# SelfCAD Manual

## Hello

Welcome to the overview of an online 3D modeling software - SelfCAD. In this material, I'll walk you through the layout of the interface, the settings of the software as well as all of the available tools for modeling, so after this presentation, you'll have all the knowledge you'll need to start your journey with 3D modeling.

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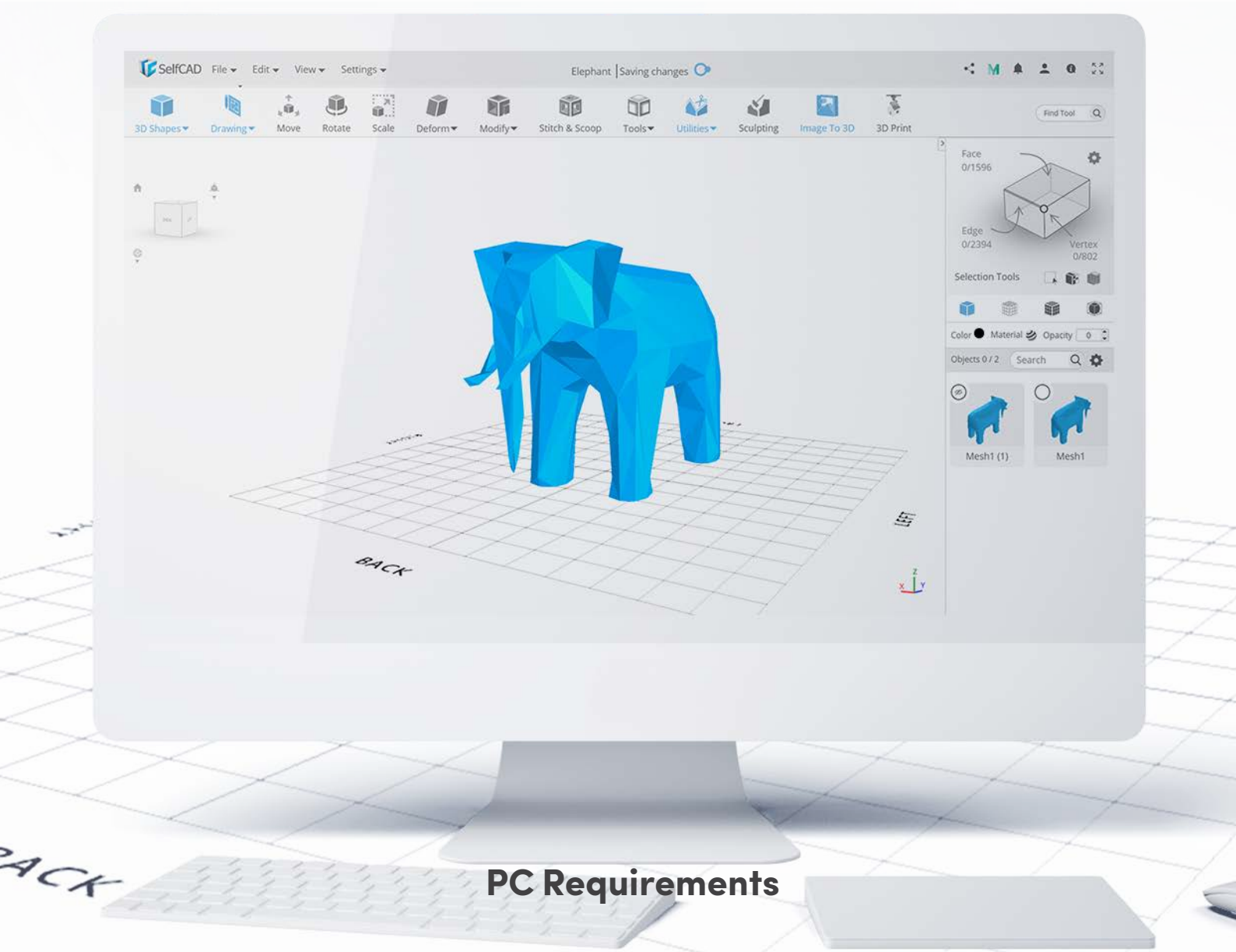


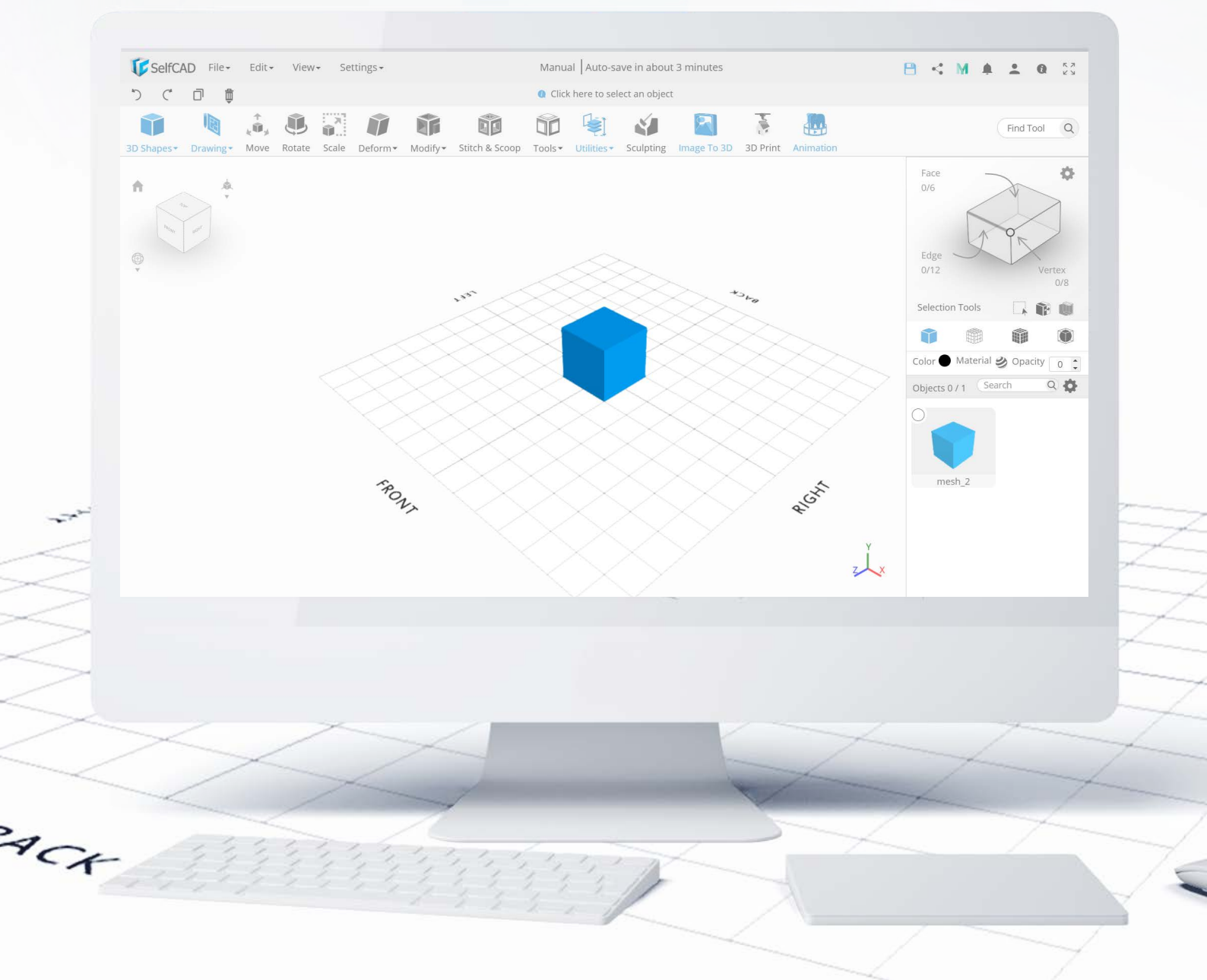

## PC Requirements

A bit of a warning before we begin. Despite the fact that the software is browser-based and to run it your computer technically only has to be capable of operating said browser, you still might face some issues when running it on old PC. The reason for that is very simple - some of the tools are simply too powerful for older CPUs and Graphic Cards to keep up. To avoid any misunderstandings, below you'll find both the minimum and the recommended requirements to run SelfCAD without any problems:

Minimum:
CPU: 2.5GHz
Memory: 4 GB RAM
Graphics: Modern Graphic Card

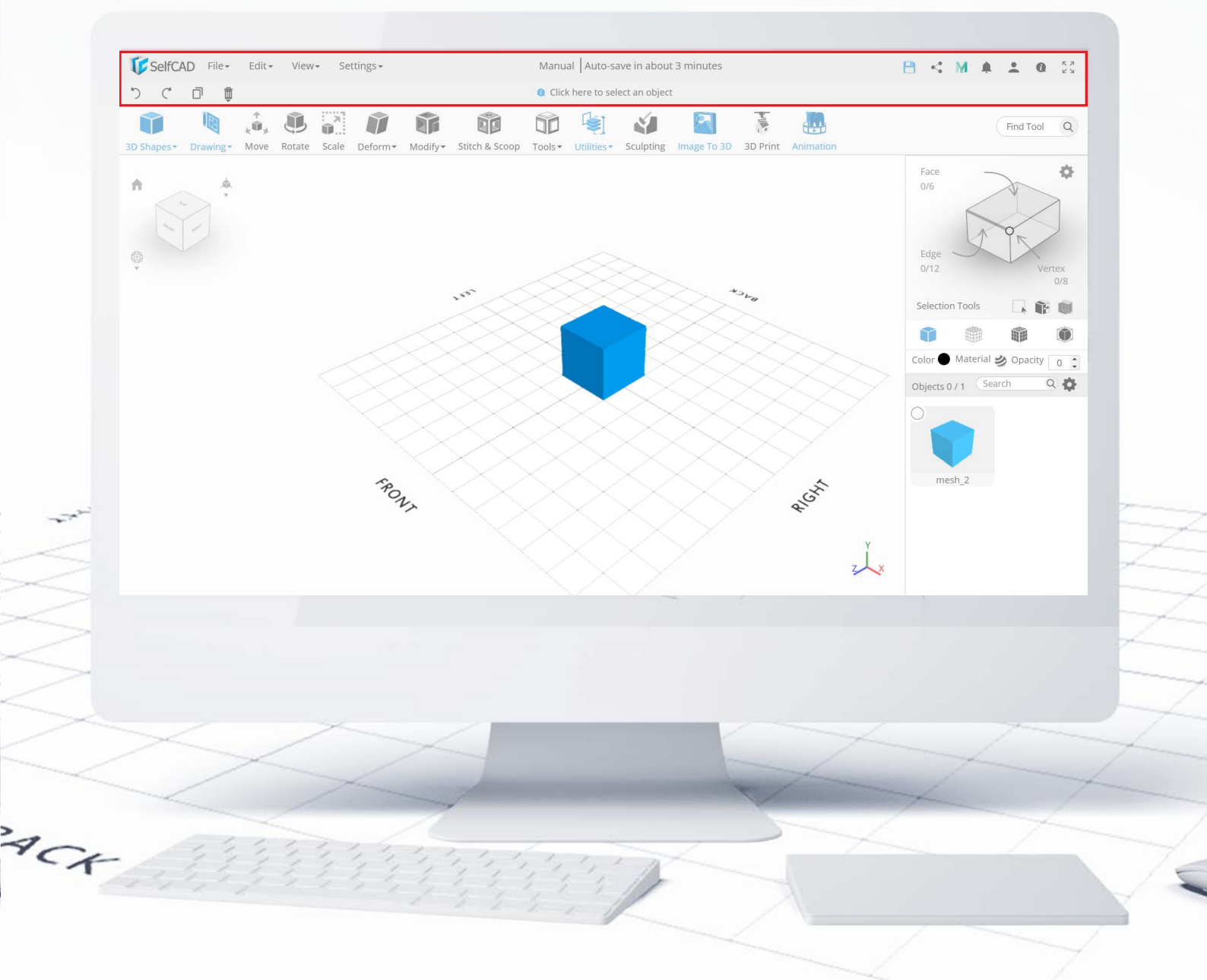
Recommended:
CPU: 3.0 GHz
Memory: 8 GB RAM
Graphics: Modern Graphic Card

# The Interface



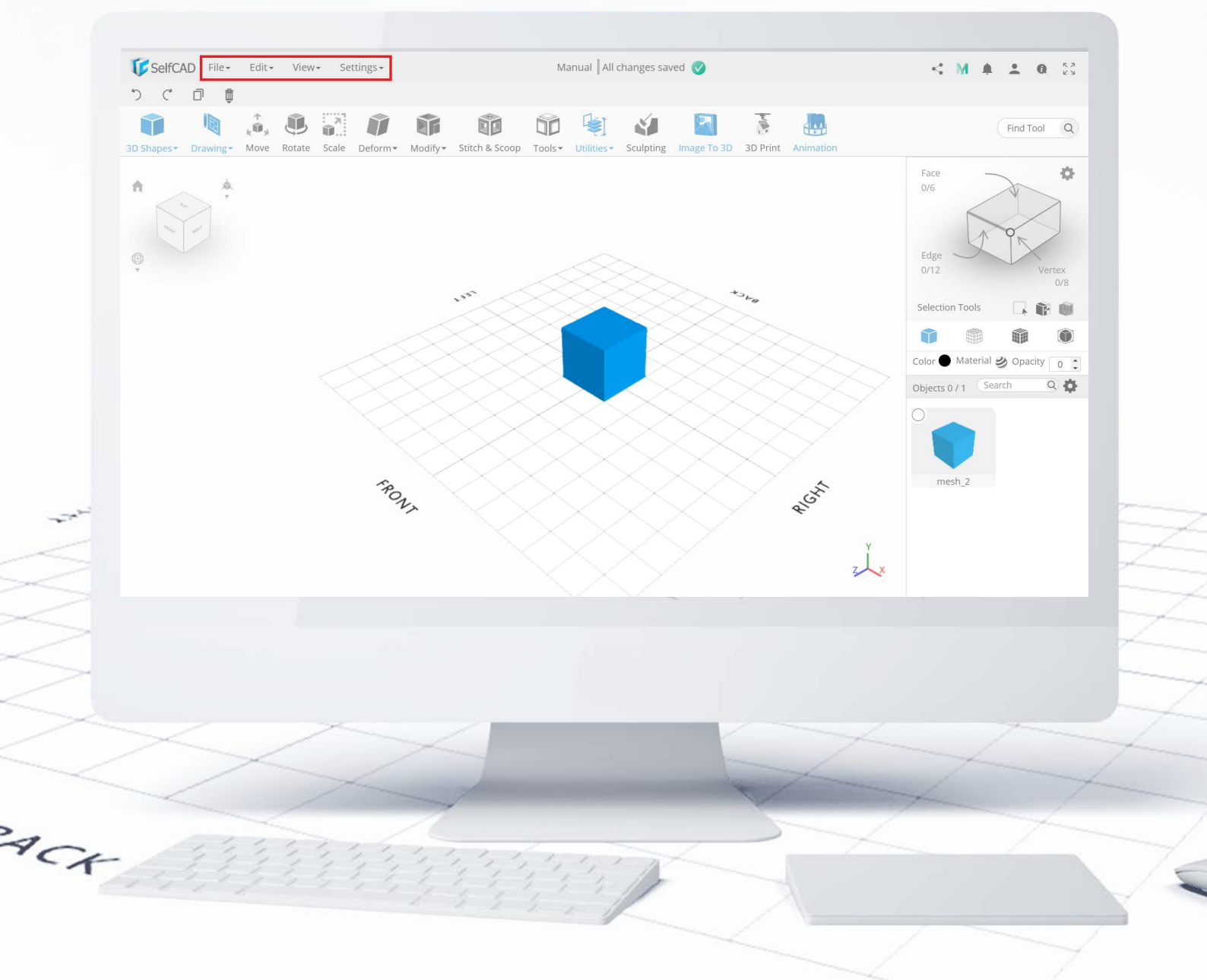

I'll start with the **Interface** - because let's face it - it would be hard to create anything in the software if you don't know its options. The interface is the first thing you'll see after launching the editor. In SelfCAD, the interface has been split into 4 panels, each serving a different function and having its own sub-sections. Those 4 panels are as follows: Top Panel, Left Side Panel, The Main Toolbar, and Right Side Panel.

# Top Panel



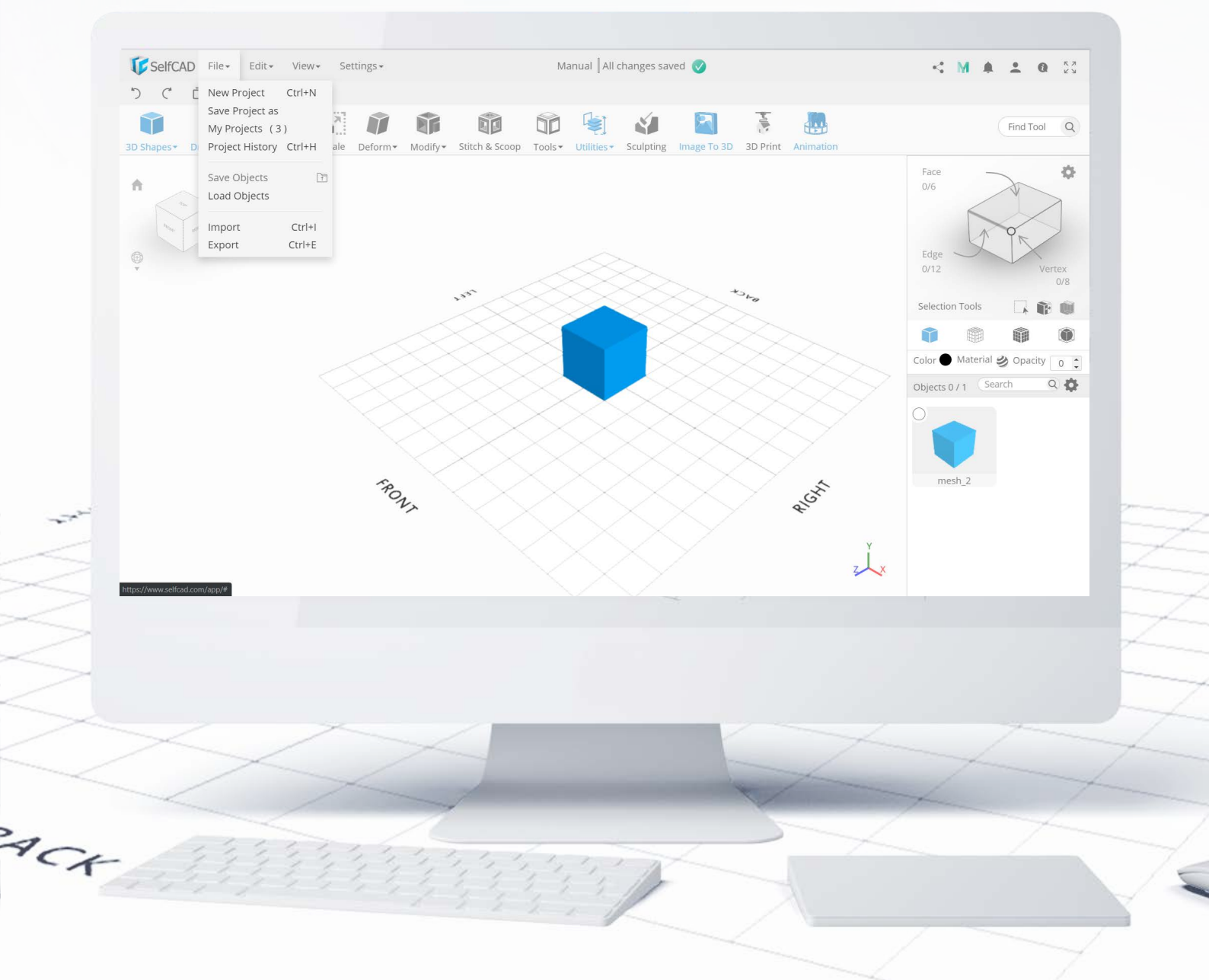

**Top Panel** consists of the main menu of the software with options dedicated to managing the project and the software itself, the status indicator and a few miscellaneous user options.

# Top Panel: The Main Menu



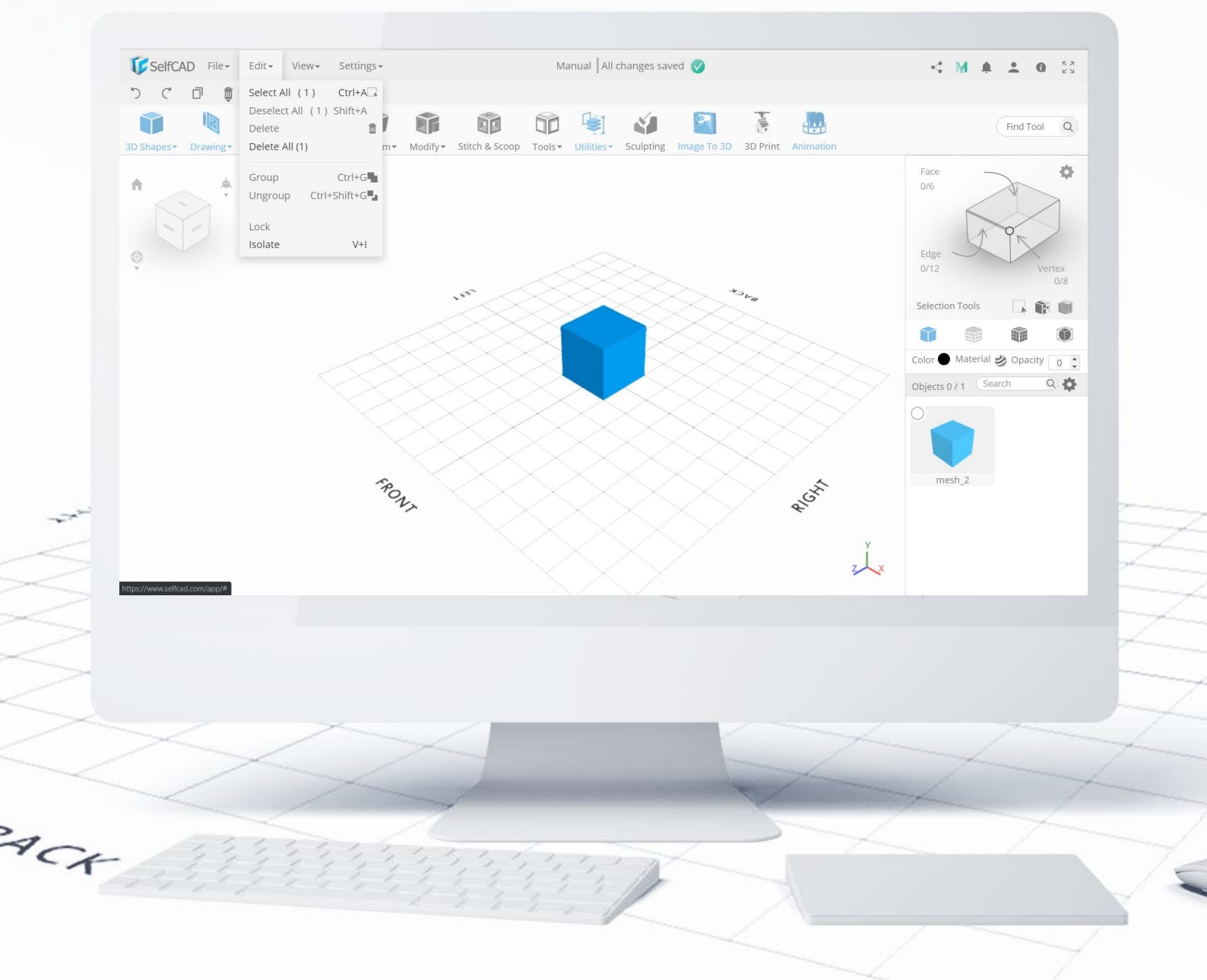

At the very top, we have the **Main Menu** of SelfCAD - you'll find here options responsible for managing the current project, individual object within in, as well as settings of the software itself.

