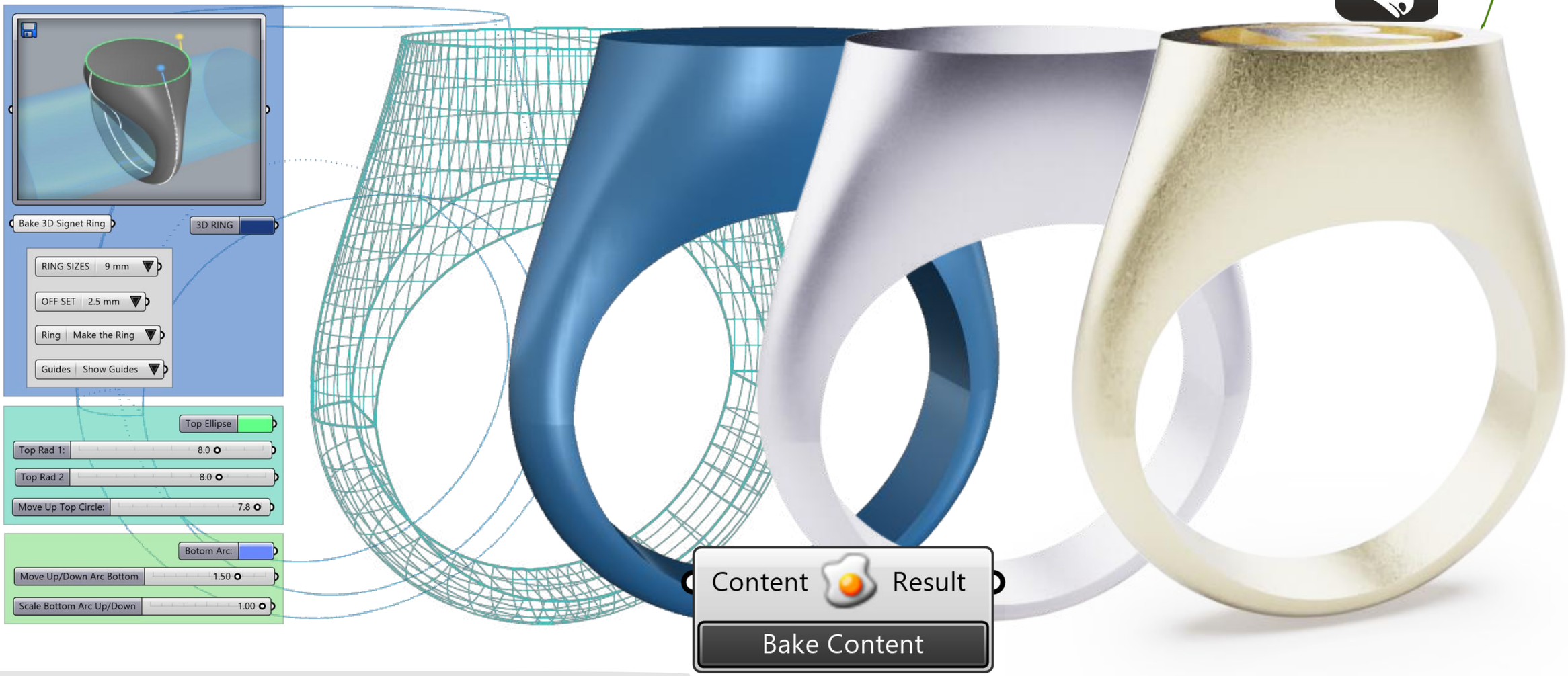
Computational and Parametric Design for Jewelry



This course is part of a Micro-Minor

In this course, you will have the opportunity to enhance your understanding of computational design and apply it specifically to the creation of jewelry and accessories.

To further improve and broaden your expertise in jewelry design using Rhino and Grasshopper, we recommend considering the **Micro-Minor**, which consists of five courses:

1. **Intermediate Rhino 8**
2. **Introduction to SubD in Rhino 7 and 8**
3. **3D Jewelry Modeling**
4. **Computational Design with Grasshopper**
5. **Computational and Parametric Design for Jewelry**

Content

In chapters 1 through 6, you will revisit numerous concepts from the course on **Computational Design using Grasshopper**. If you feel confident in your understanding of this material, please proceed to **chapter 7**.

