriguez, Specialization Course Advanced Digital Design in Complex Geometries 2020, FAU, University of Chile.

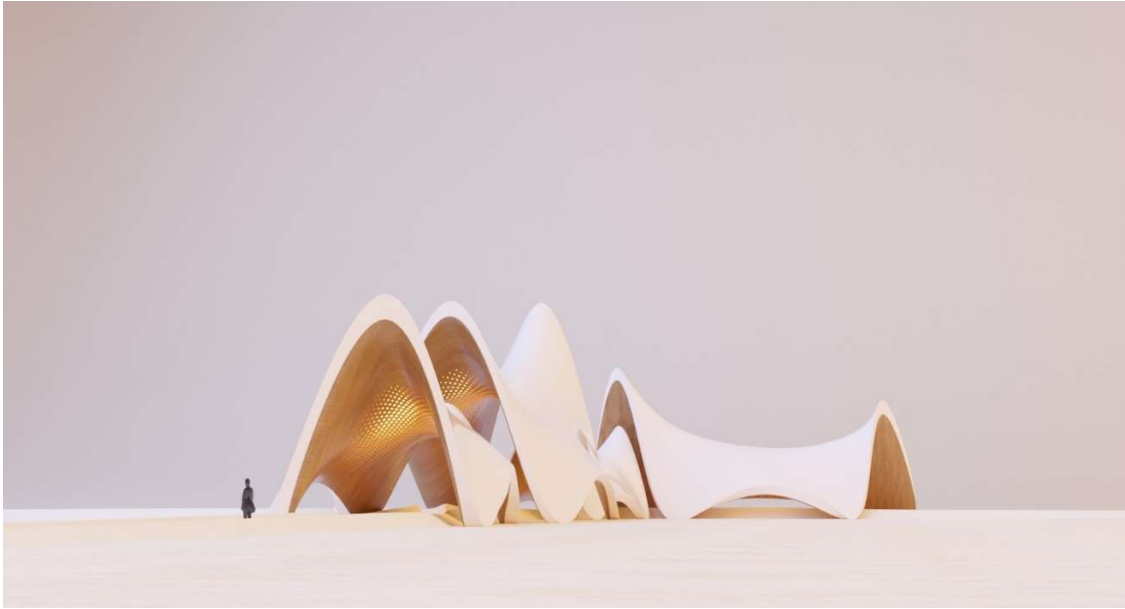


Figure 5 - Example of Topological Patterns and Morphing Patterns, student Benito Claria, Specialization Course Advanced Digital Design in Complex Geometries 2020, FAU, University of Chile.

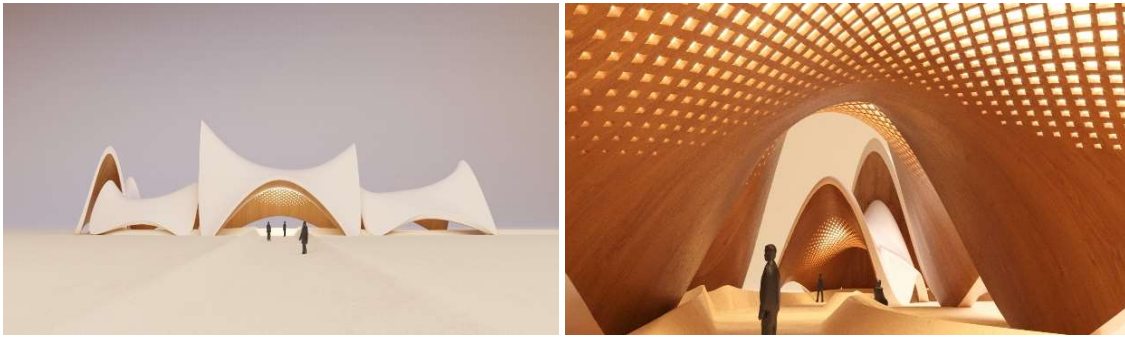


Figure 6 & 7 - Example of Topological Patterns and Morphing Patterns, student Benito Claria, Specialization Course Advanced Digital Design in Complex Geometries 2020, FAU, University of Chile.



Figure 8, 9 & 10 - Example of Procedural Polygon Modelling, student Alvaro Salinas, Specialization Course Advanced Digital Design in Complex Geometries 2020, FAU, University of Chile.