# The Main Menu: File



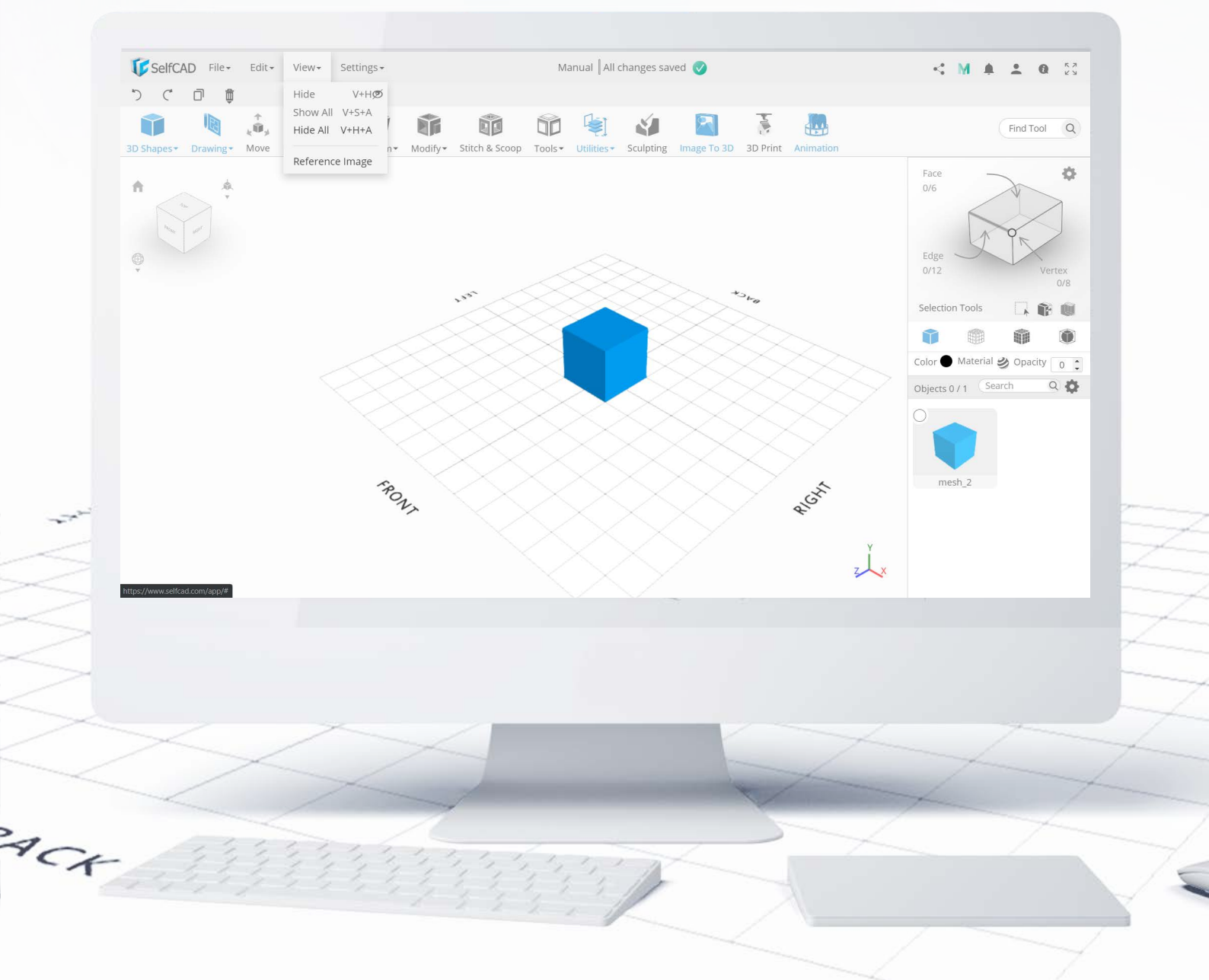

First is the **File** drop-down list responsible for the project itself. Options such as New Project, Save Project as, My Projects and Project History are rather self-explanatory and - in my opinion - don't require extensive explanation. The other four features allow you to store designs for future use. What's worth noting about them, is that Save and Load Objects allow you to store them in the cloud for future use within the software, while Import and Export allow you to do that from your hard drive.

# The Main Menu: Edit




**Edit** drop-down is responsible for the objects within the project. You'll find here: Select All and Deselect All, Delete and Delete all - those options don't really require explanation either, Group and Ungroup will allow you to connect multiple objects together to model them at the same time. Locking an object will make it immune to change until you disable the option, while Isolate will hide every other object on the grid.

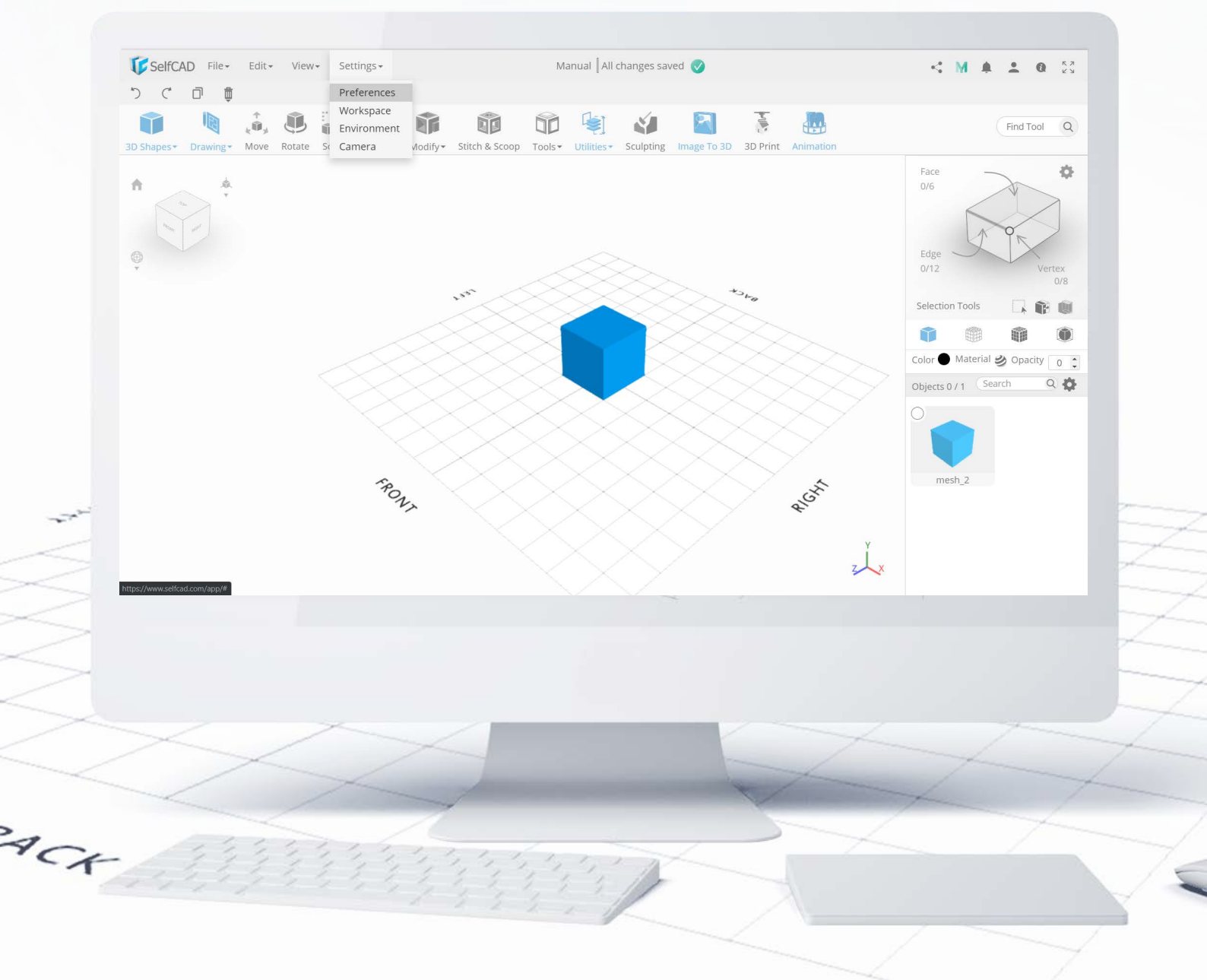
# The Main Menu: View




**View** deals with objects within a project as well. **Hide**, **Show All** and **Hide All** - if you work with multiple objects at the same time, you can hide some - or all of them - to have more space to work with.

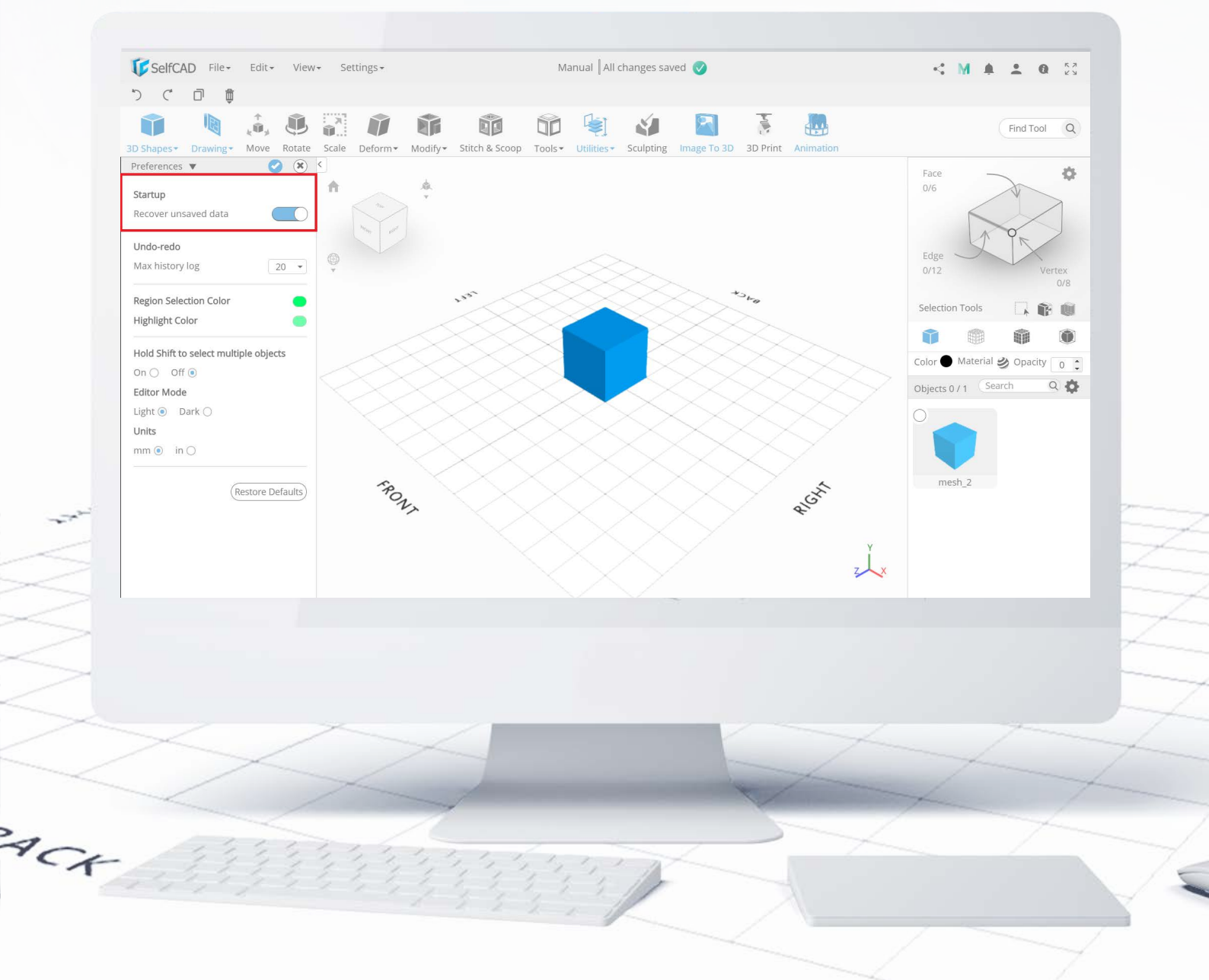
You'll find here the **Reference Image** as well. With this option, you can load any image that your project is based upon, or serves as an inspiration to you, and keep it visible without the need to use multiple windows and switch between them all the time.

# The Main Menu: Settings and Preferences



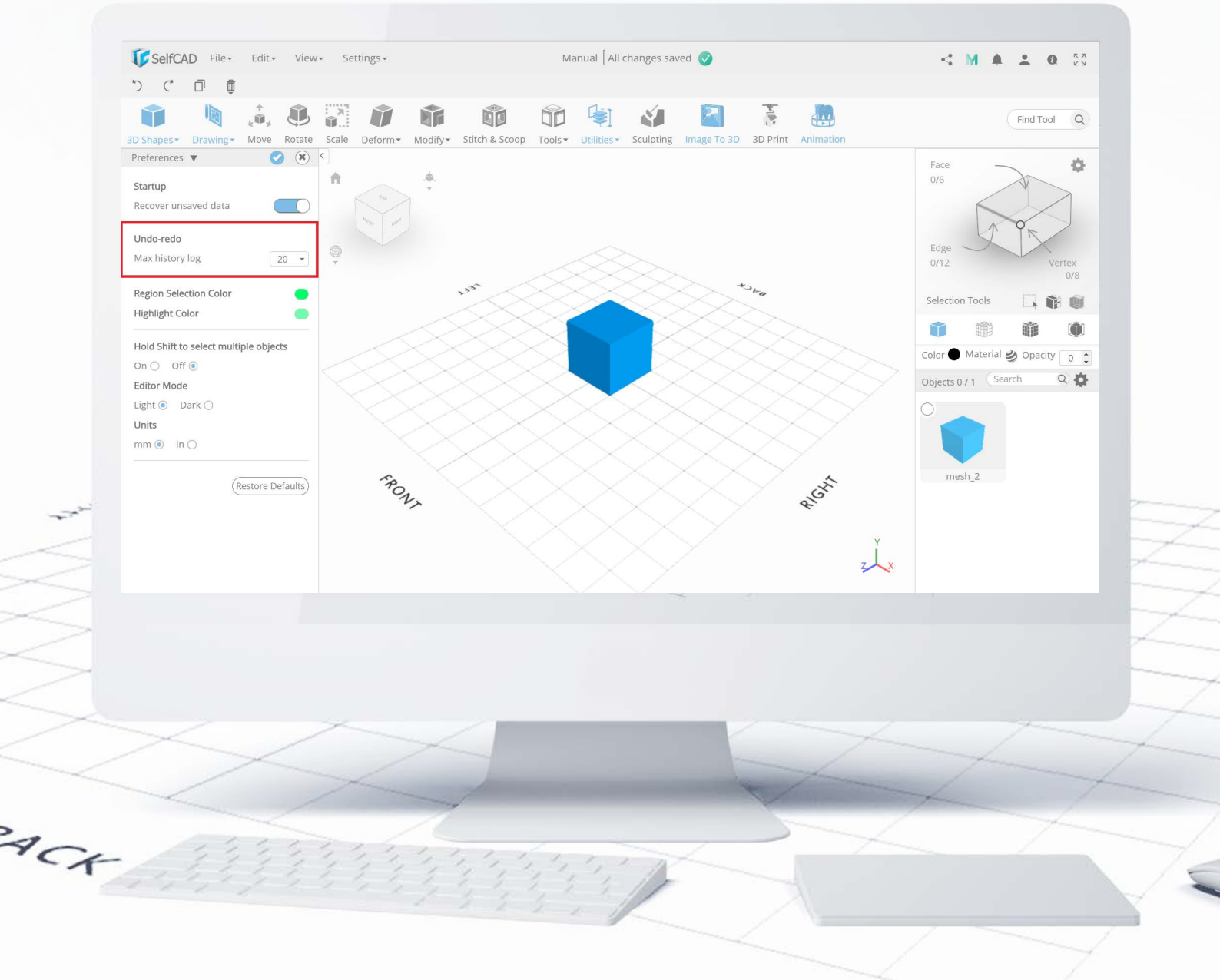

Now we'll go to the most dreaded but also the most important part - the **Settings** themselves. You'll find here all options available for customizing the software. They've been split into four separate sections, each with its own set of responsibilities. We'll start with Preferences.

# Preferences: Startup



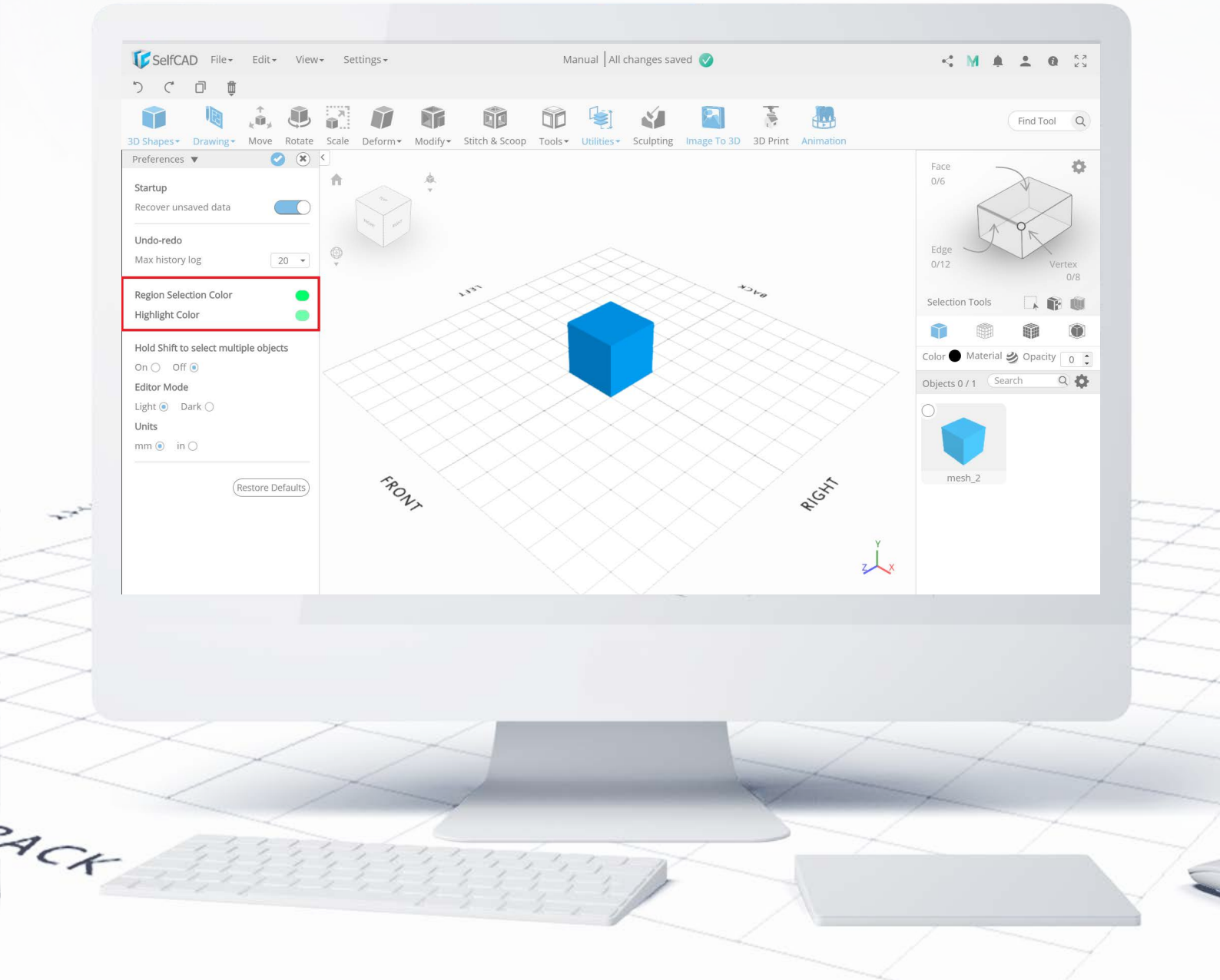

First, we have the **Recover unsaved data**. It's important to leave it ticked - if your computer crashes or you'll close the browser by accident, then during the next launching of SelfCAD the software will by default try to restore unsaved changes from the previous session, but there is an option to discard them as well. Pretty handy if you ask me!