Chapter 07: Different ways to analyze curves

Chapter 08: Manipulating circles to create rings and bands

Chapter 09: Cutters

Chapter 10: Parametric orientation from one construction plane to another

Chapter 11: Create baskets and bezels

Chapter 12: Channels

Chapter 13: Woman and man dome rings

Chapter 14: Create bands with two 2D cross sections

Chapter 15: Twisted cables

Chapter 16: Create the surface for a ring = skin

Chapter 17: Let´s work with chains

Chapter 18: Signet ring with grasshopper3D

Chapter 19: Different ways we can create a pavé and prongs

Chapter 20 Tips & Tricks: Create a toolbar and use the get-grasshopper-params

Chapter 7: Various Methods for Curve Analysis

7.01 Different ways of analyzing curves

7.02 Different ways of dividing curves

7.03 How to extend curves

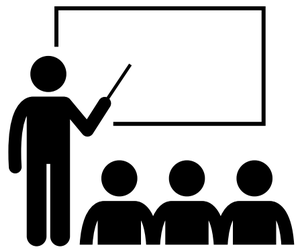
7.04 Align construction planes

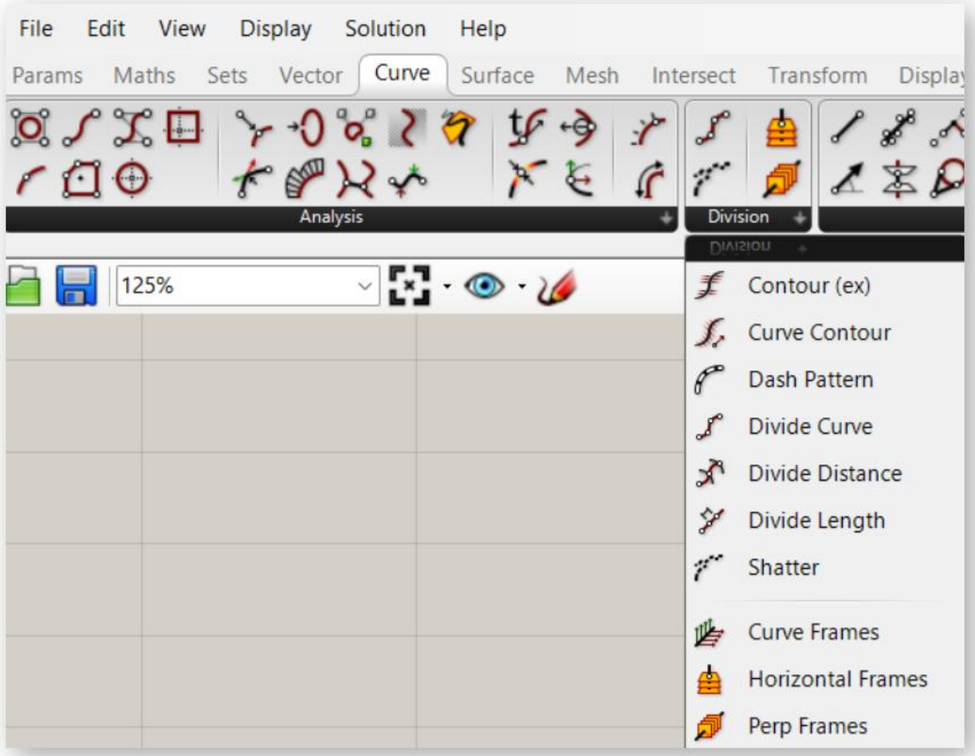
7.05 The Evaluate length component

7.06 Project [01]: Orienting circles in order with a guide curve and on top of a surface

7.07 Project [02]: Organize multiple circles of varying diameters along a designated guide curve.

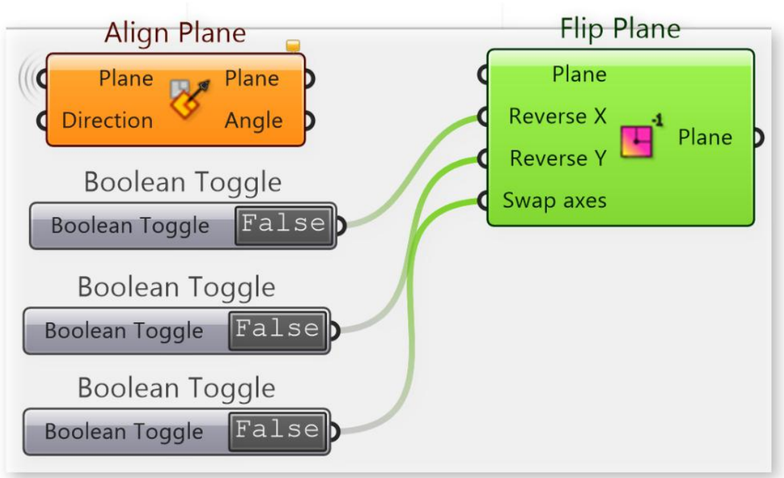
7.08 Ask your teacher questions

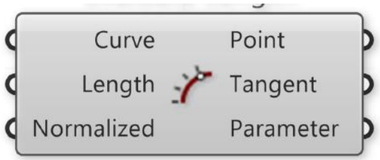


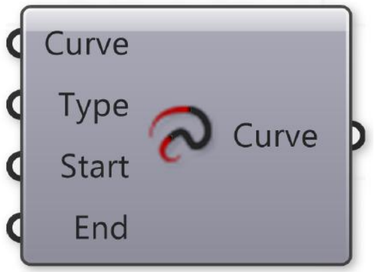


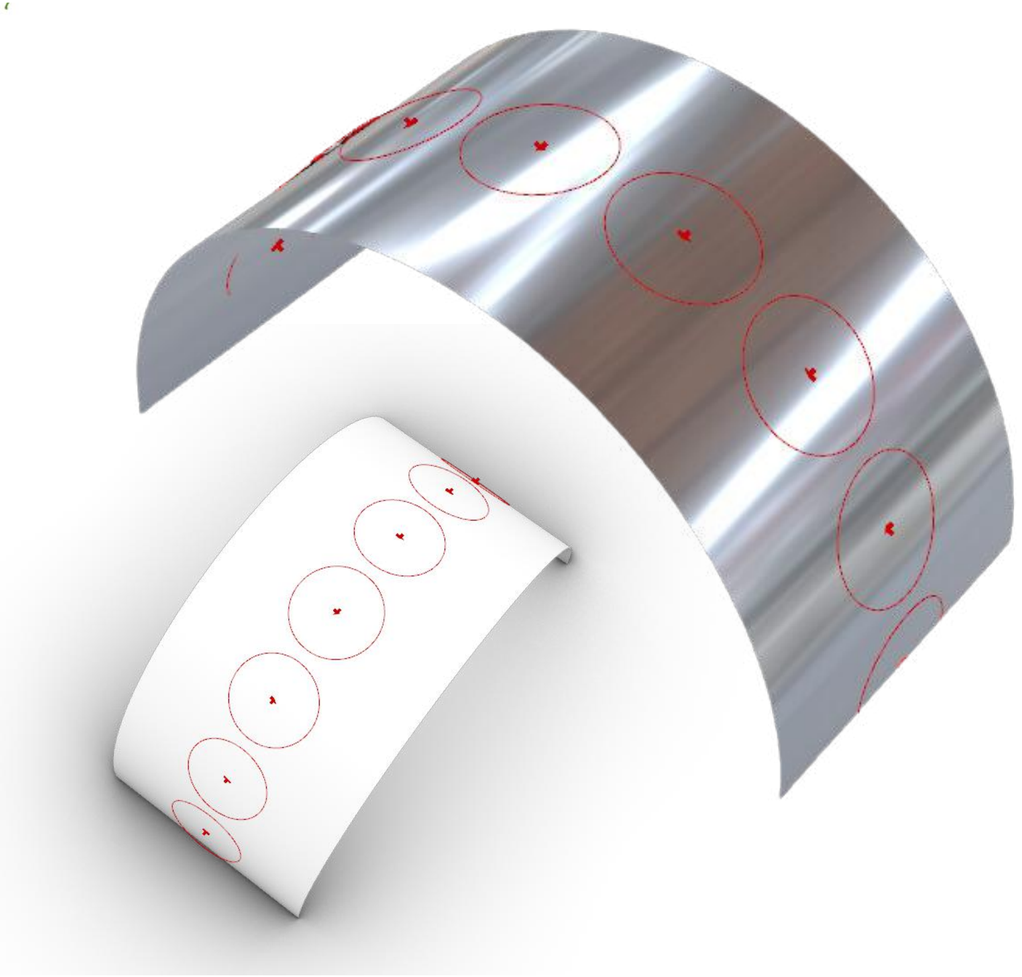
Curves

In this chapter, we will discuss **curves**, focusing on how to create, orient, modify the origin, and organize curves using parametric definitions in Grasshopper.