Figure 11 - Example of Procedural Polygon Modelling, student Vanessa Soto, Specialization Course Advanced Digital Design in Complex Geometries 2020, FAU, University of Chile.

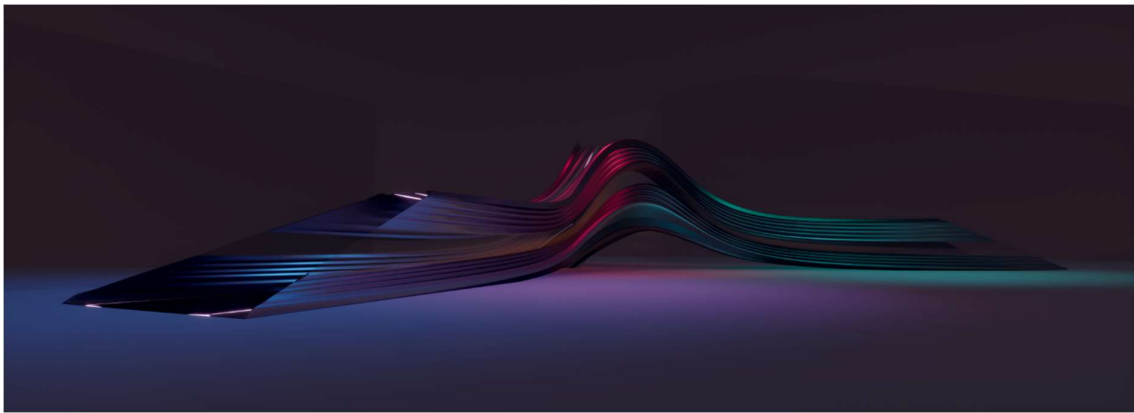


Figure 12 - Example of Procedural Polygon Modelling, student Vanessa Soto, Specialization Course Advanced Digital Design in Complex Geometries 2020, FAU, University of Chile.

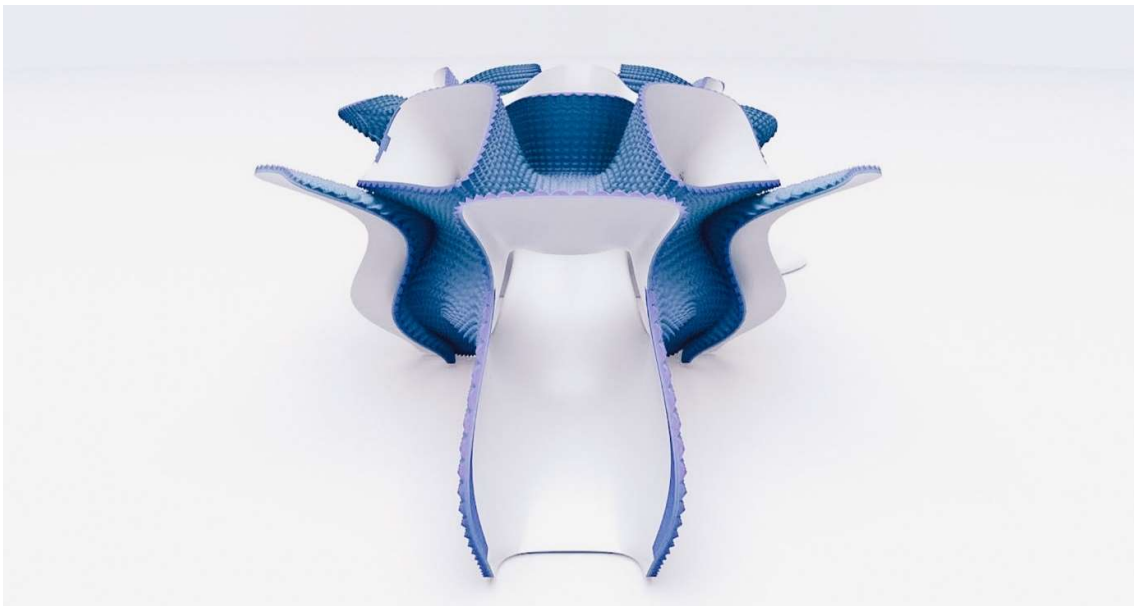


Figure 13 - Example of Procedural Polygon Modelling and Morphing Patterns, student Nicolas Divin, Specialization Course Advanced Digital Design in Complex Geometries 2020, FAU, University of Chile.