# Preferences: Undo-redo



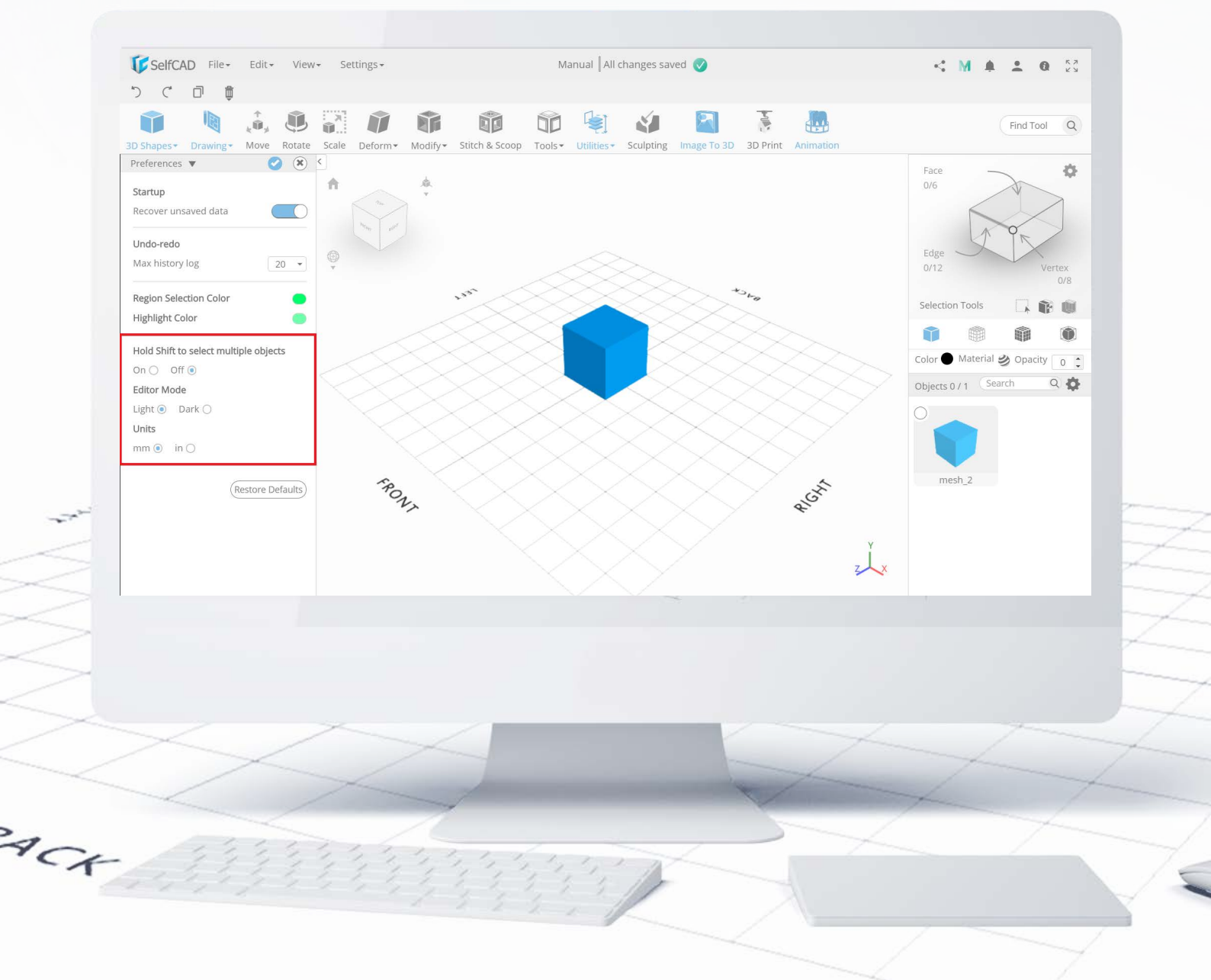

**Max History Log** refers to Project History from the File drop-down - it's the number of steps the software will save and allow you to undo. Set it to a higher value to be able to go back to even earlier changes.

# Preferences: Selection Color



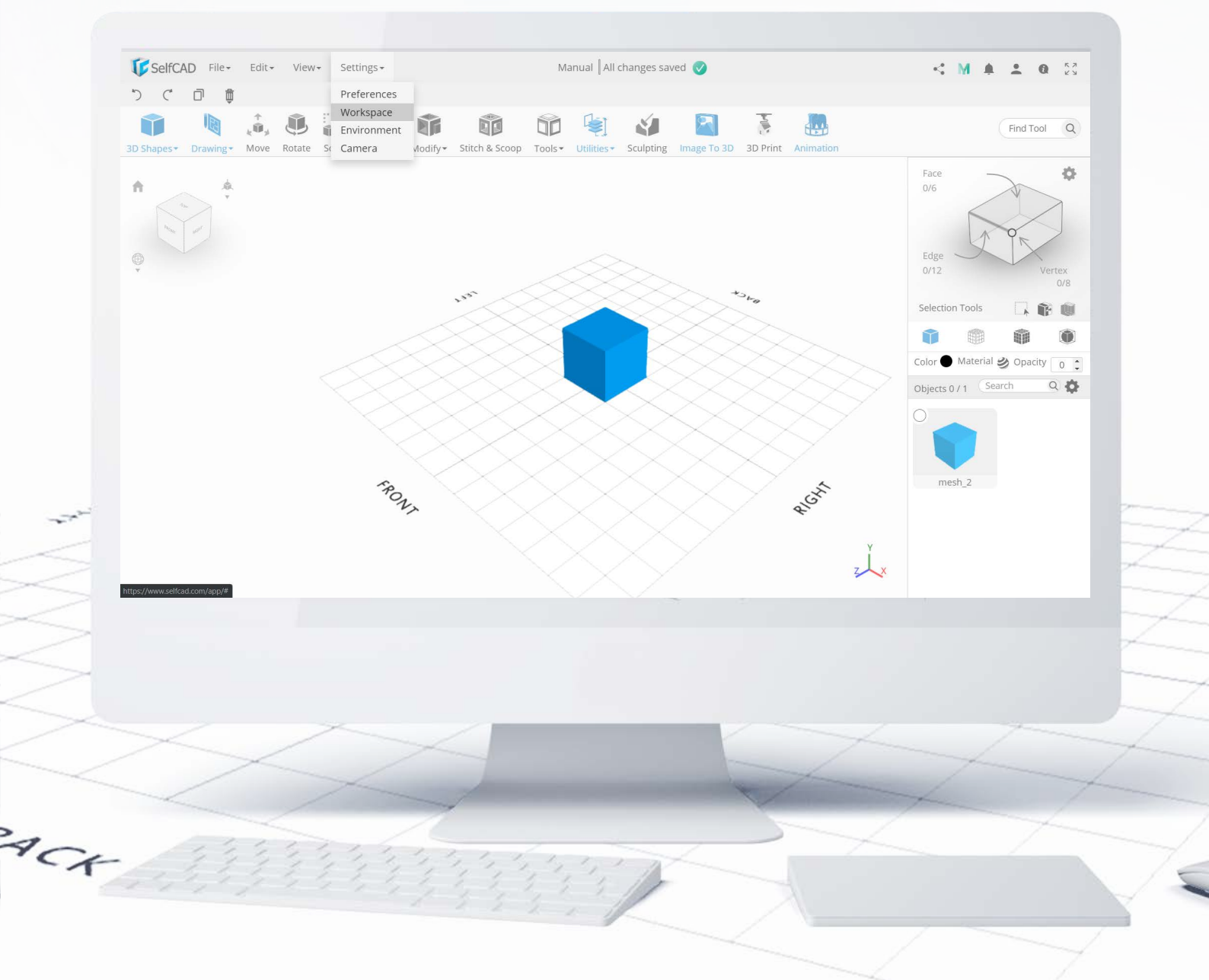

**Region selection Color** changes the color of the selected part of the figure, and Highlight Color does exactly the same but for parts that you're pointing at with your cursor.

# Preferences: Selection, Editor Mode and Units



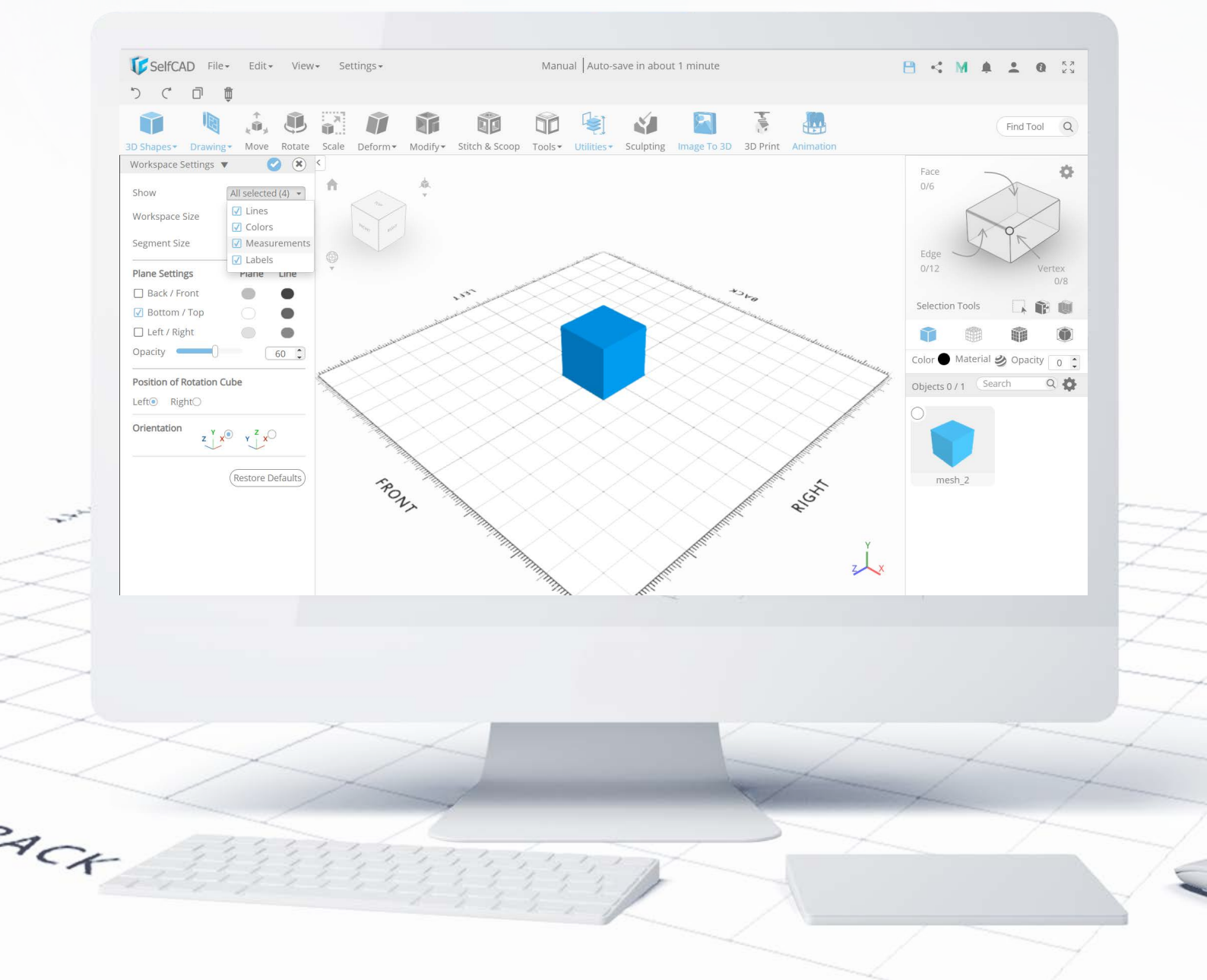

The last options are purely for convenience: **Hold shift** to select multiple objects - with this option turned off you can simply left-click on an object to select it. The **Editor Mode** changes to the color of the interface from white to dark grey, and **Units** refer to measurements - you can choose between **inches and millimeters**, so simply choose the one you're familiar with.

# Settings: Workspace



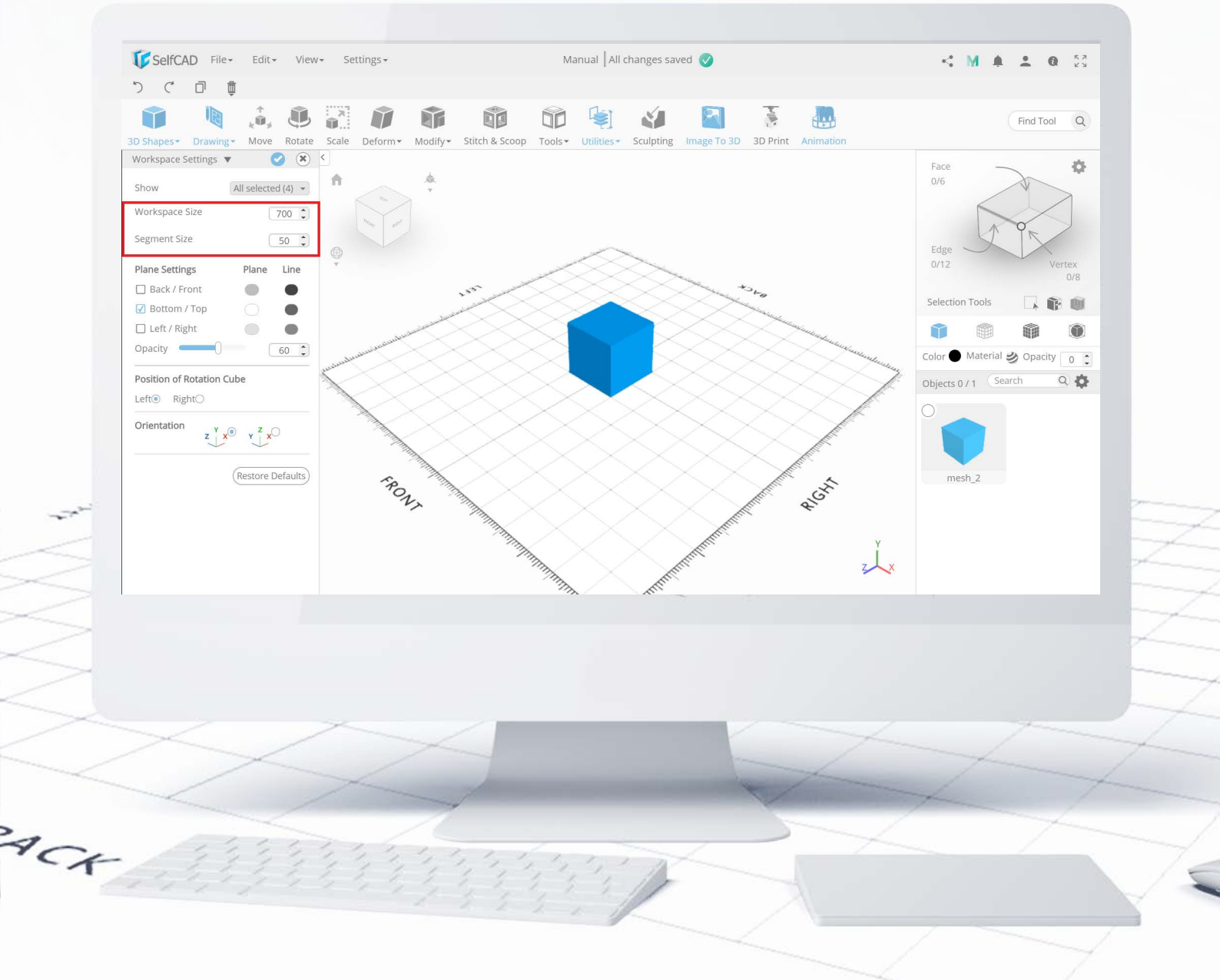

Next, we have the **Workspace**. You'll find here options for customization of the place you're going to work in. There are two ways to access them: the first one is by choosing this from the **Settings menu** at the top, and the second one is by clicking on this **3d Coordinates Axis** at the bottom right of the screen.

# Workspace: Workspace Settings



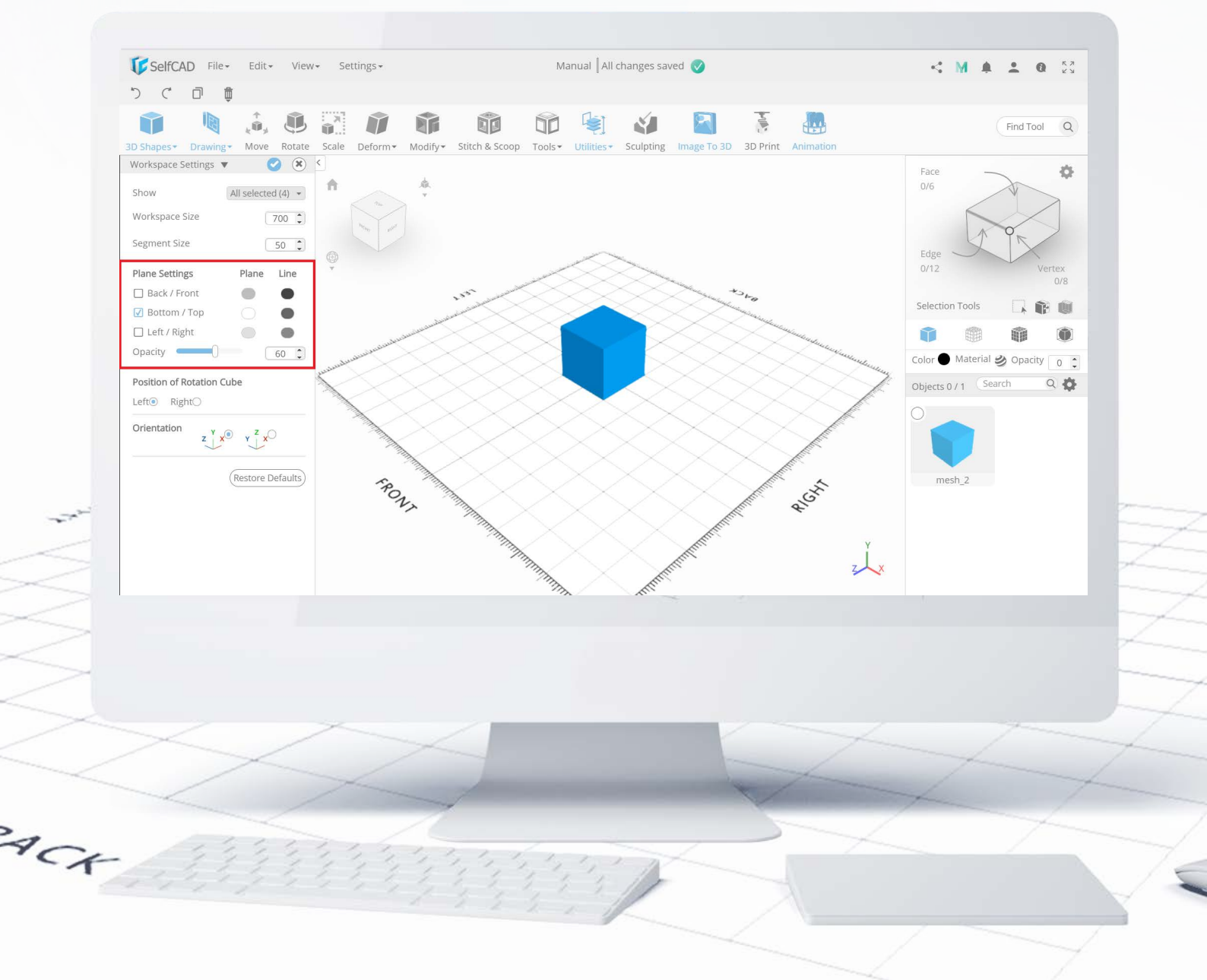

The first option in **Workspace Settings** is **Show**, which refers to the visualization of the grid itself. You can choose to see **Lines**, which will show you the segments, Colors which will change the color of the workspace, **Measurements** which will show you the exact coordinates of your cursor on the grid and **Labels** which show you the orientation.

# Settings: Workspace



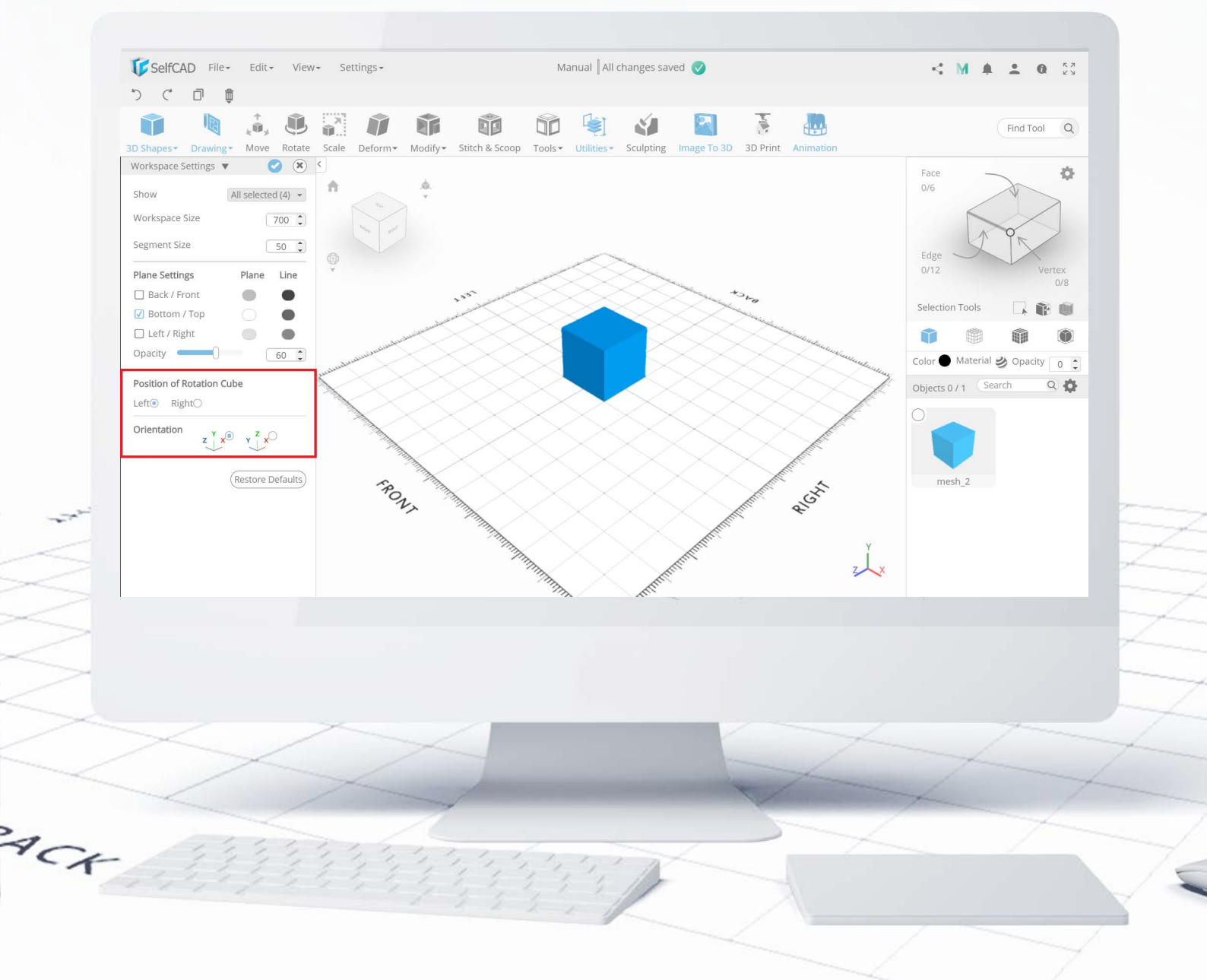

**Workspace** and **Segment Size** are self-explanatory - just remember: if you're going to print the object, the workspace cannot be bigger than what your 3D printer supports - otherwise, some part of your object might get cut from printing, or your project will get rejected altogether. Setting smaller segments size might help you with measurements without using additional tools.