Chapter 8. Manipulating circles to create rings and bands

8.01 Create a list of ring size values

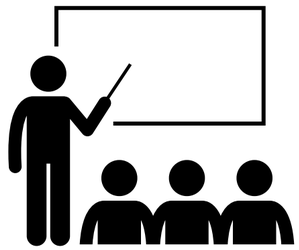
8.02 Create very simple 3D band type of ring

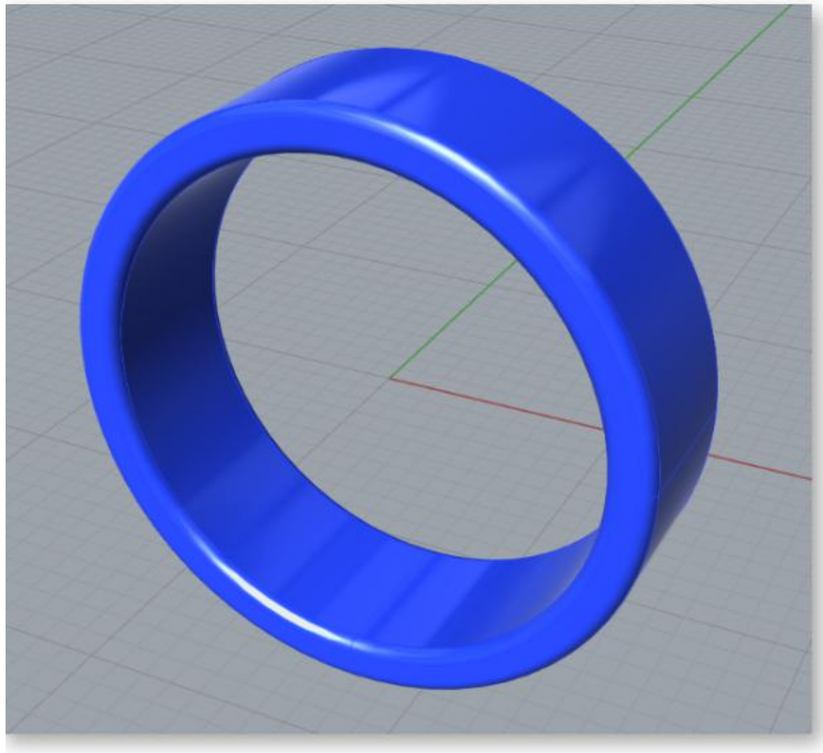
8.03 Project [01]: Create a 3D band ring with fillets, or chamfers

8.04 Project [02]: Design a 3D band ring and create a corresponding area on the floor for its display

8.05 Project [03]: A ring composed of multiple bands (plates) and screws

8.06 Ask your teacher questions





Circles and Rings

We will begin this section by manipulating circles, which help us create different ring sizes and thus model simple bands and rings with Grasshopper.

Chapter 9. Cutters

9.01 Adding guides on the stones and modeling a simple cutter in Rhino 8

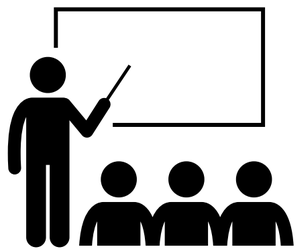
9.02 Create our first simple cutter with Grasshopper

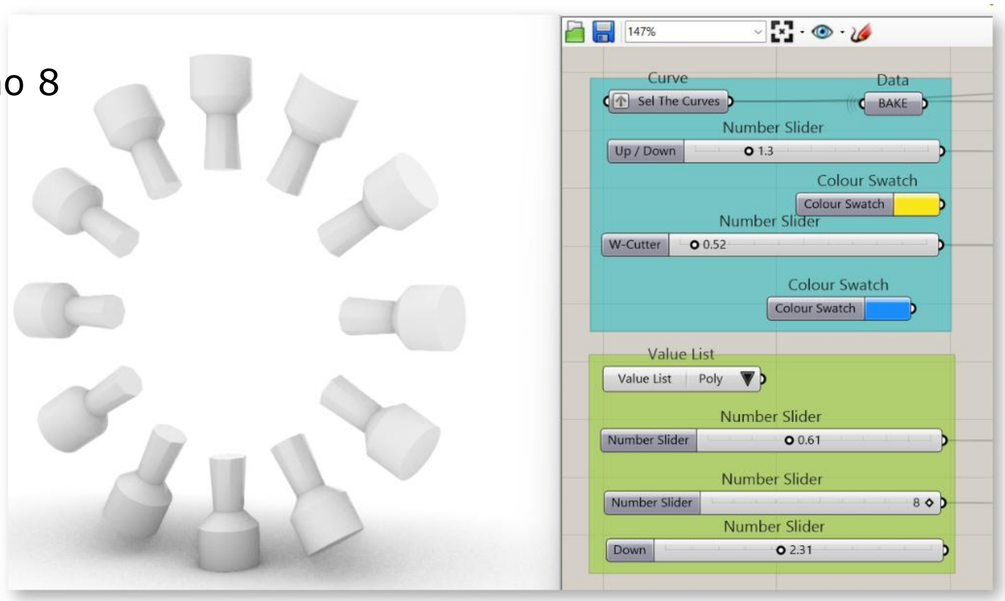
9.03 Project [01]: Create a 3D solid cutter on any construction plane!

9.04 Project [02]: Create a 3D solid cutter with different tips

9.05 Project [03]: Let's polish the last definition of the cutter

9.06 Ask your teacher questions





Cutters

Cutters, as the name implies, assist in shaping sections and components of the stone to ensure a proper fit, while also allowing light to filter through the piece. In this chapter, we will utilize Grasshopper to create these cutters.

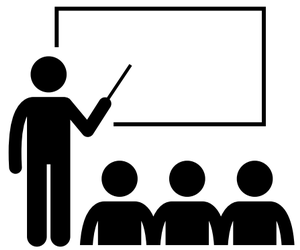
Chapter 10. Parametric Orientation

10.01 Finding where things are and where we want to orient them to!

10.02 Project [01]: Orient a group of objects and be able to scale them

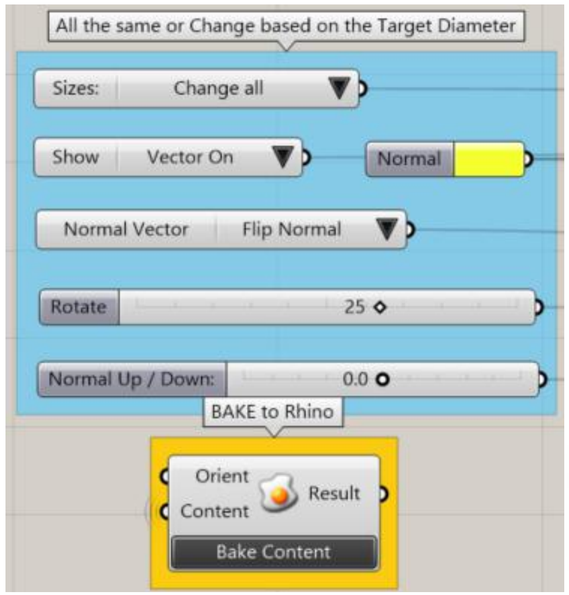
10.03 Project [02]: Being able to **Bake** more easily

10.04 Ask your teacher questions



In this chapter we are going to orient objects

We will develop parametric definitions using Grasshopper to facilitate the orientation and scaling of objects between construction planes. This process will involve orienting gems, cutters, or supports and seamlessly baking them into Rhino 8.