# Workspace: Plane Settings



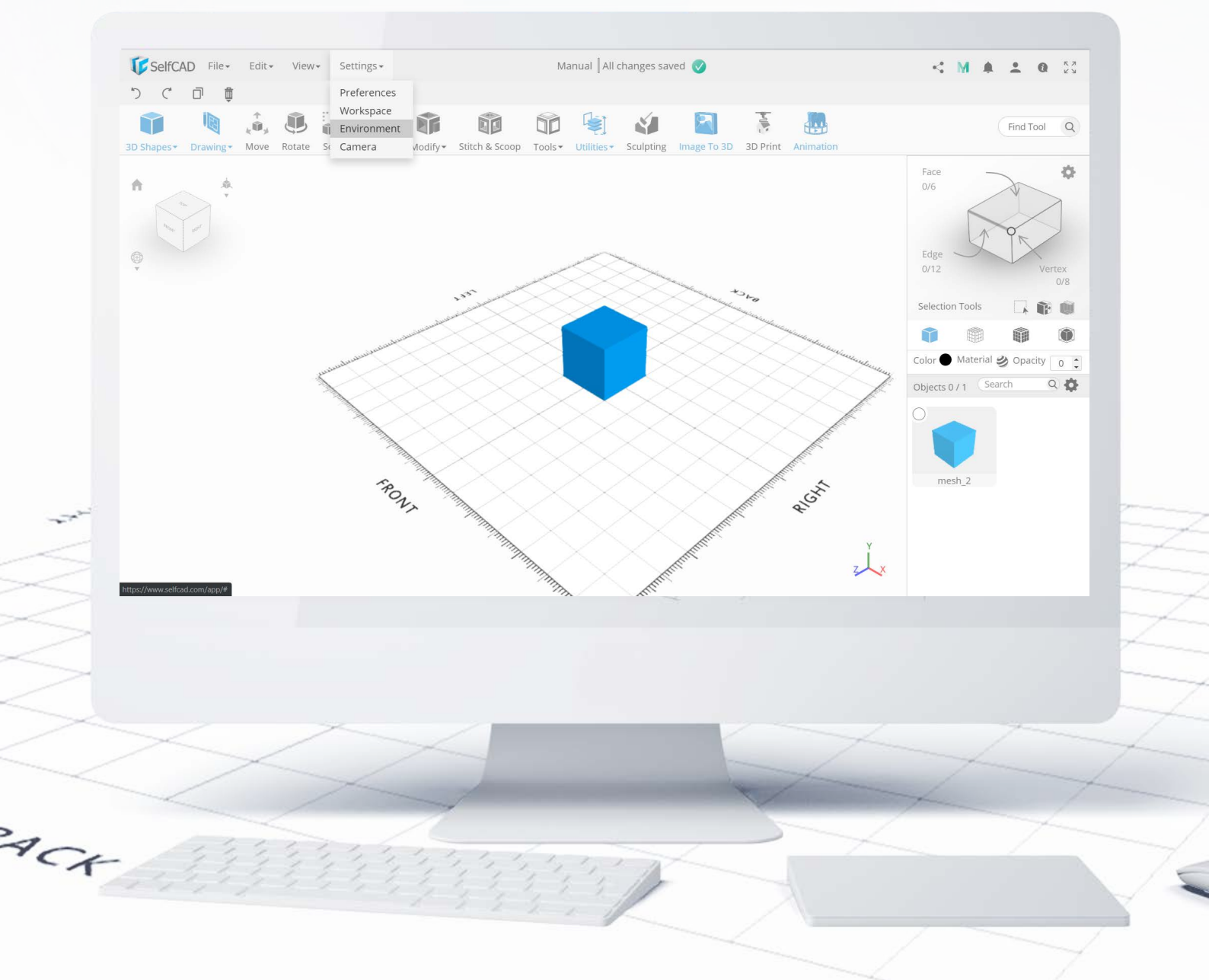

**Planes** are the physical borders of your workspace - every time one of your objects gets out of the grid, it will be - by default - snapped back inside, so it might be helpful to know the limits within which you have to work. Other than that, you'll find here options to change the color of the planes and the color of the lines, as well as their opacity.

# Workspace: Cube and Orientation



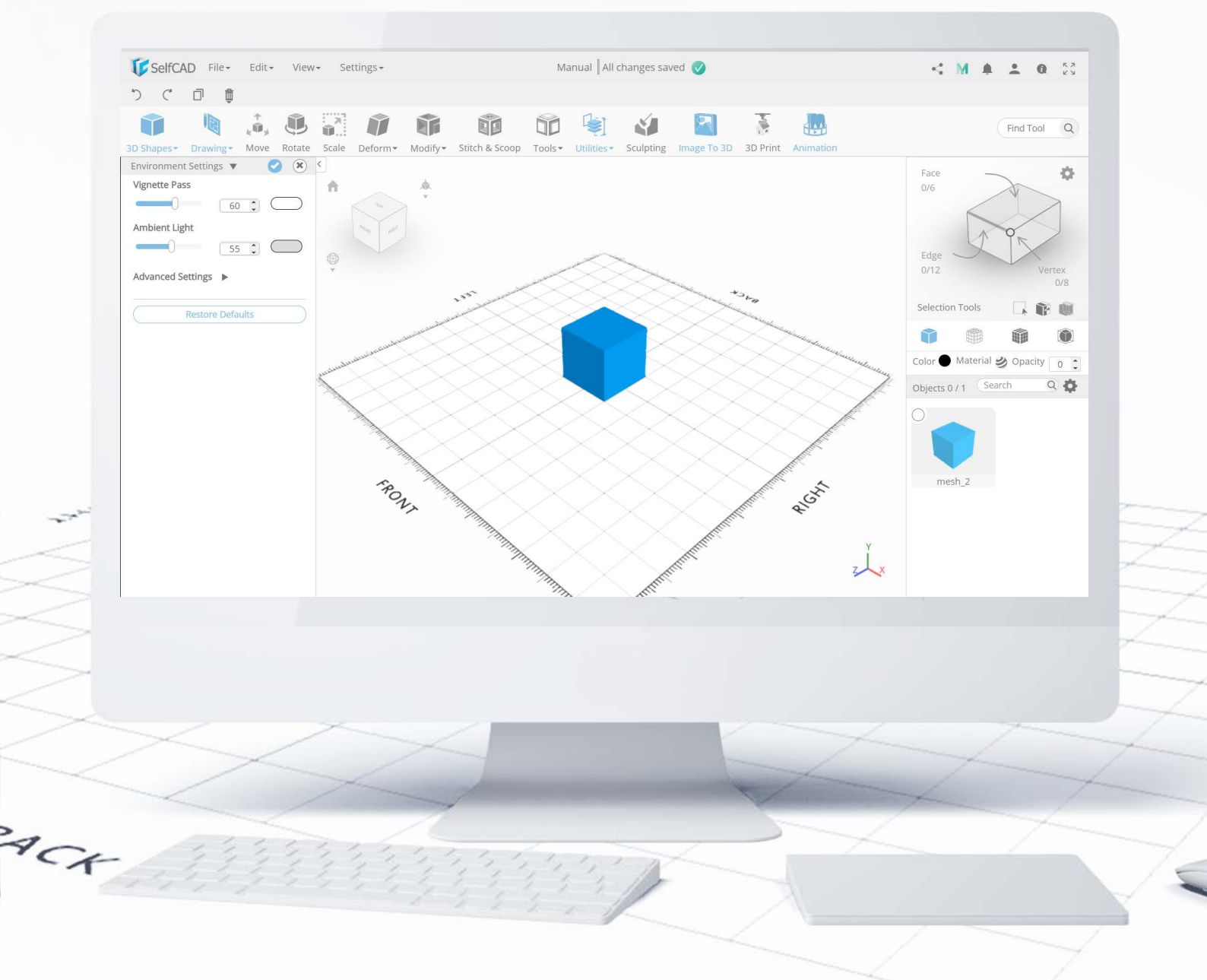

**Position of Rotation Cube** refers to **Camera Cube** to which we'll get in a second. You can set it up to be on the left or the right side of the screen, while Orientation swaps the YZ axis on the 3d coordinates axis at the bottom right of the screen.

# Settings: Environment



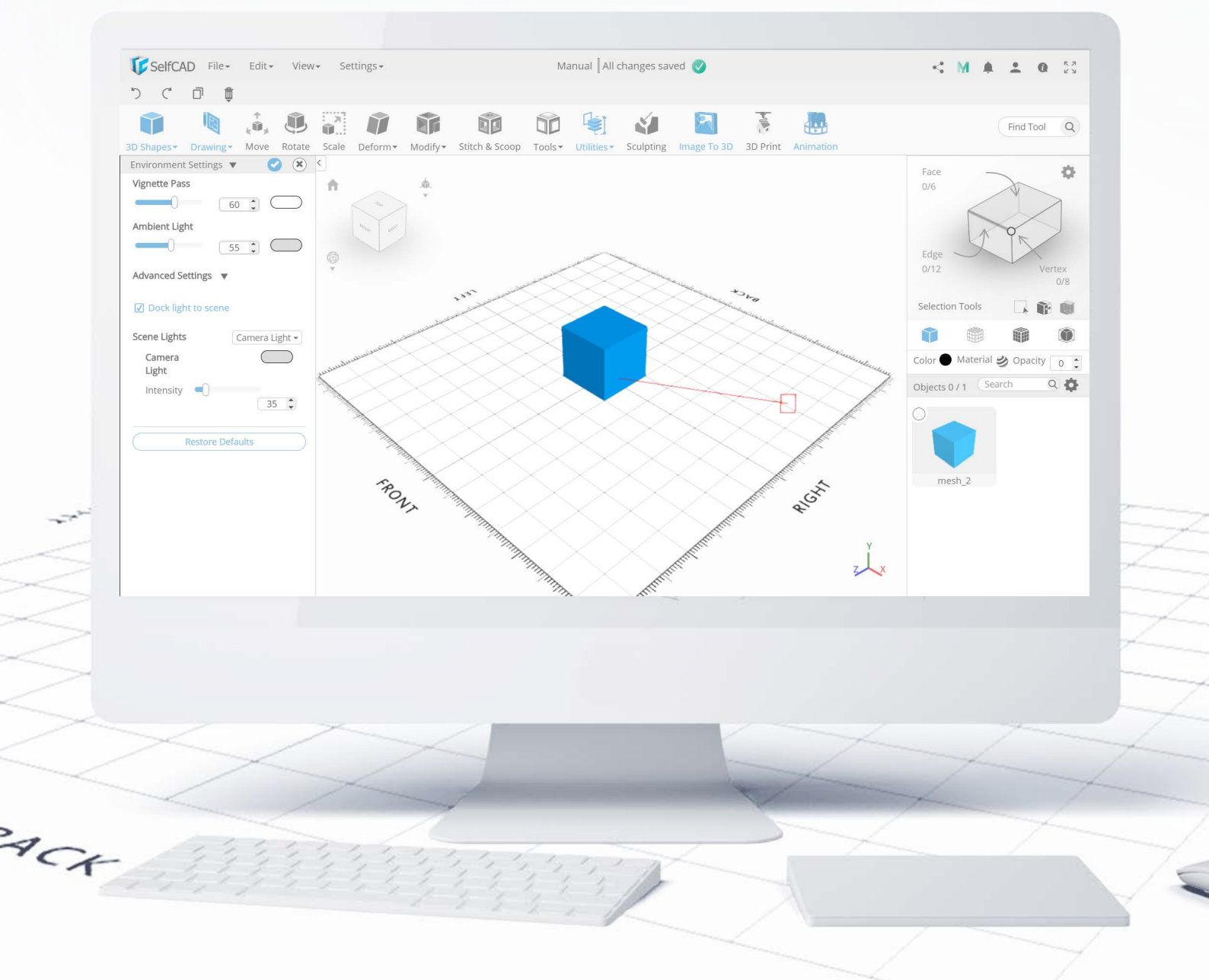

The **Environment** is responsible for the lighting within the software. You can personalize its brightness, color, and even its direction.

# Environment: Vignette Pass and Ambient Light



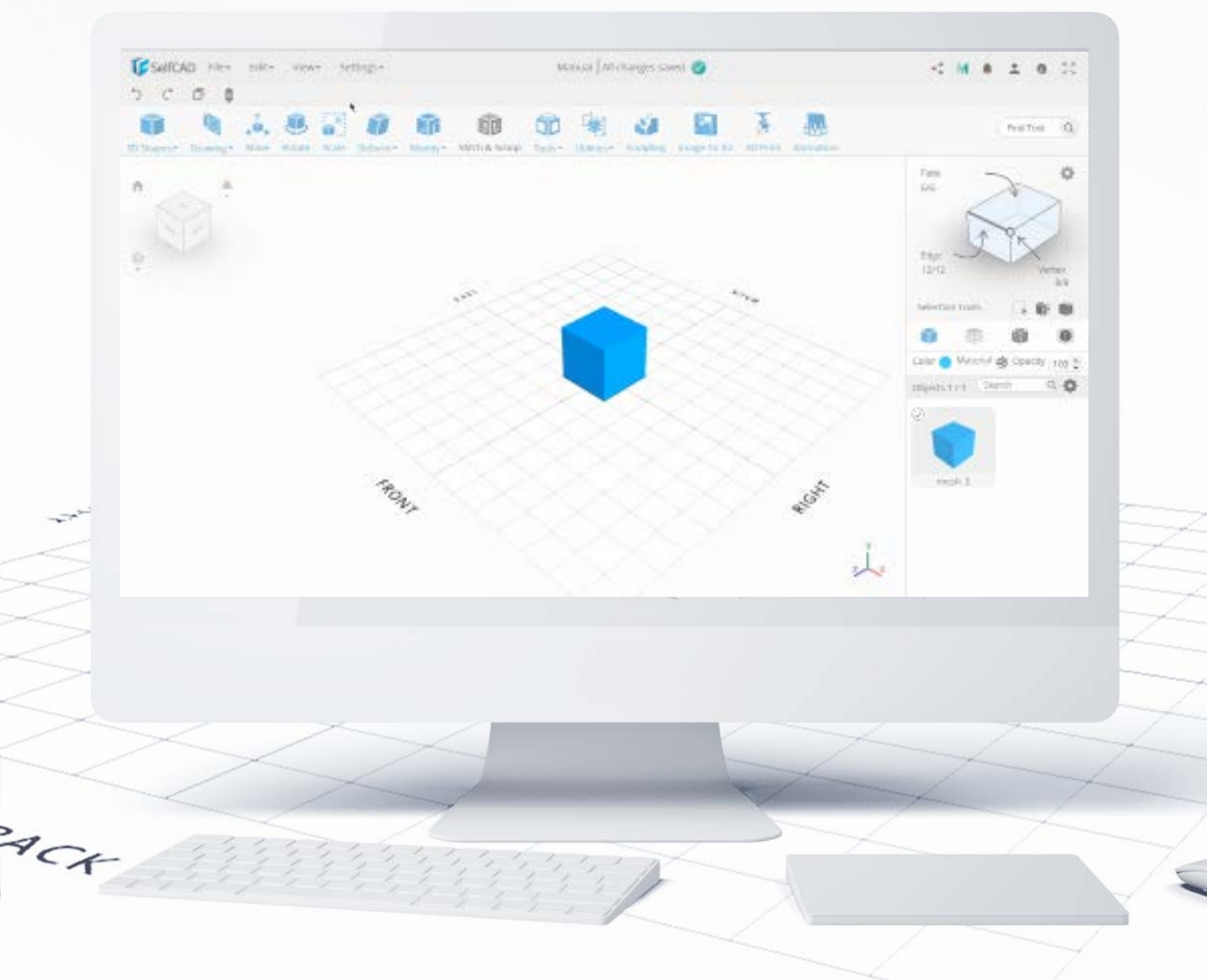

**Vignette Pass** allows you to adjust the lighting of the whole workspace, and Ambient Light adjusts the light coming off the figure itself. And of course, there is the possibility to change the color of those respective lights as well.

# Environment: Dock Light




**Dock Light** allows you to set an additional light coming from a specific direction, which will be represented by that red line. As before, there is a possibility to change the color of each light separately.

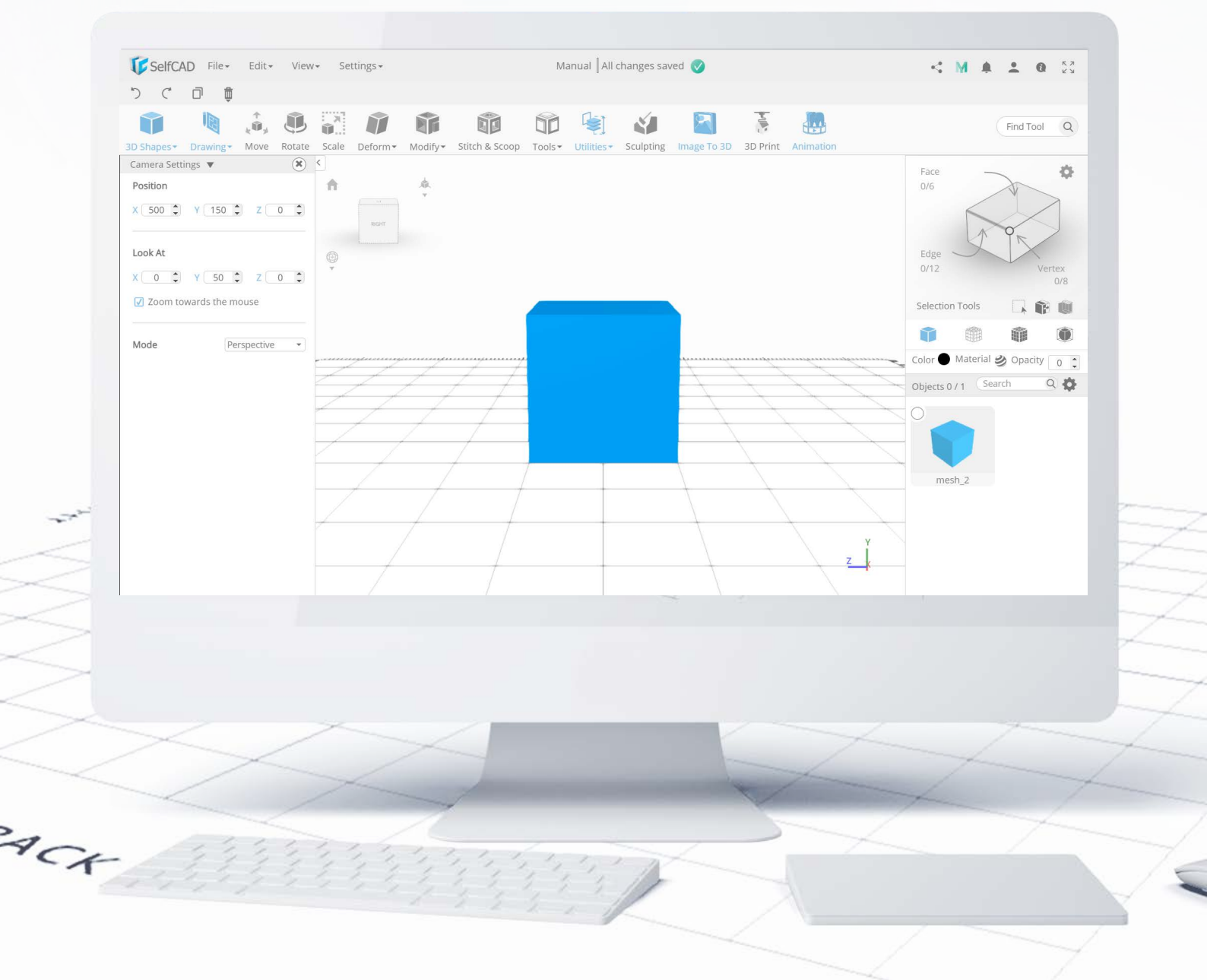
# Settings: Camera




**The Camera** allows you to set precise positions of the camera that will look at the very precise place in the project.

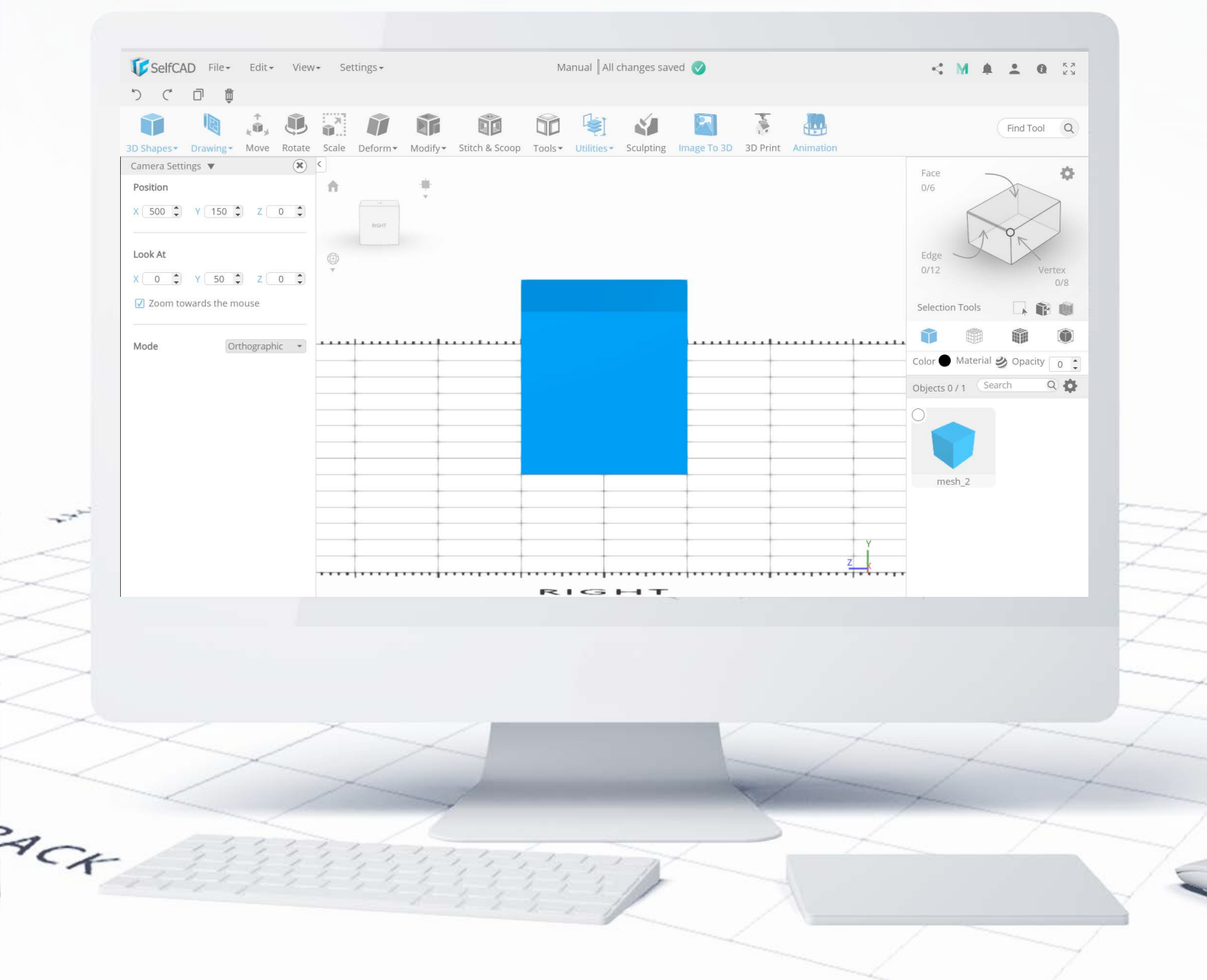
Zoom towards the mouse will allow you to bring the camera closer towards the part of the workspace you're pointing at with your cursor.

# Camera Mode: Perspective



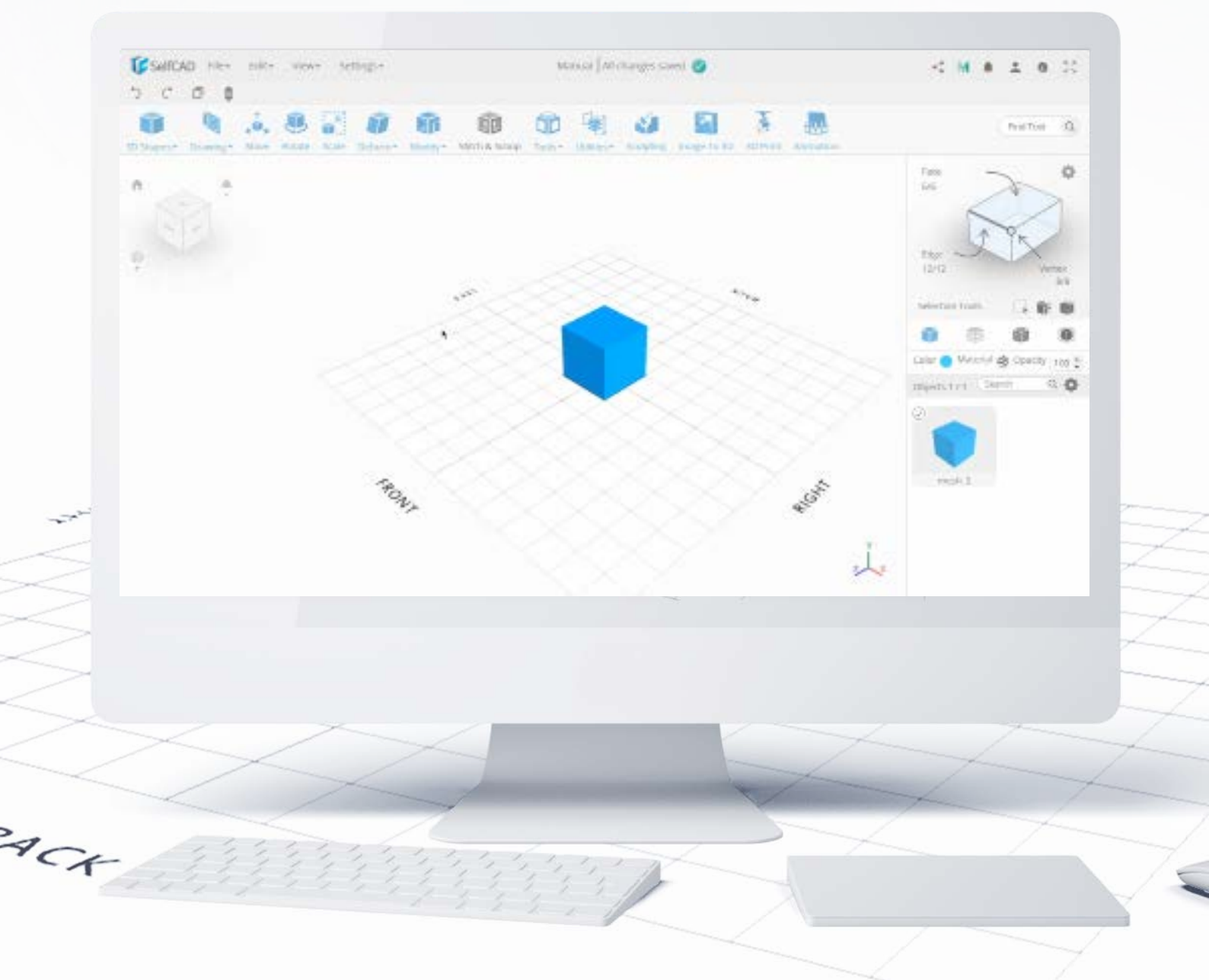

Then there is the mode of the camera. **Perspective Camera** works exactly like the perspective does in art - depending on the position of the camera, objects that are further away from it will appear as smaller than they are in reality. You can easily observe this after positioning the camera over the edge of the model. You can see clearly, that the edge closer to the camera seems to be bigger than the one further away. While it looks good on paintings, you can get into some trouble during modeling - because of the distorted vision of the perspective camera you might end up with incorrectly measured designs, especially if you're working with objects on different offsets.

# Camera Mode: Orthographic




**The Orthographic camera**, on the other hand, takes away all the depth from the project and shows everything on the flat surface. Take a look at the exact same model I showed you with the Perspective Camera, but this time with the Orthographic camera - you can clearly see, that every edge has the same size. And no matter how much you zoom in or out, or change the angle of the camera - the effect will stay the same.

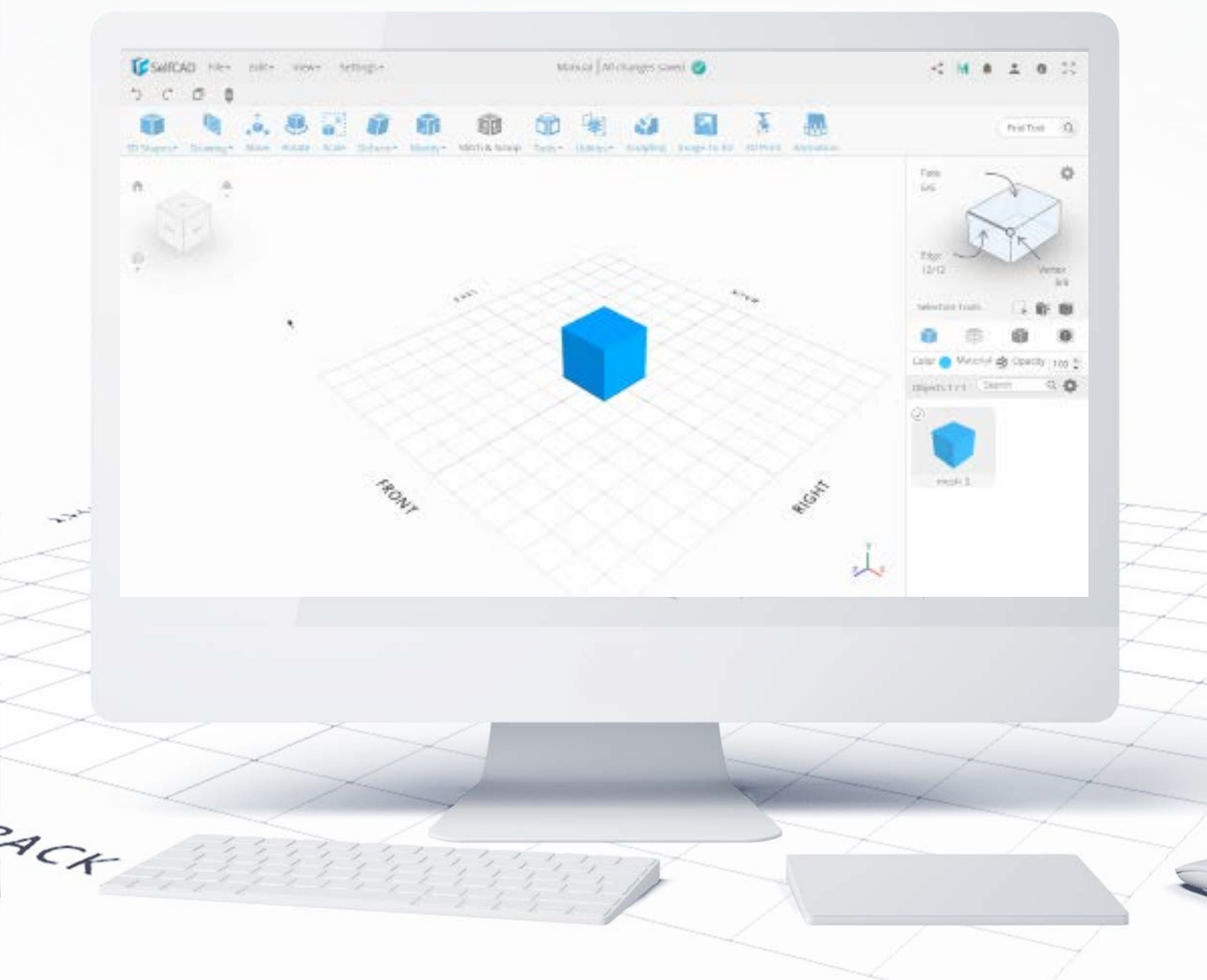
# Camera: The Cube




There is another way to manipulate the **Camera**, and it's by operating the **Rotation Cube** on the top left side of your screen. You can set the position of the camera to one of the preset options and change between different modes of the camera.

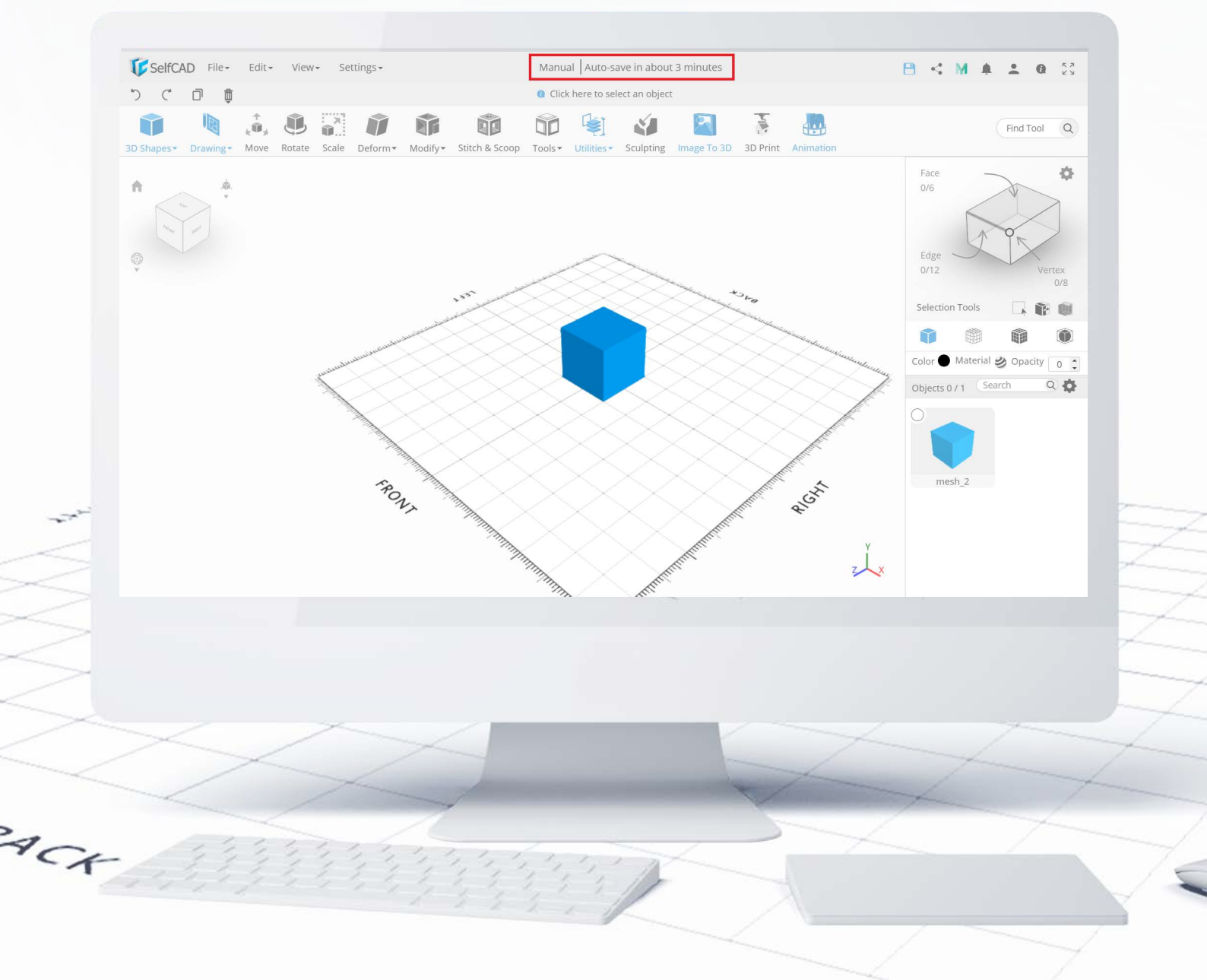
In the top left corner is the option to reset the camera to its default position, and on the right is the option to change between Perspective and Orthographic modes.

# Camera Cube: Rotate, Pan and Zoom



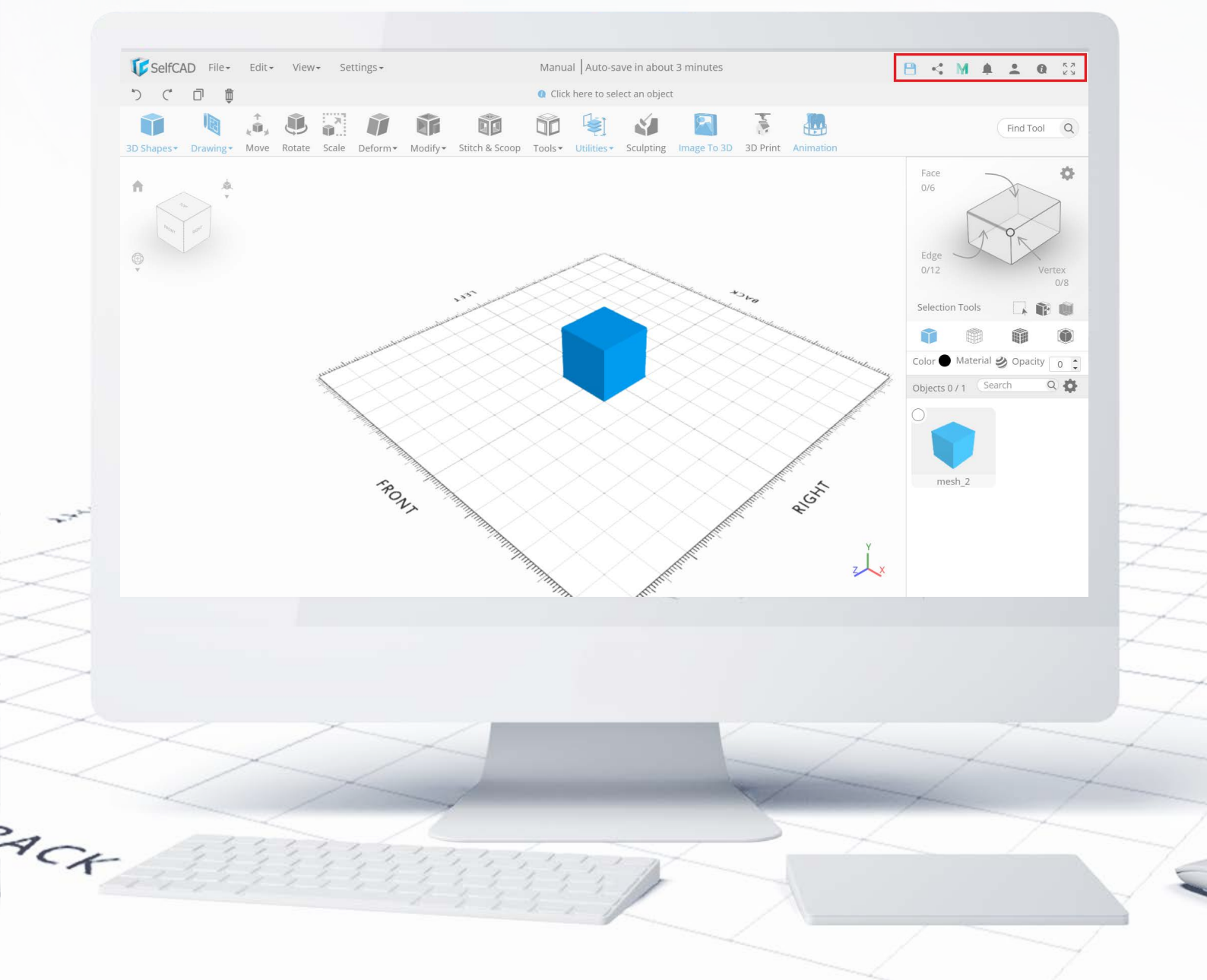

On the bottom left you'll find options to set up the default mouse behavior. You can choose between **Rotate Camera**, which allows you circle the view around the project, **Pan Camera** which only allows you to move the camera in two dimensions and the **Zoom Camera** which doesn't allow anything other than changing the distance between the camera and your project.

# Top Panel: Status Indicator



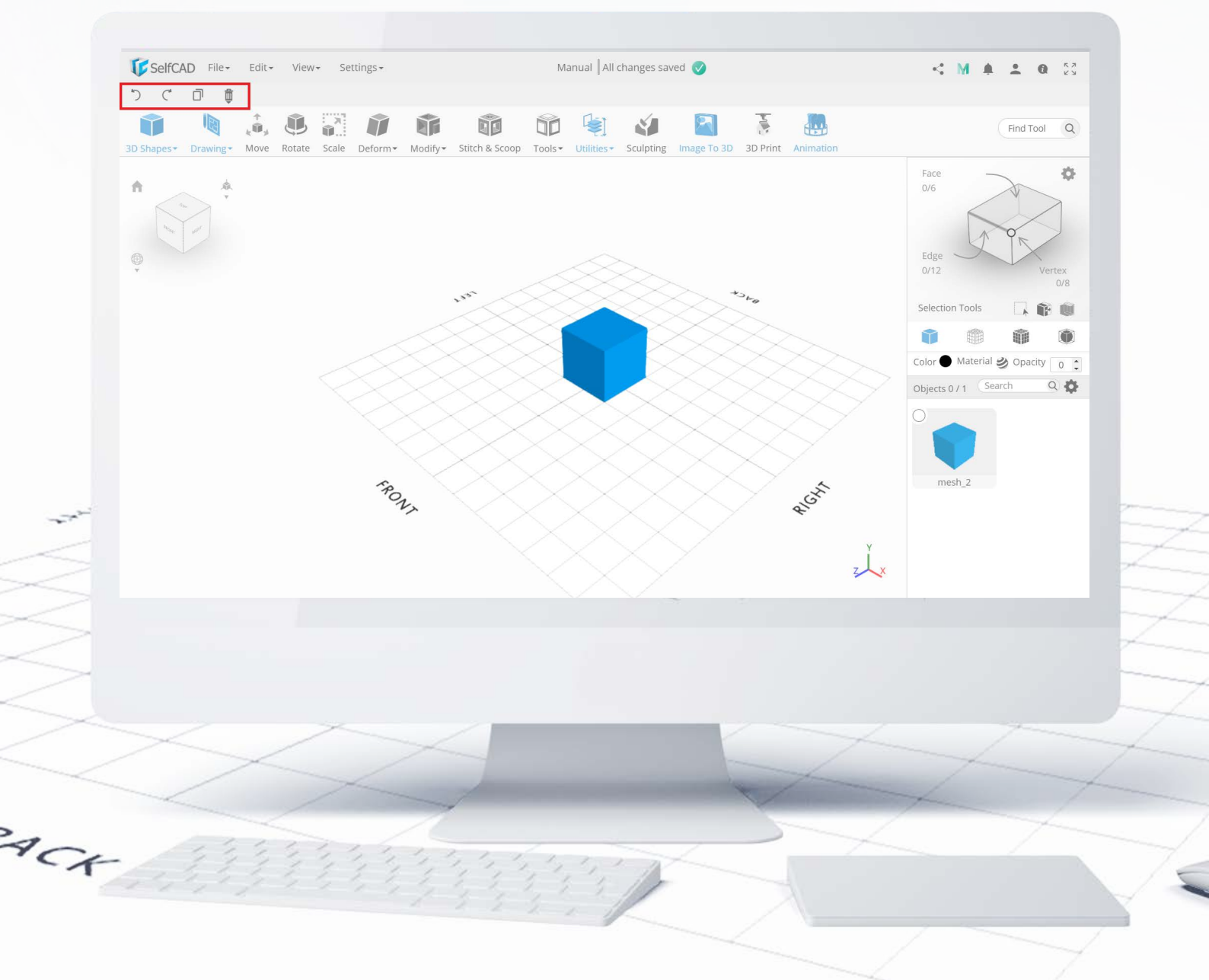

In the middle of the Top Panel you'll see the **Name of your project** (which you can always change by clicking on it), as well as the **Status Indicator**, which shows you if the project has been saved, and if not, how long until the software will perform an autosave, which by default, happens every 3 minutes.