Chapter 11. Create baskets and bezels

11.01 Simple basket, but let's fix a few things first!

11.02 Have the possibility to put cutters and make holes to my basket

11.03 Project [01]: Polish my basket definition and set the automatic **Bake**

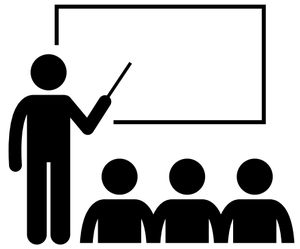
11.04 Project [02]: Create a basket with SubDs

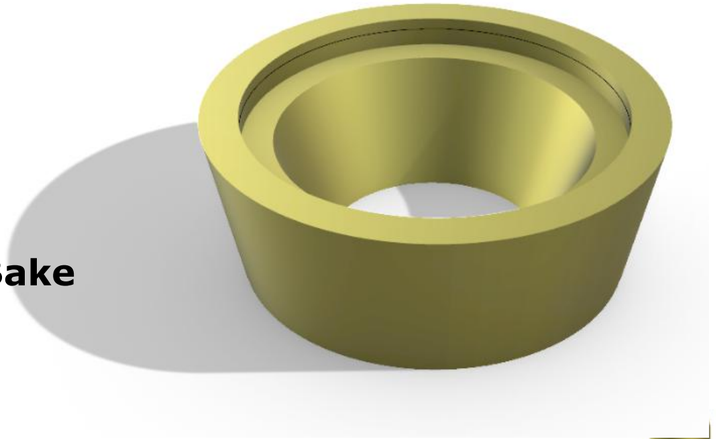
11.05 Project [03]: Creating a simple bezel

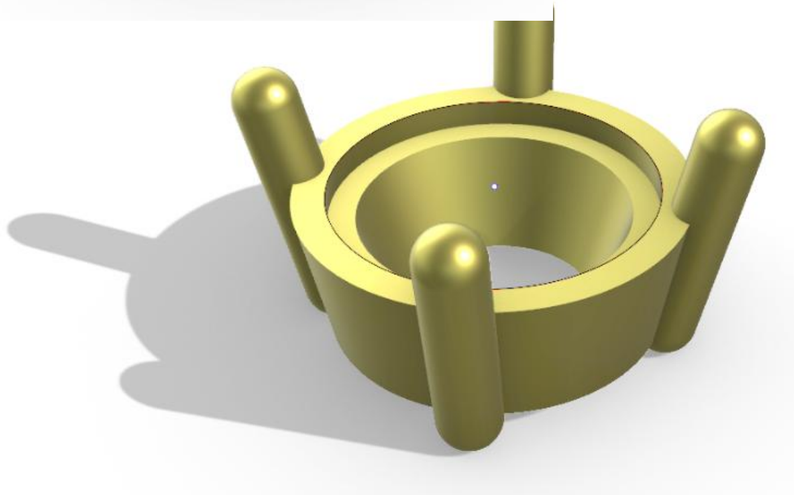
11.06 Project [04]: An idea to add the claws [Prongs] to the baskets or bezels

11.07 A new way to join solids, meshes, breps, and SubDs with **ShrinkWrap**

11.08 Ask your teacher questions







Baskets and Bezels

We will develop a variety of classic mounts, including the bezel mount, basket mount, and supports designed to protect and secure the gemstone.

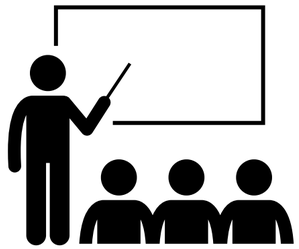
Chapter 12. Channels

12.01 Create a basic channel

12.02 Channel with option to rotate the cross sections and cap the endings

12.03 Basic channel with a closed curve guide and assign a material to the channel

12.04 Ask your teacher questions



Rings as Channels

We will begin by developing bands with various two-dimensional profiles using Grasshopper.

Chapter 13. Woman and man Dome Rings

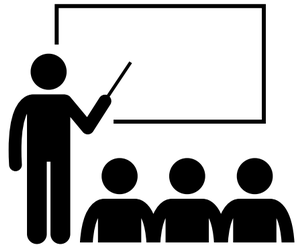
13.01 First draw the curves to create a dome ring

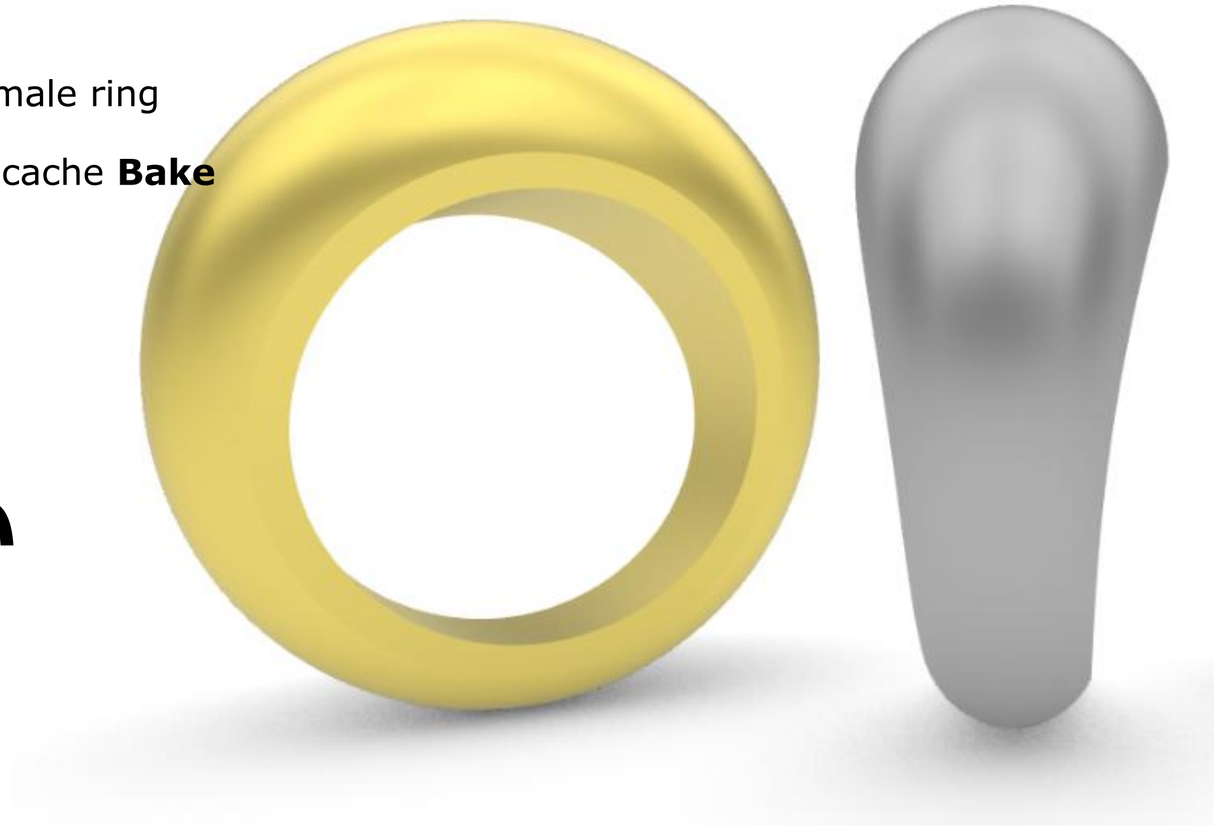
13.02 Continue with the DEF from 13.01 and create the female ring