# Top Panel: User Options



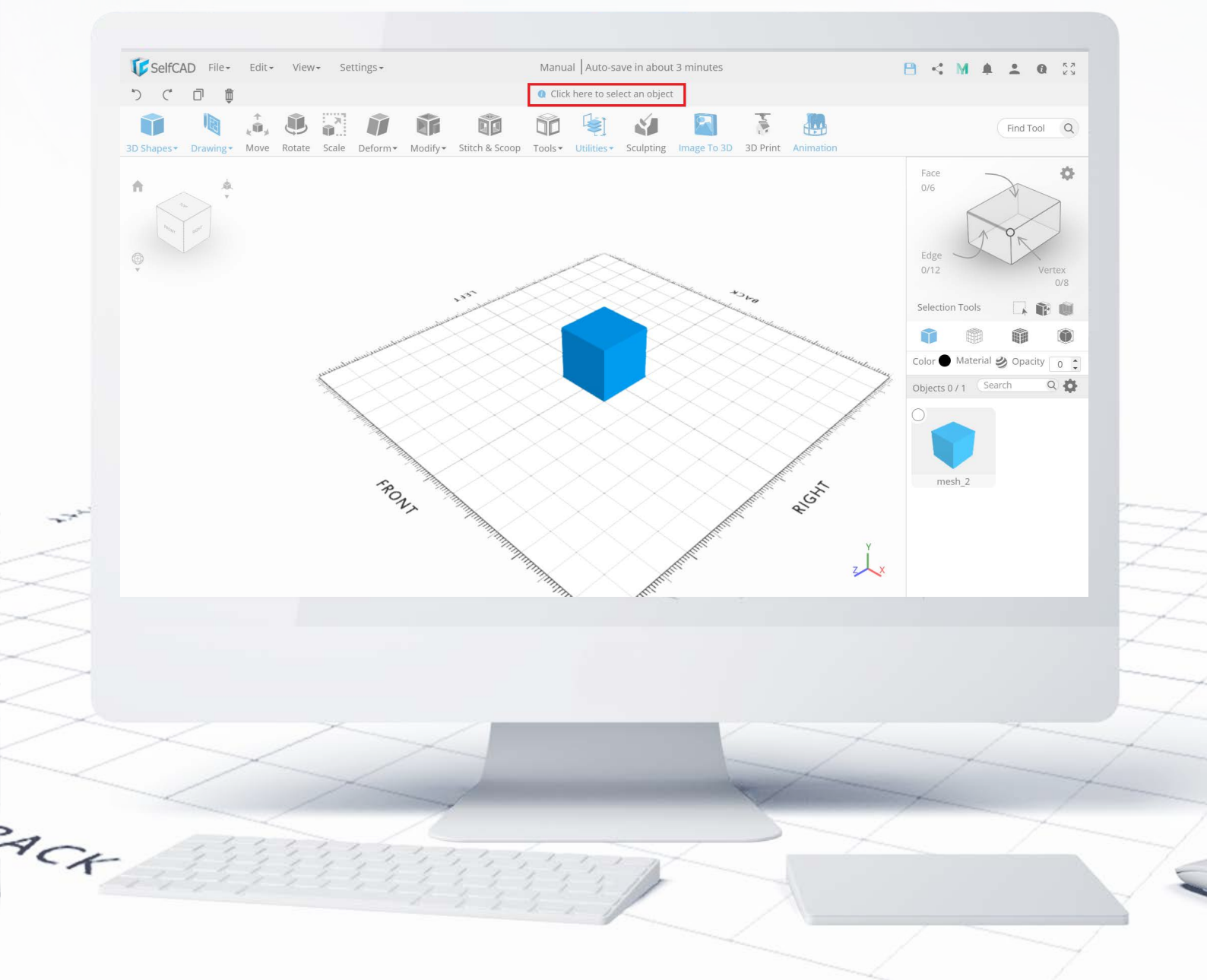

And on the right, there are **User Options**. Here you can save manually (this option will disappear when the project is saved), **Share** your work through **MyMiniFactory (MMF)**, Connect to your MMF account (which you can use to download more complex shapes), check **Notifications** as well as access the **Help Center**. There is also an option to change to full-screen mode.

# Top Panel: Quick Access



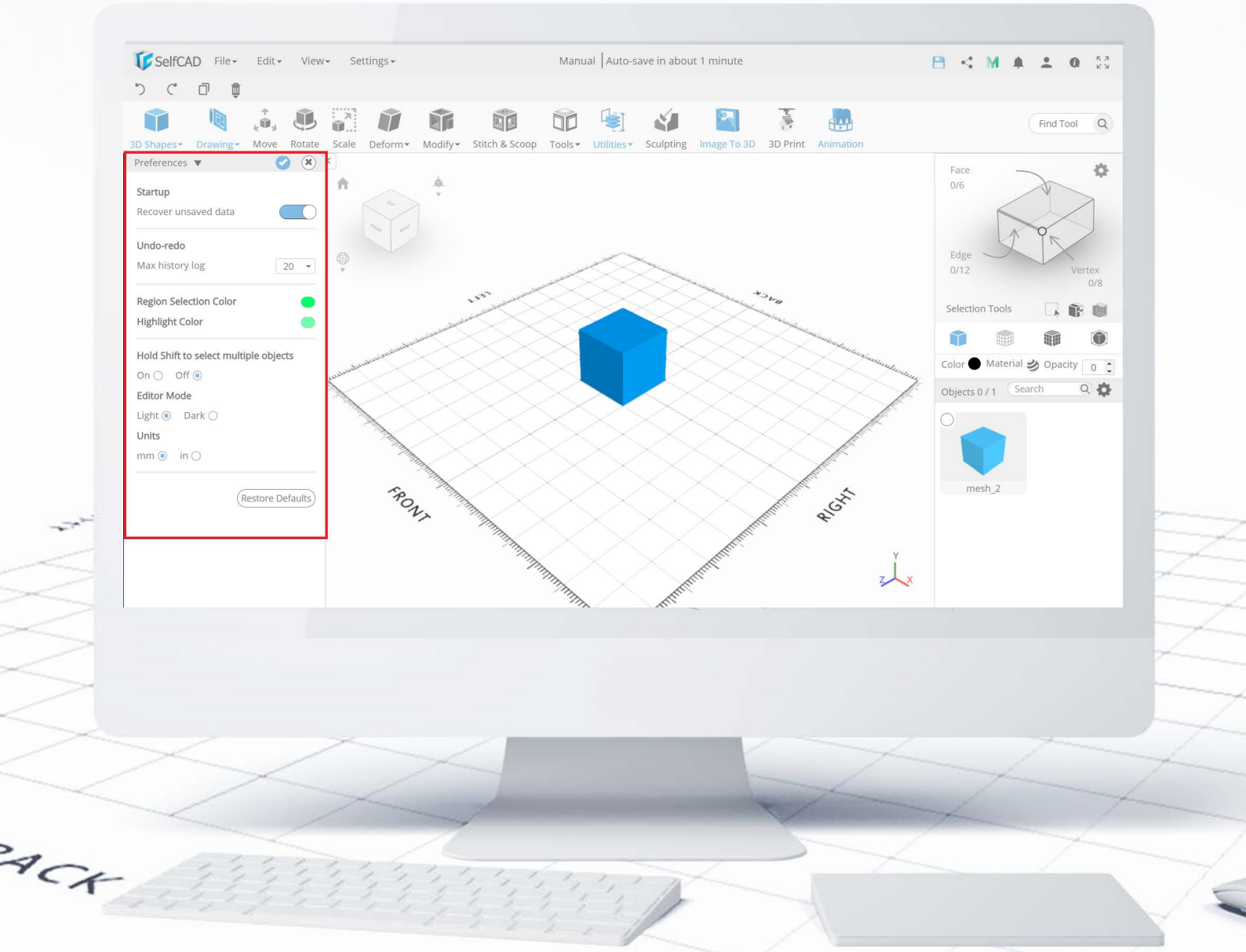

Below the Main Menu, you'll find the bar with **Quick Access options**. Those are universal - **Undo**, **Redo**, **Copy** and **Delete** - you can use them either by clicking on them on the panel or simply by using Shortcut Keys.

# Top Panel: Information Panel




In the middle is the **Information Panel**, which shows you a brief description of tools and features available in SelfCAD. Naturally, the description updates as you hover your cursor over other options.

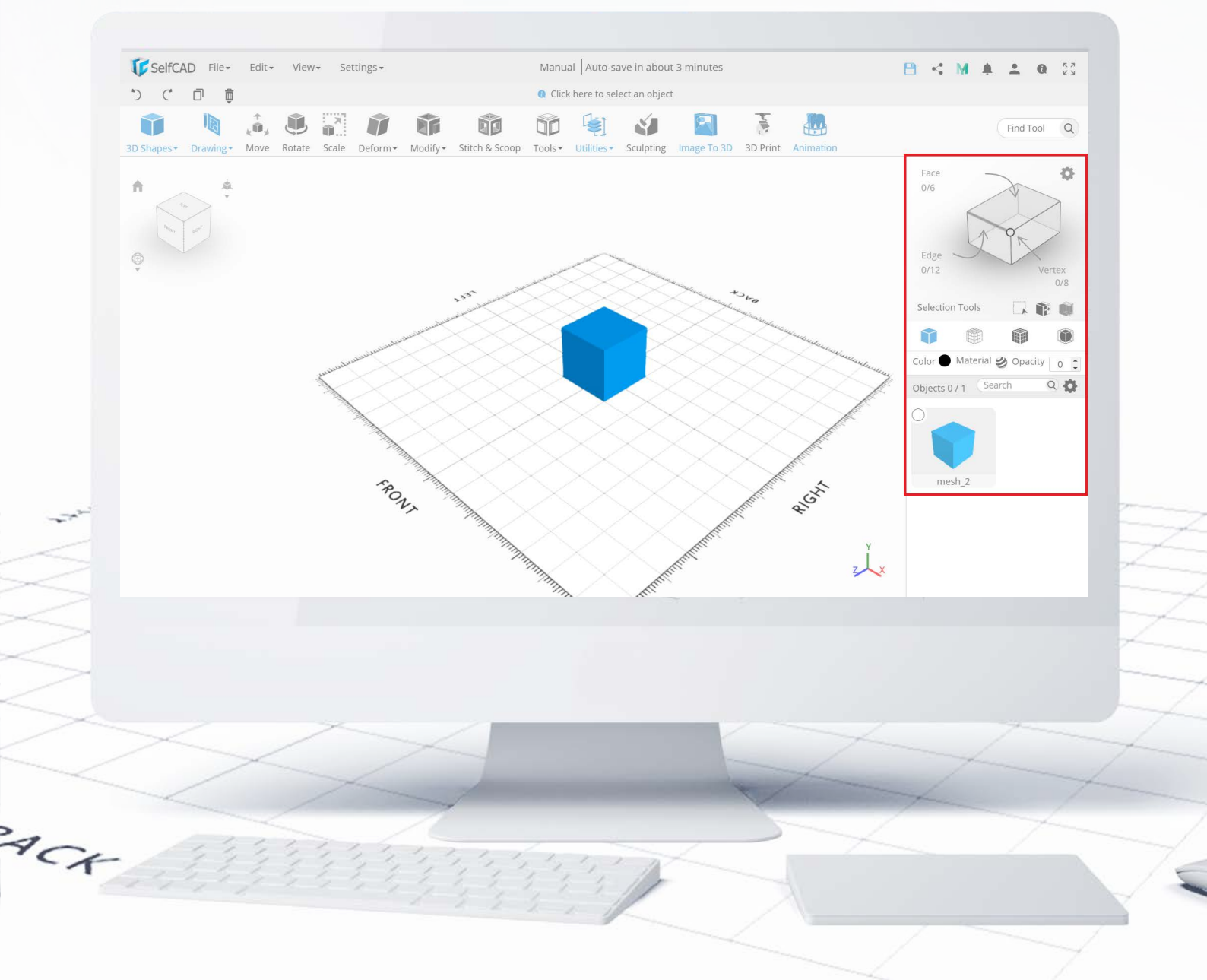
# Left Side Panel: Tool Settings




The panel you can see on the left side of the screen is what we call the **Tool Settings** - it will appear every time you'll use the tool which has any customizable options. The most common way to change the settings is by using Sliders, but the more precise one is by typing in the exact numbers (fractions included), which is particularly true when the range on the slider is so big, that even the slightest movement will significantly change its value. In some cases, you can even set up higher values using text boxes than with a slider.

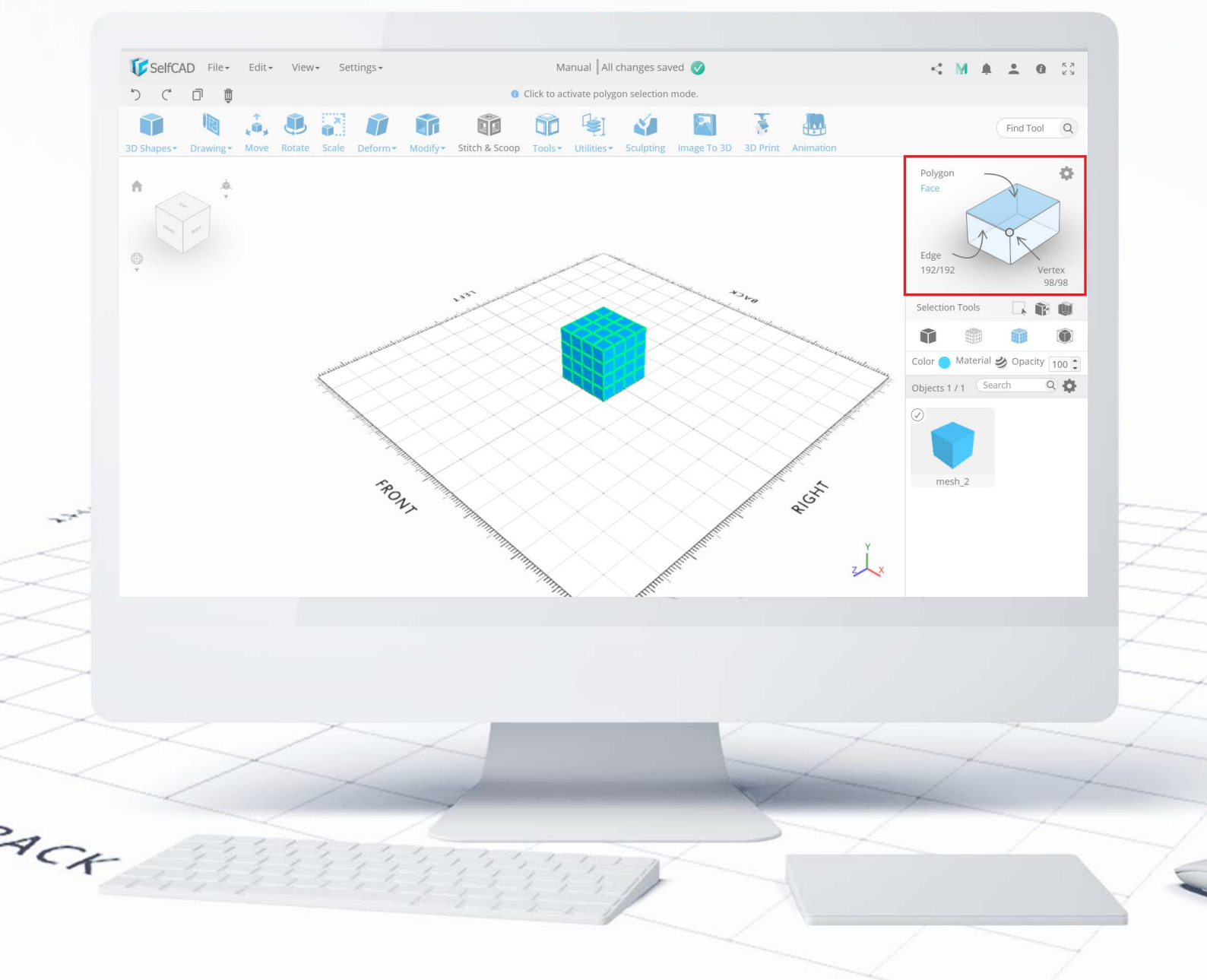
SelfCAD has an integrated feature of seeing the changes in real-time, which means that every change you make will be immediately visible to you. Thanks to this you won't have to save changes every time to see the result of it.

# Right Side Panel: Selection and Display



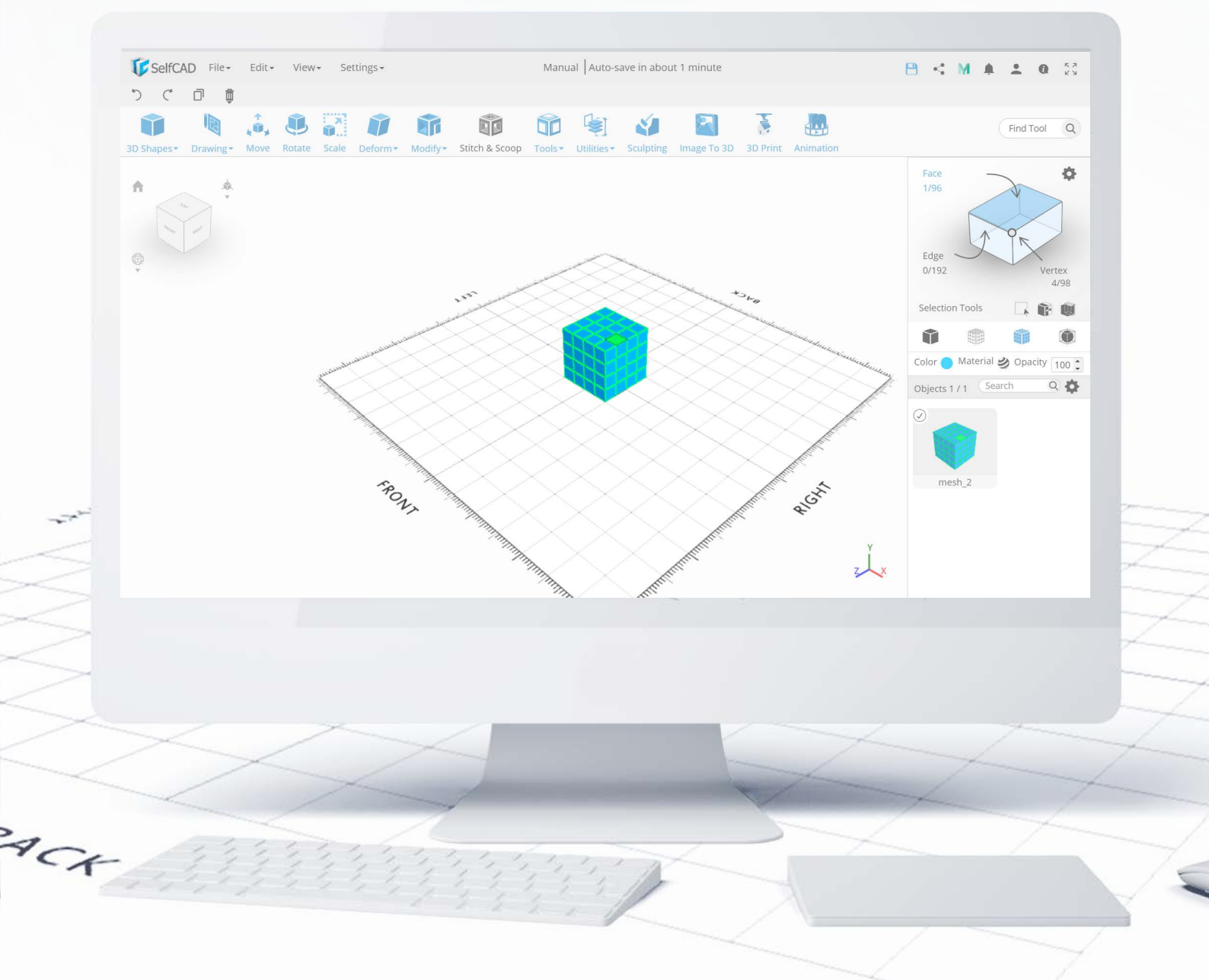

The **Right Panel** is responsible for the selection and display of the objects within the project.

# Structure of models




Before we'll even get to the **Selection Modes**, it's important that you'll know how models are built-in 3D software. Take a look at the highlighted **Interactive Rectangle** - you'll see that every shape has four distinctive parts, which are **Faces**, **Polygons**, **Edges**, and **Vertices** - all of them have arrows pointing towards the parts of the figure they refer to. When it comes to Edges and Vertices the idea is rather simple so I won't dwell on it, but it gets interesting when it comes to Faces and Polygons. To switch to Polygon selection you need to move your cursor over the Face selection and switch to Polygon.

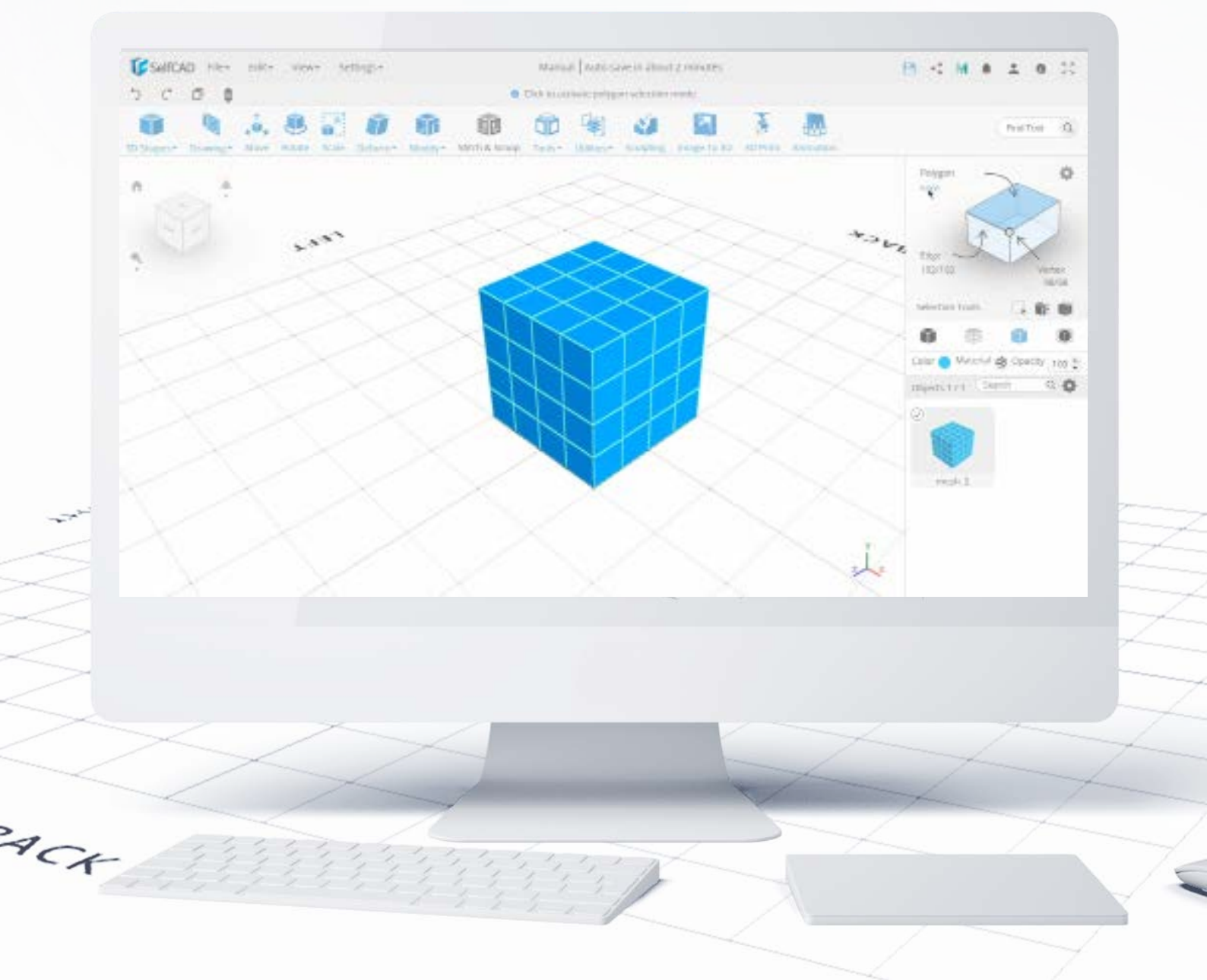
# Structure of Models: Faces




You shouldn't think about 3D models as of solid shapes, but rather as a collection of **Faces (segments)** which can be compared to building blocks or tiles. And just like when building something in real life, with smaller segments (building blocks) you can create much more precise shapes.