13.03 Project [01]: Optimize, organize and implement the cache **Bake**

13.04 Project [02]: Cut the top of the ring

13.05 Ask your teacher questions





Dome Rings

The dome ring is a timeless design characterized by its rounded top. In this chapter, we will explore a step-by-step guide on how to create it using various profiles, along with the application of different materials.

Chapter 14. Create bands with two 2D cross sections

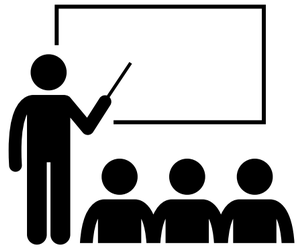
14.01 Use a circle and an ellipse to create first, the wireframe

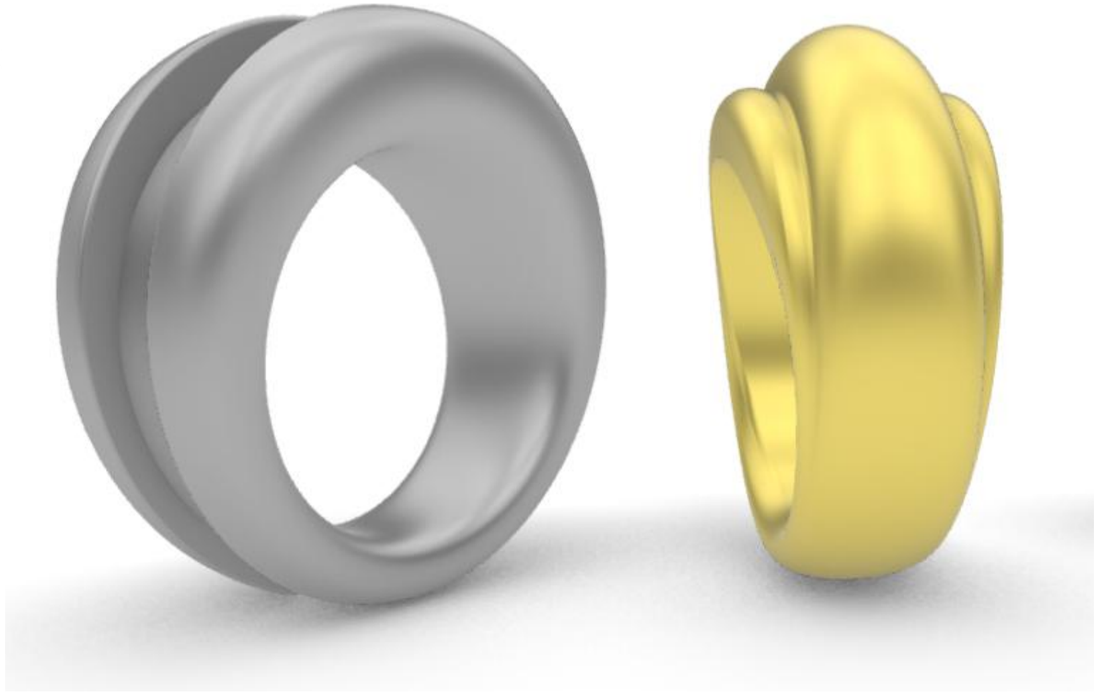
14.02 Time to create the two mapping rectangles, to orient my 2D sections

14.03 Use **Sweep-Two** rails and the rectangular mapping component

14.04 Project [01] Using the Orient component,
Sweep by two rails, and Scale in XYZ

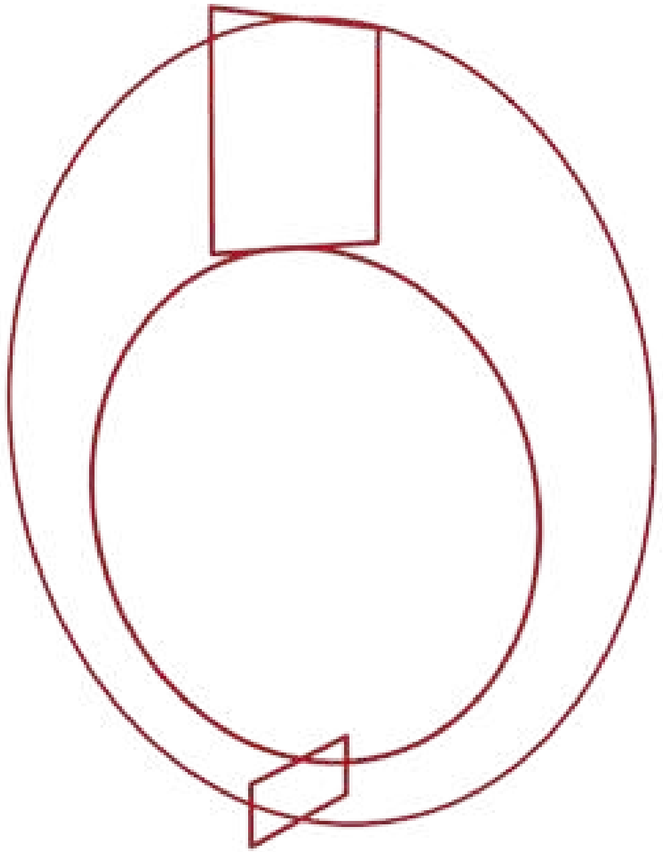
14.05 Ask your teacher questions





Dome Rings with Two Sections

In this chapter, we will further develop dome rings and bands by integrating two sections along with the Sweep 2 Rails component.