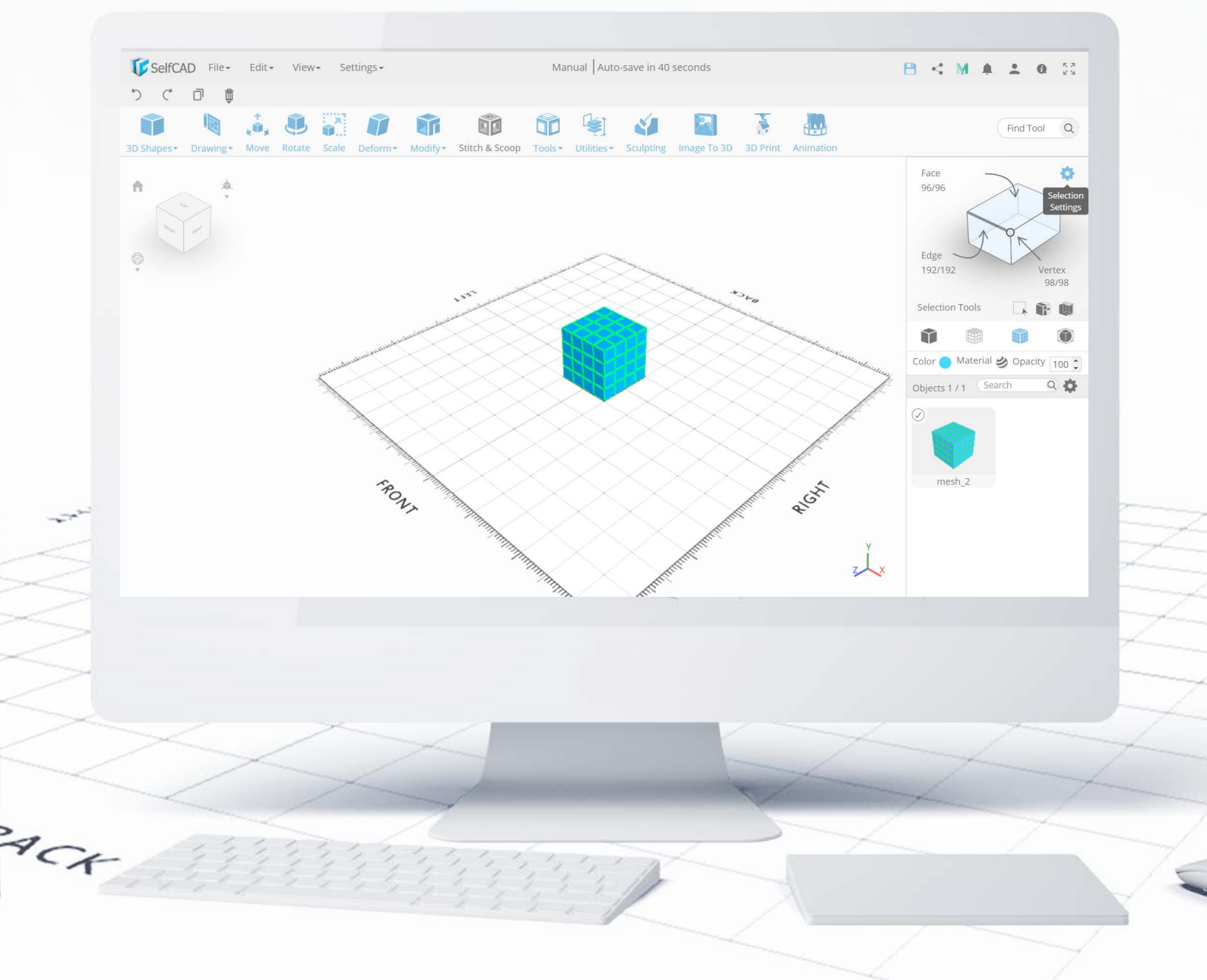
Each **Face** has its own **Edges** and **Vertices**, that can be modeled separately. Because of that, the more segments your figure has, the more precisely you can shape and model it to achieve a certain goal.

# Right Side Panel: Interactive Rectangle



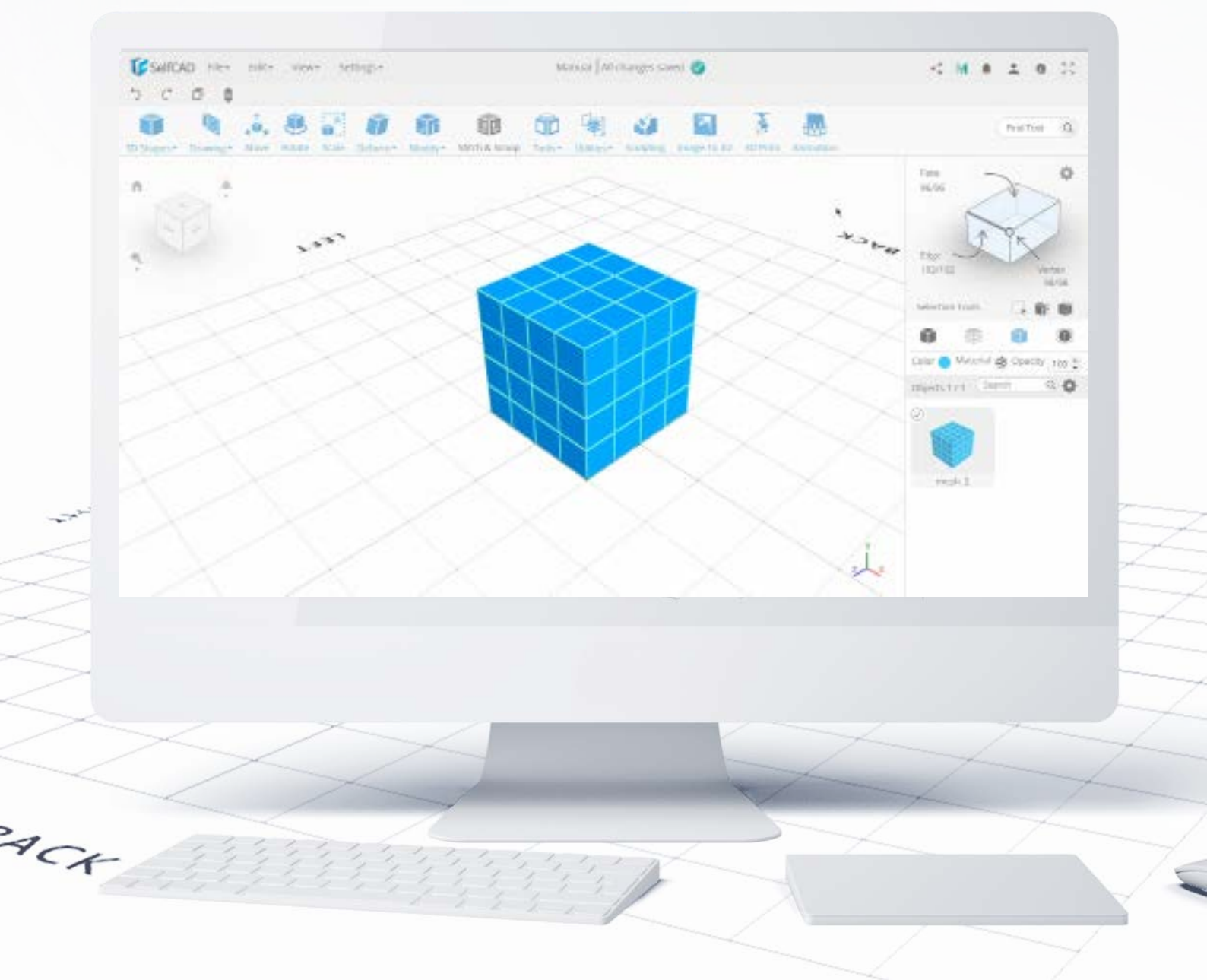
At the very top, you'll find the **Interactive Rectangle** for selection modes, which allows you to select parts of the figure to model them individually. You have the options to select **Faces or Polygon (flat surfaces)**, **Edges**, and **Vertices** as well as their advances options for selection.

# Interactive Rectangle: Advanced Options



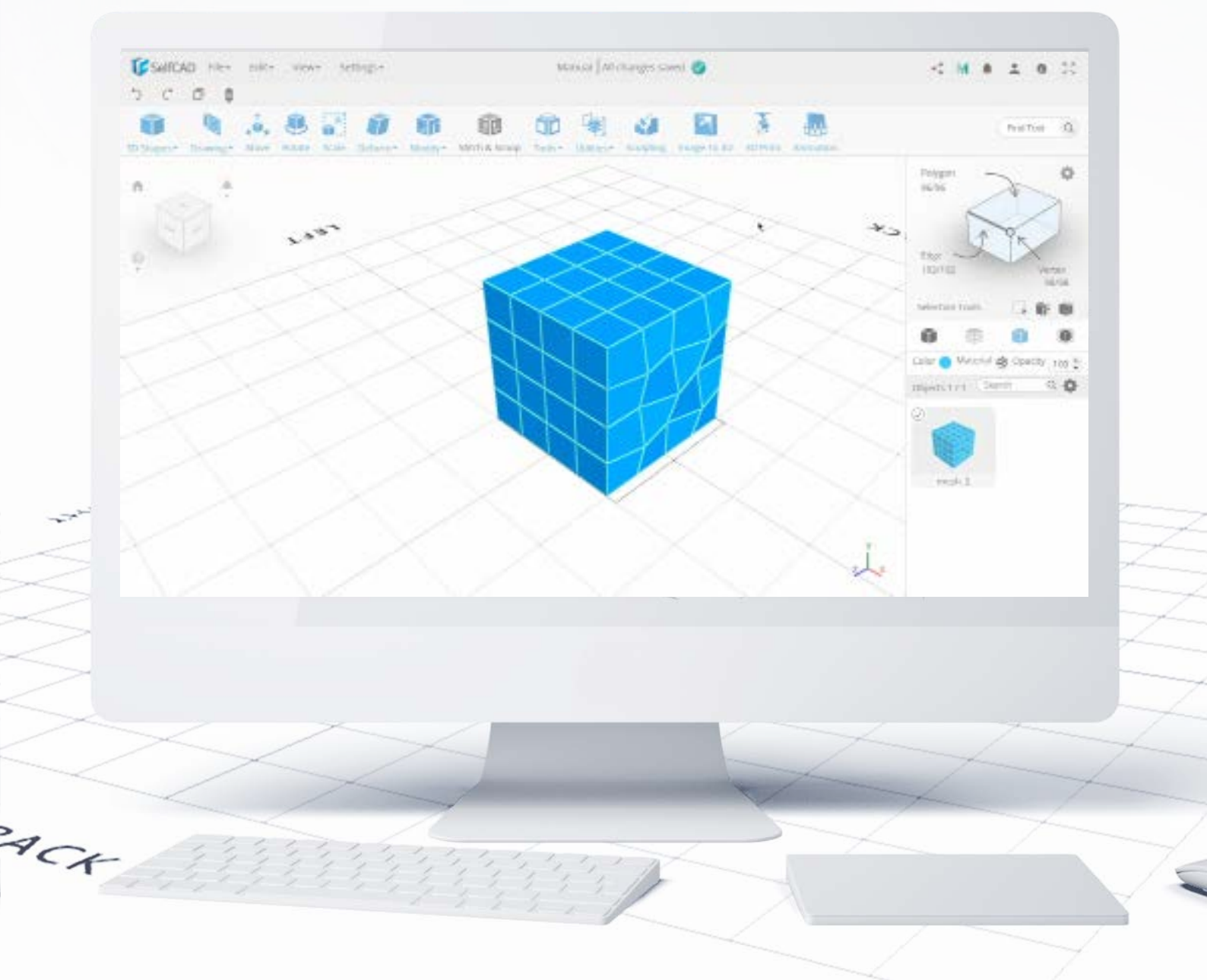

You can access them by clicking on the **Selection Settings** icon in the top right corner of the panel. For **Edges** and **Faces**, you'll find a **Loop Selection**, while for the **Polygon Selection** you'll find the option called **Tolerance** and **Part Selection** which helps with selecting previously cut profiles. When it comes to **Vertex selection**, there is just one option to select all of them. Select All is also available for every other **Selection Mode**.

# Advanced Options: Loop Selection



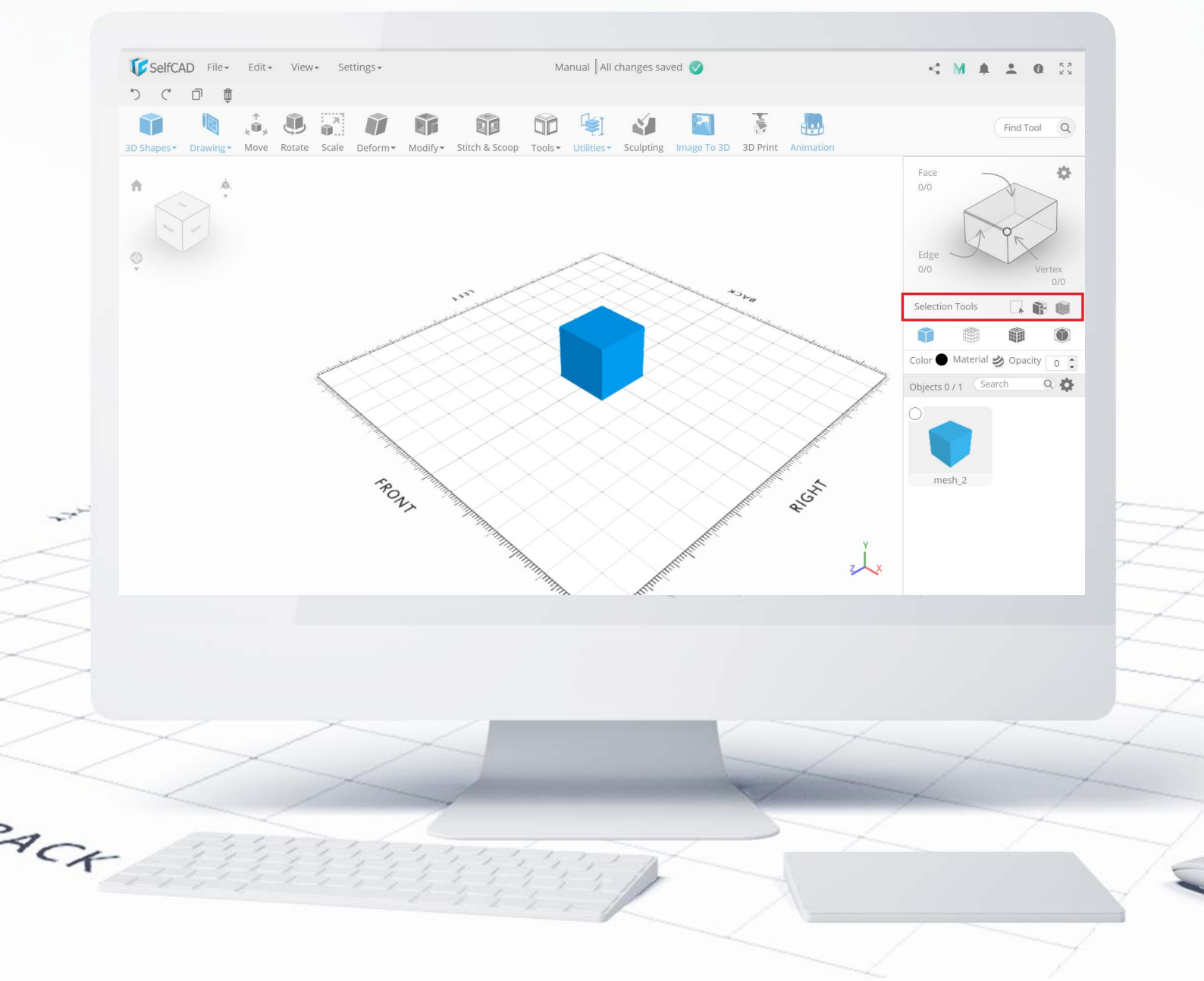
**Loop selection** allows you to simply select loops of **Faces and Edges**. When you select two objects next to each other the software will select a complete loop around the object, and when you select them separated, the software will select a row between those points.

# Advanced Options: Tolerance



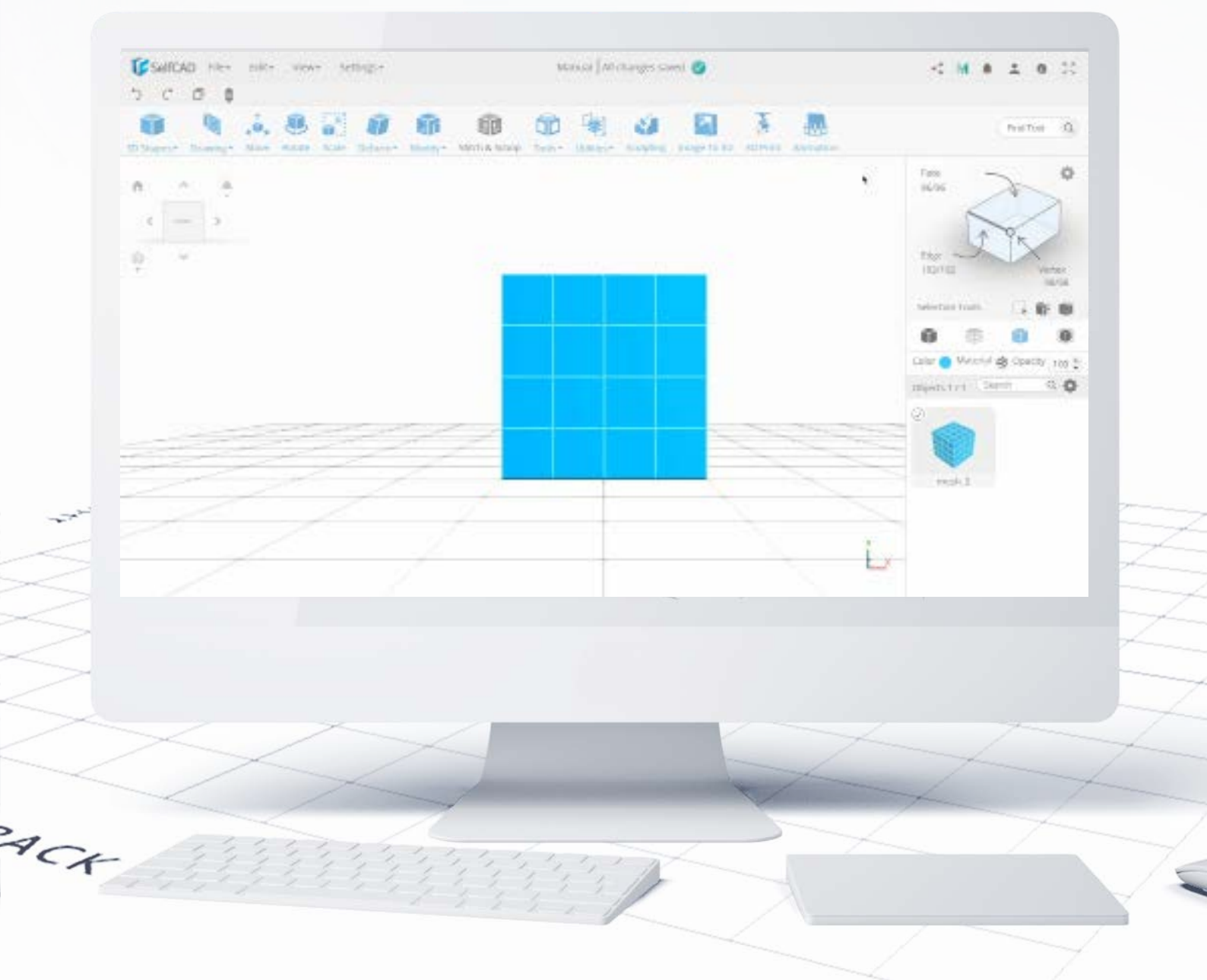
**Tolerance** is an advanced setting for **Polygon Selection**. Originally, Polygon Selection allowed you to select complete flat surfaces - with Tolerance however, you can select more uneven surfaces.