Chapter 15. Twisted cables

15.01 Part one, we will create the solids that we want to twist

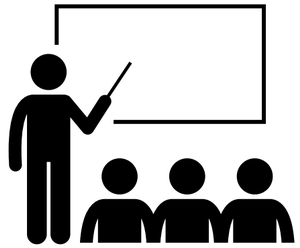
15.02 Part two, we will twist the solids created in the first part

15.03 The last part is to flow the twisted rods, around my rail

15.04 Project [01]: Create two Sub-Curves, rotate them apart, and join them

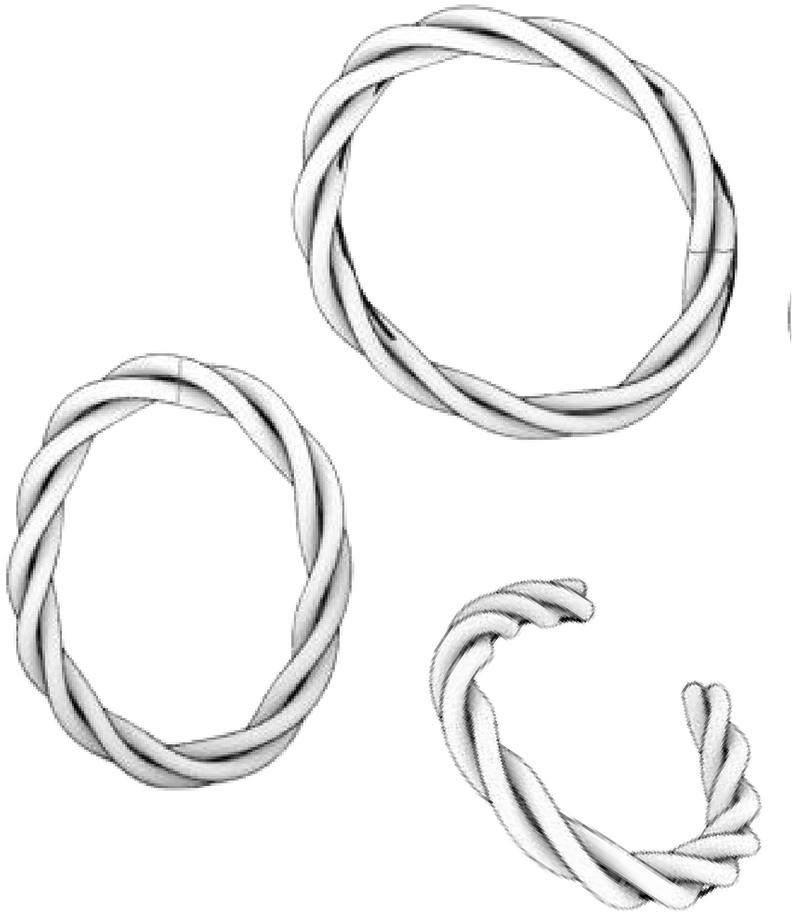
15.05 Project [02]: Quickly create a circle and a surface for a ring

15.06 Ask your teacher questions

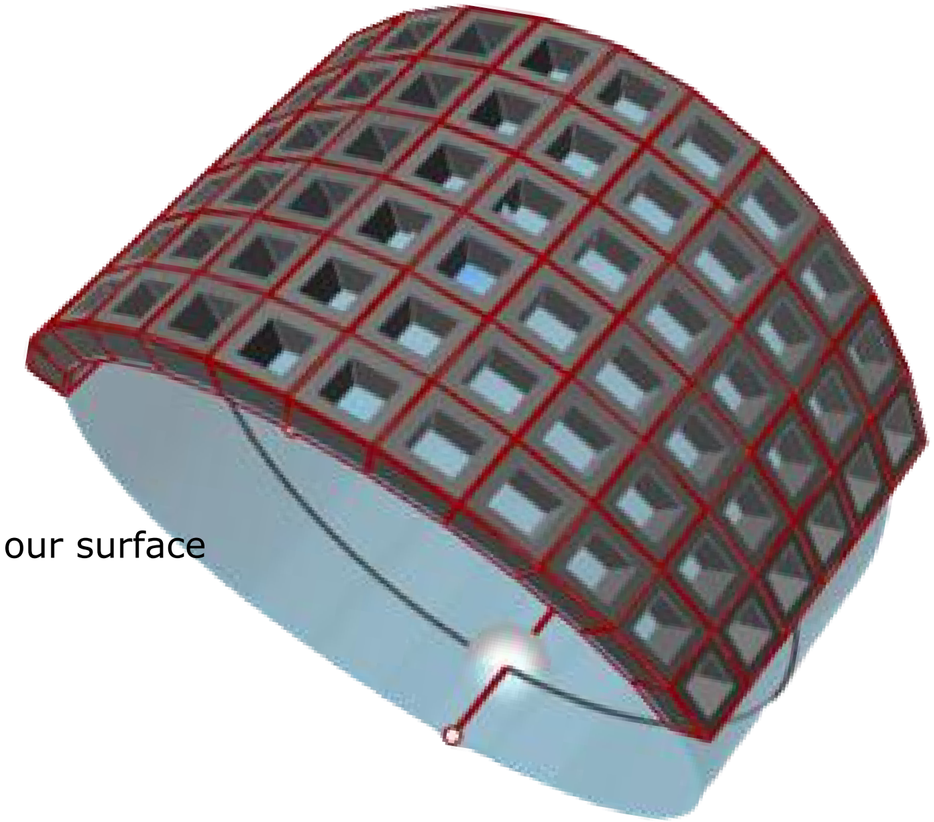


Interlaced Ring

In this chapter, we will design interlocking rings composed of various shapes and curvature styles, while also incorporating materials to enhance their presentation.



Chapter 16. Create the surface for a ring



16.01 Create the surface of the ring we want to use

16.02 Set the domain of the surface we want to use

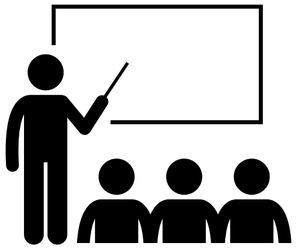
16.03 Create the 3D boxes that we will use to place our 3D tiles

16.04 Project [01]: Use the wired boxes to place **SubD-Pipes**

16.05 Project [02]: Being able to use open 2D cross sections to generate our surface

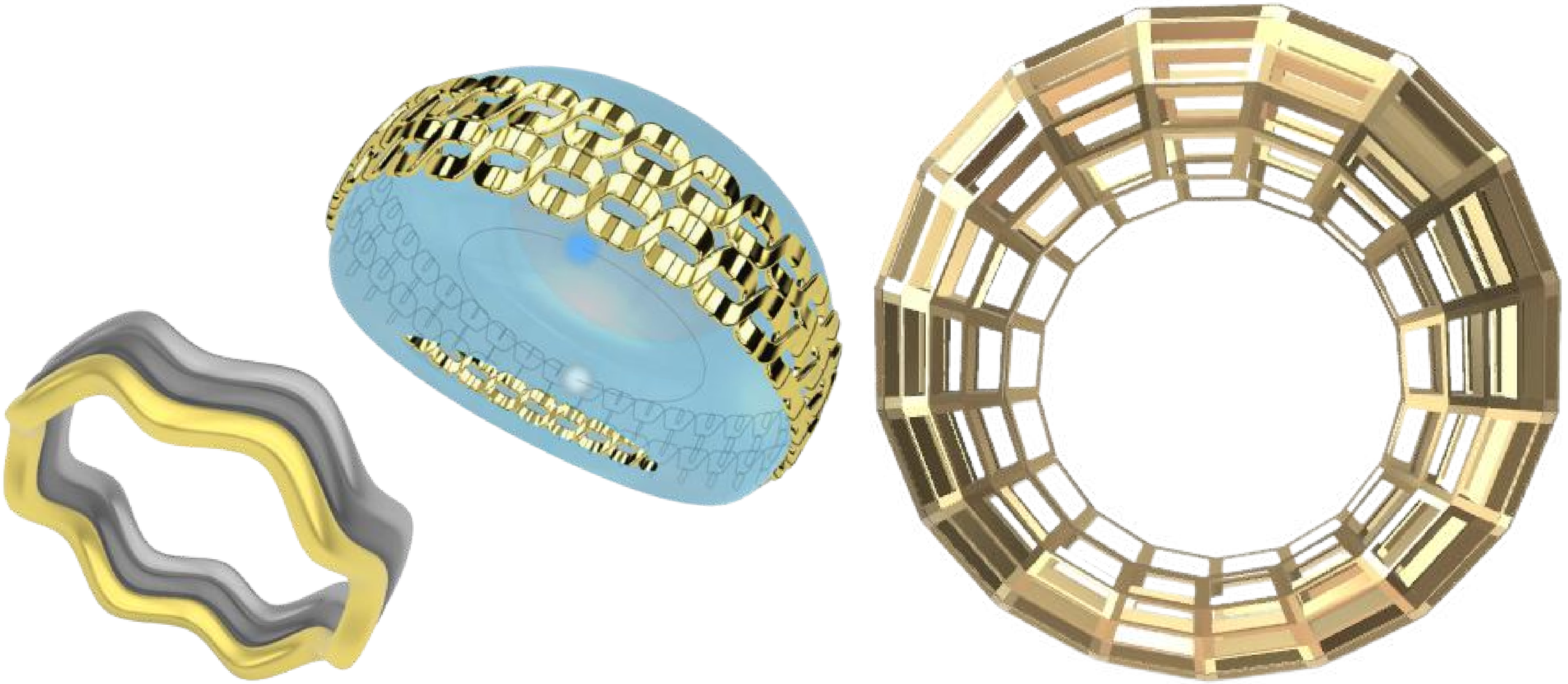
16.06 Project [03]: Bracelet with waves

16.07 Ask your teacher questions



Internal Surfaces

Utilizing various 3D solid tiles, we will construct three-dimensional box containers to strategically orient these tiles.



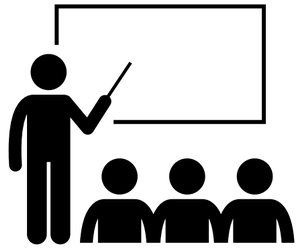
Chapter 17. Let us work with chains

17.01 Define the section of the curve that we will use in the chain

17.02 Choose the 3D block to generate our chain

17.03 Project [01]: Being able to select 2 different blocks, to design my chain

17.04 Ask your teacher questions



Chain Links

We will develop the original solid that will serve as the foundation for creating a chain, employing various techniques that allow for movement and rotation of the solids.

Chapter 18. Signet ring with grasshopper

18.01 Create the first curves needed for our signet ring

18.02 Create the center curve of our signet ring

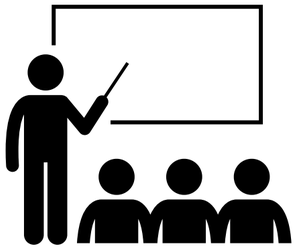
18.03 Create the blends on the front of the ring and the solid-pipe for the size of the ring finger

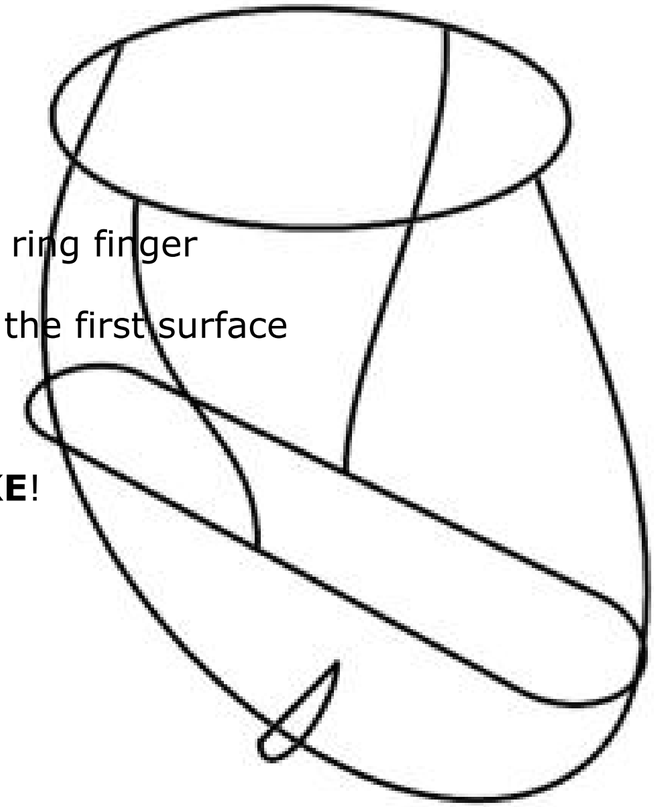
18.04 Create the blends on the right side and use the NetWork component to create the first surface

18.05 Union all surfaces and create a solid then, apply materials and **BAKE**!

18.06 Project [01]: Polish your grasshopper definition and add the possibility to **BAKE**!

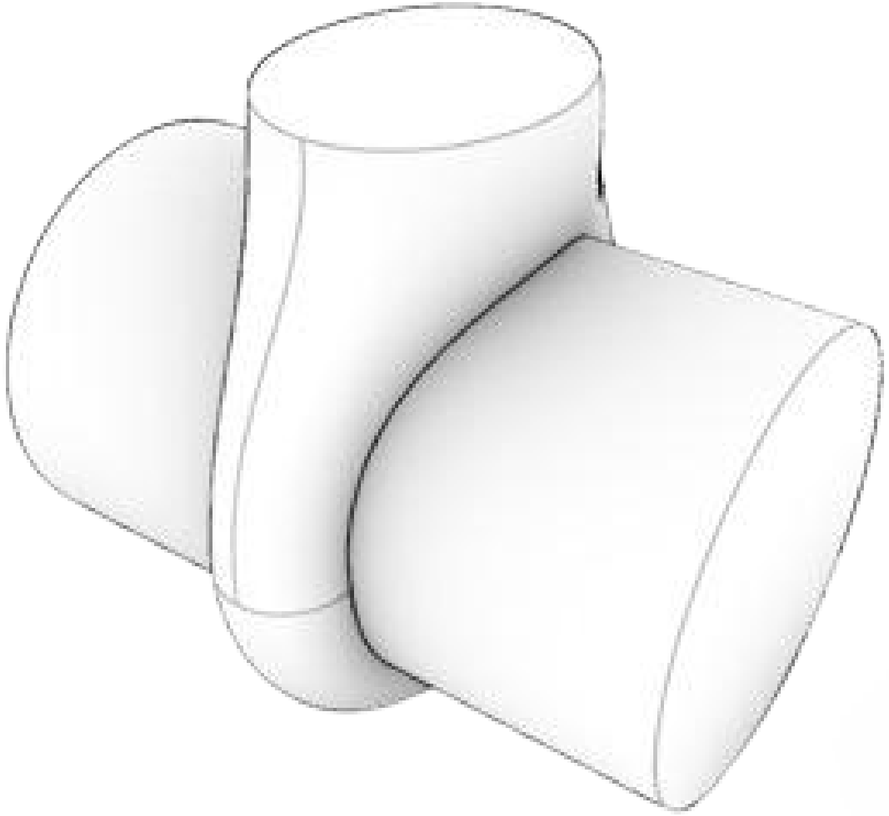
18.07 Ask your teacher questions





Signet Ring

The signet ring is like the classic VIP pass for your fingers, perfect for showcasing symbols, text, or dazzling gems! In this chapter, we’re diving into the magical world of Grasshopper to whip up some snazzy signet rings using a parametric definition. Let’s get our creativity buzzing!



Chapter 19. Different ways to create a Pavé and the Claws [Prongs]

19.01 Create a simple 2D Pavé

19.02 Adding the supports [Prongs] to the 2D Pavé

19.03 Project [01] Using the Duplicate-Points component in the above definition

19.04 Bringing a Pavé that is in 2D to a region of a surface

19.05 Project [02] Design and create a Scalloped Pavé

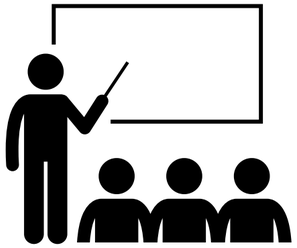
19.06 Project [03] A Scalloped Pavé using the rectangle and a taper components

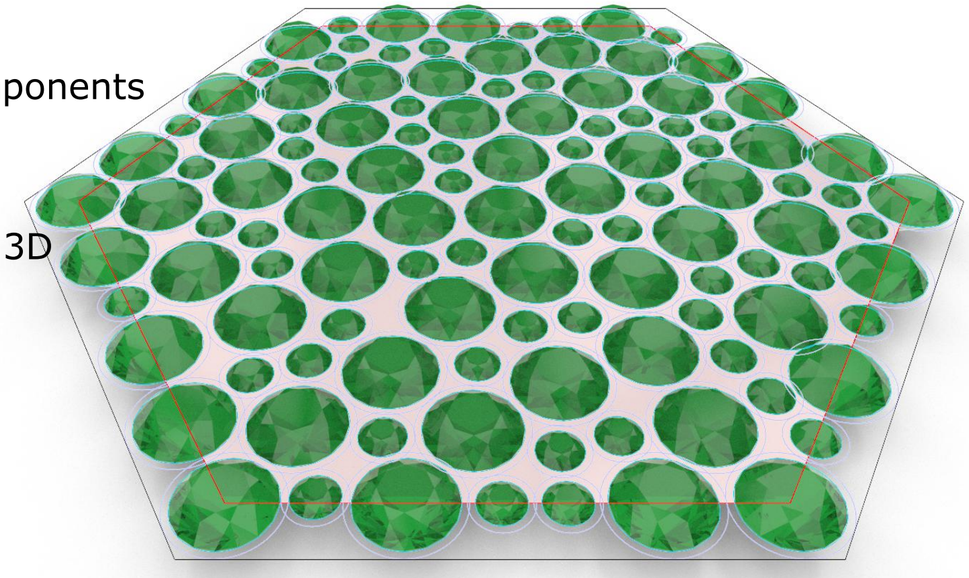
19.07 Let's understand an equidistant triangle to create our Pavé

19.08 Let us use **Paneling Tools** a plugin, to create our Pavé in 2D and 3D

19.09 Project [04] Create a Pavé using Kangaroo2

19.10 Ask your teacher questions

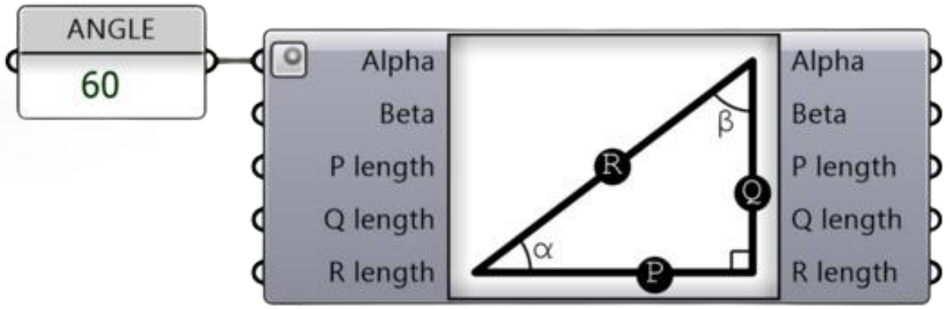




Pavé and Supports

Explore the techniques for creating classic settings, including pavé and scalloped pavé.

PanelingTools
for **Rhino** *and* **Grasshopper**



Chapter 20. Tips & Tricks: Create a Toolbar and use the Grasshopper Player

20.01 Create our resources folder for our libraries. Set the [Path]

20.02 Some Get parameters that we need in order to use the **Grasshopper-Player**

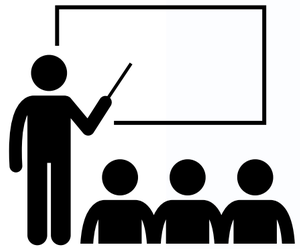
20.03 Create a toolbar with some buttons to speed up our work

20.04 Project [01]: Link or join a toolbar with buttons to another toolbar

20.05 Project [02]: Create a **GH-Player** definition and add a bottom to a toolbar to run the **GH-Player** definition

20.06 Project [03]: How to orient text on a surface

20.07 Ask your teacher questions



Techniques using the Get-Params

Dive into the magical world of toolbars! Discover how to whip up your very own toolbar and stick those shiny GH Player definitions to its buttons. Plus, let’s sprinkle in your gems, materials, and cross sections straight from this snazzy toolbar!

Take this course now!