# Right Side Panel: Selection Tools



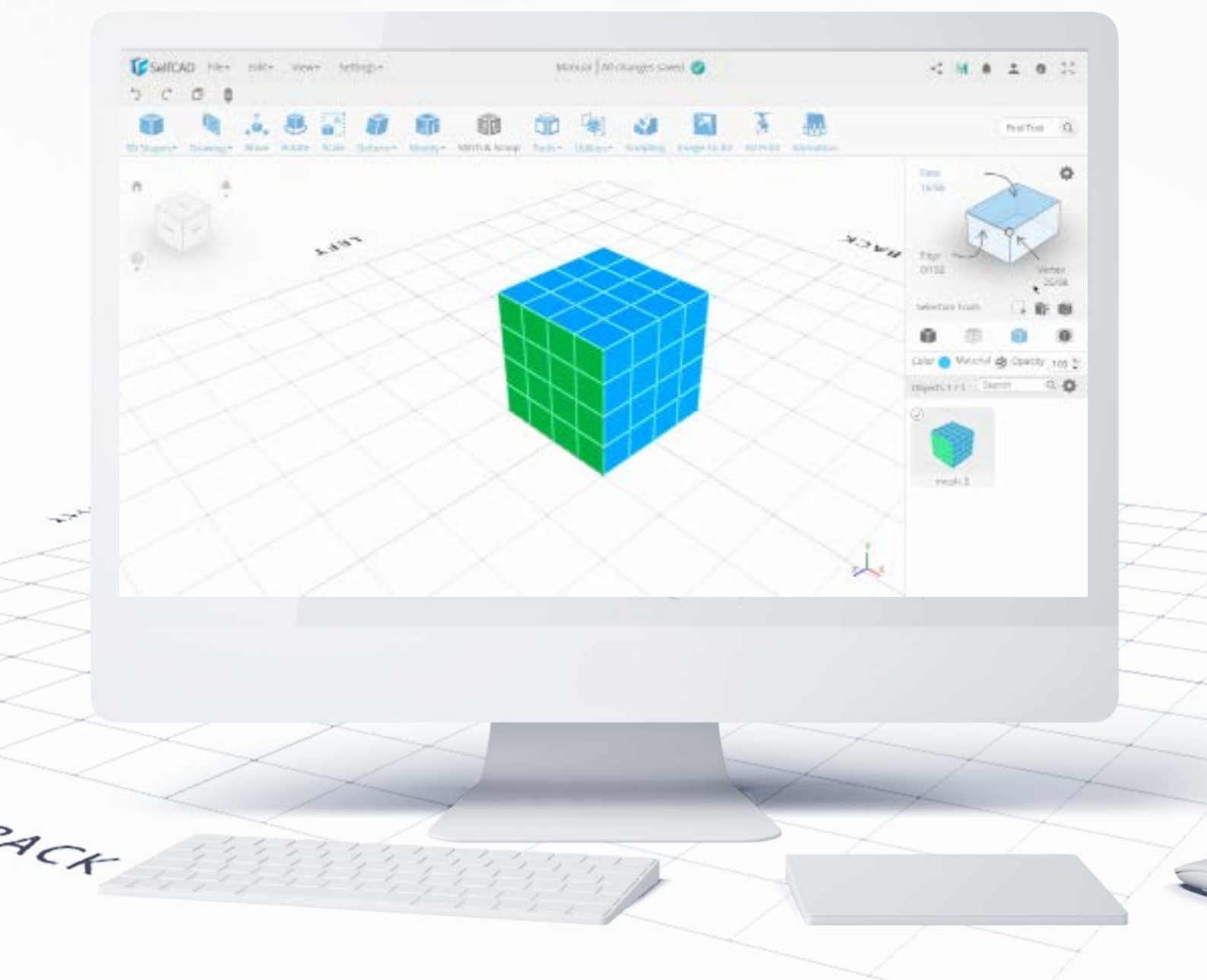

Below you'll find the additional **Selection Tools**.

# Selection Tools: Marquee Selection



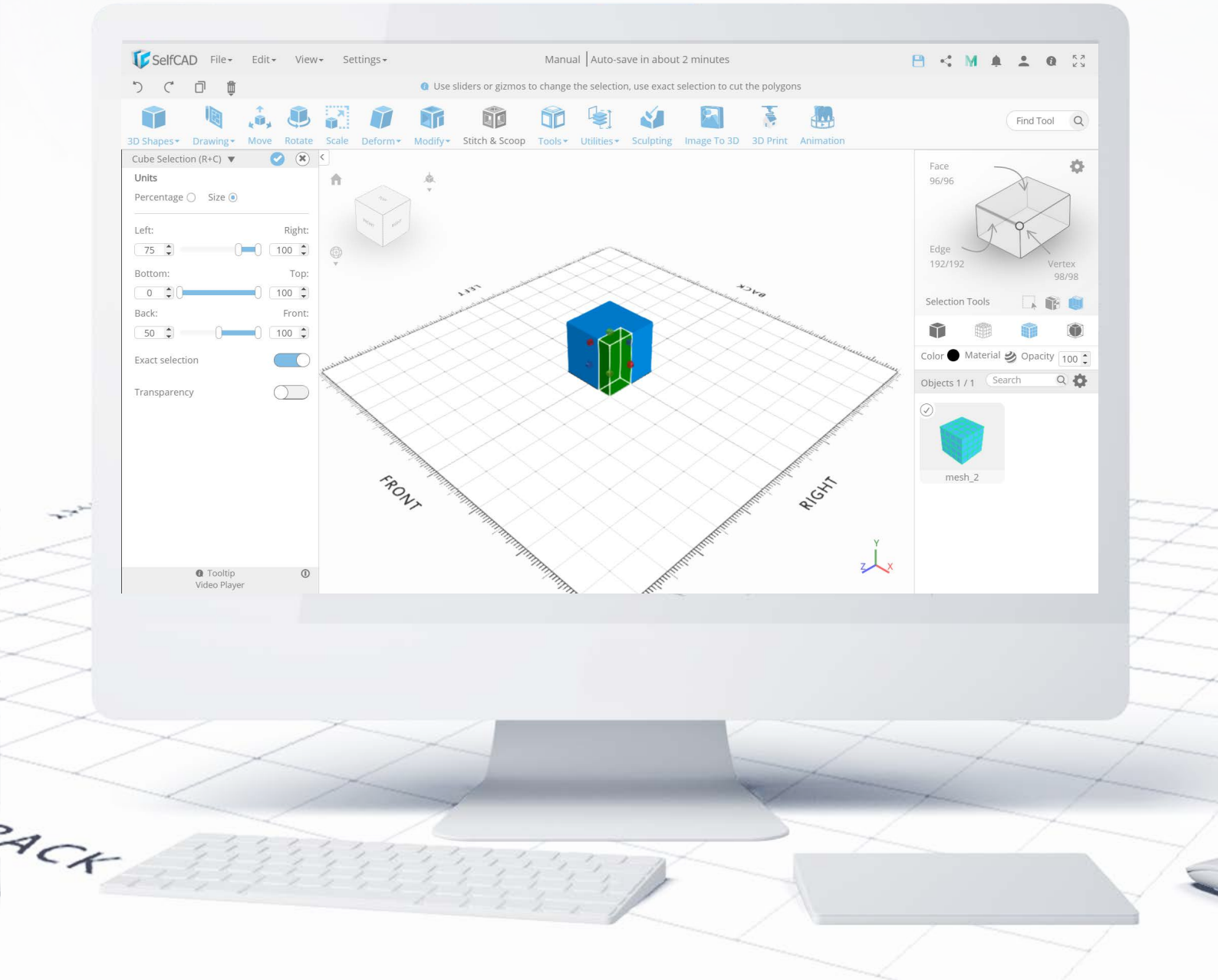
**Marquee Selection** allows you to simply click and drag to select objects. This tool works in pairs with Selection Modes, so for example, if you choose Face Selection on the Interactive Rectangle, then you'll select faces with the Marquee Selection. One interesting tidbit about this tool is the fact that if you'll drag towards the right side you'll only select objects that were fully within the selection's range, while when you drag towards the left, you'll select every object that has been even partially covered by the selection.

# Selection Tools: Inverse Selection



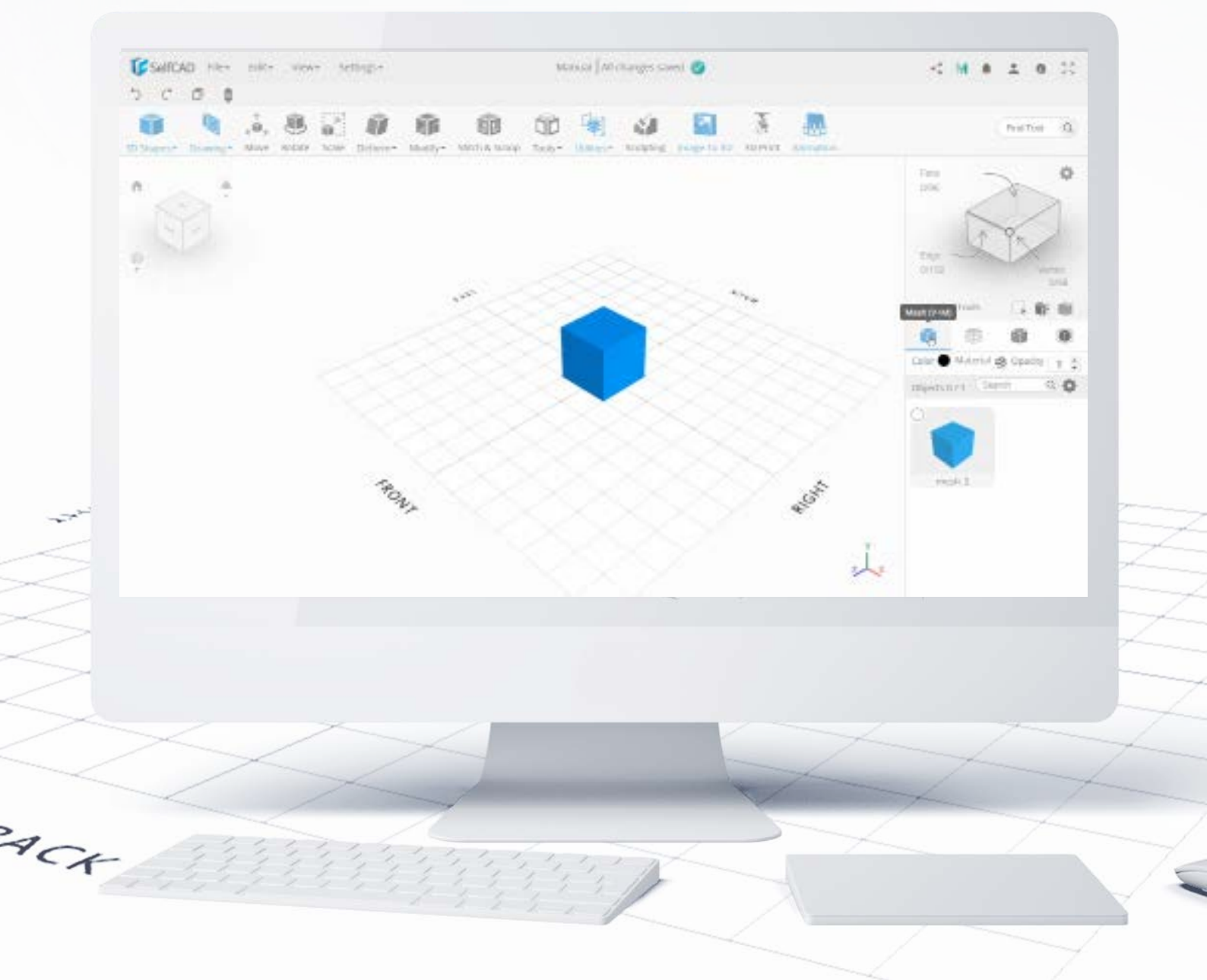
**Inverse Selection** is very straightforward - it deselects all currently selected objects and selects every previously unselected object. Just like with Marquee Selection, this tool works with objects themselves as well as their parts.

# Selection Tools: Cube Selection



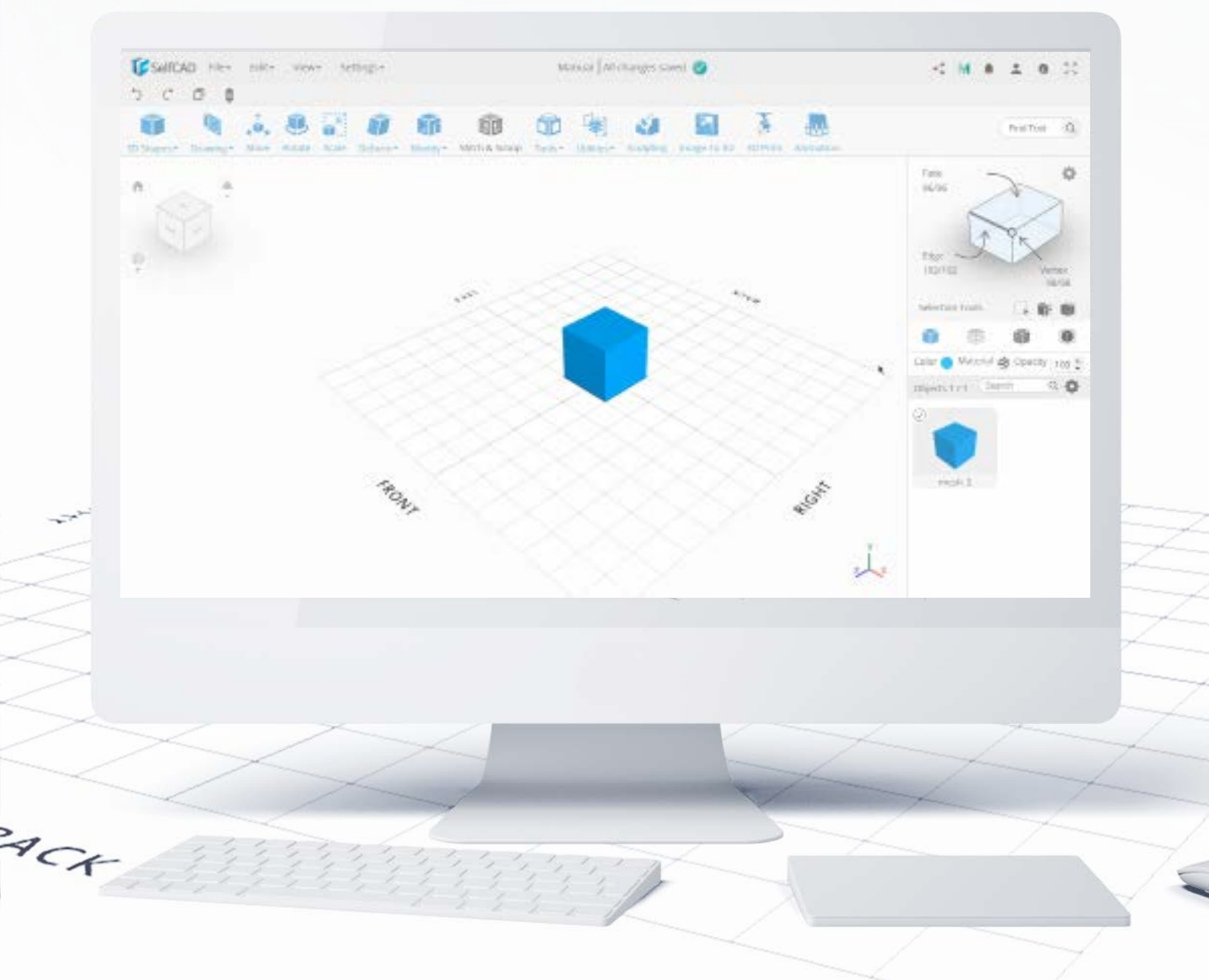

**Cube Selection**, on the other hand, allows you to select and cut a very specific amount of the model by operating the sliders or typing in the values into the text boxes. At the top are options to select the exact size or percentage of the figure. Exact Selection allows you to select to exact amount of figure - with this option turned off, your selection will be restricted to the size of individual faces, so usually, it's better to have this option turned on. Transparency speaks for itself, so I won't even try to explain it.

# Right Side Panel: Modes of Display



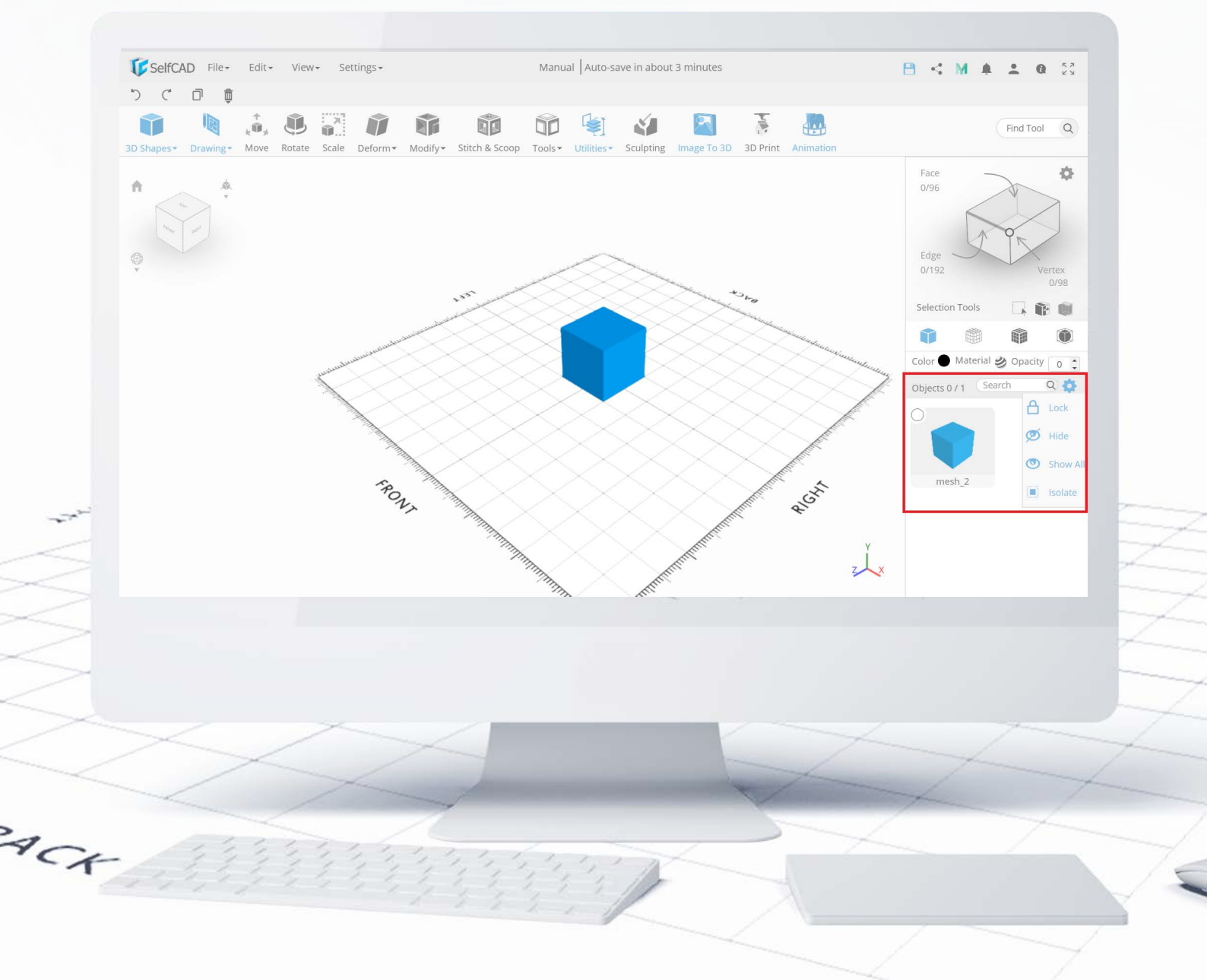

Below we have the **Scene Panel** with four different **modes of display**: there is the standard **Mesh** which is a simple representation of the 3D model, **Wireframe** which shows the internal structure of the model. **Mesh + Wireframe** is the combination of the previous two, and the last one is called **Smooth**, which alters the display of the model - remember though, that this effect is purely visual! You can click on it again to go back to the Flat display.

# Right Side Panel: Display



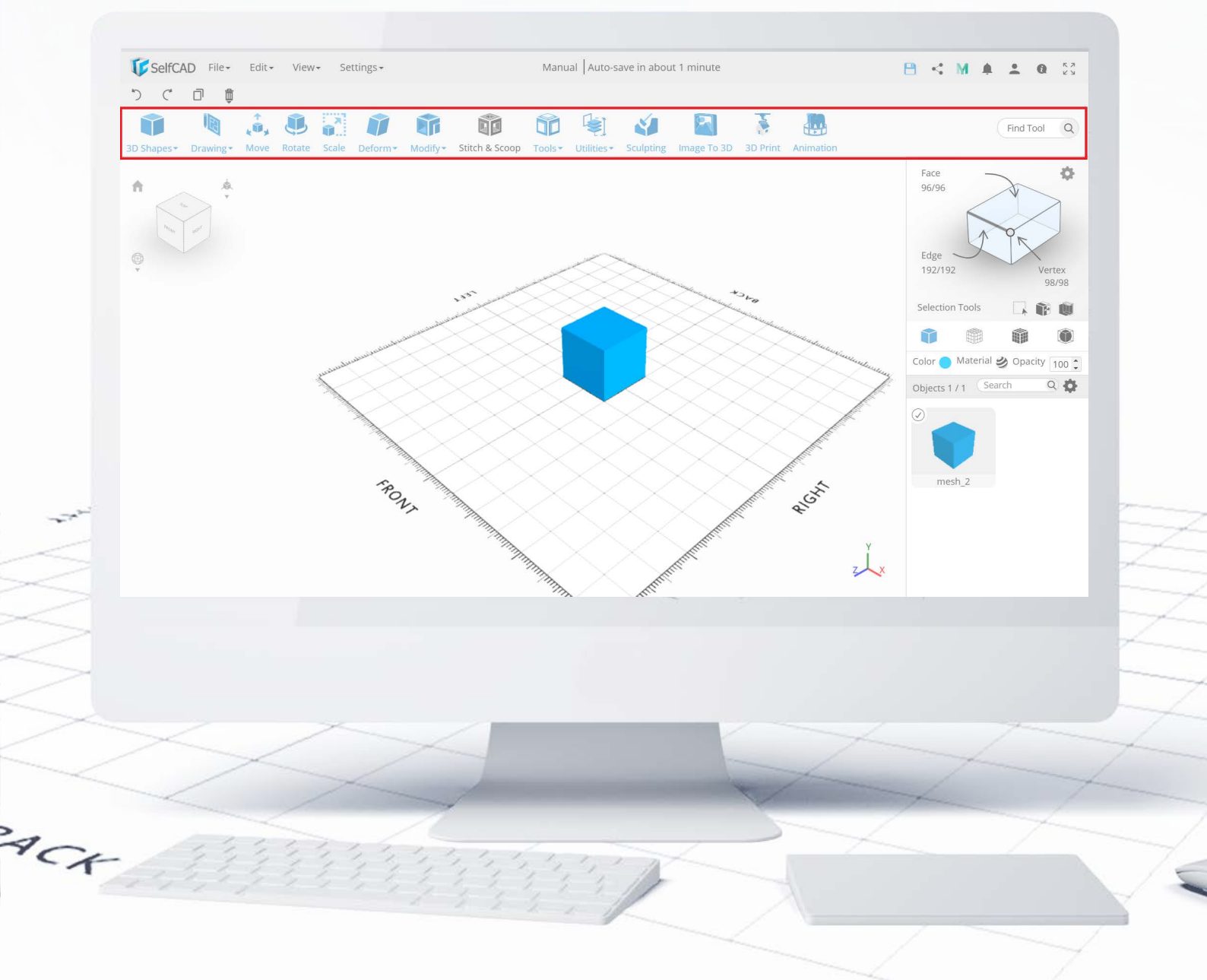

Step below you'll find options for customization of your model. You can simply change its **color and the material** altogether, by customizing its textures (you can use the available ones or upload a texture yourself), material, light and even shadows. At the end is the option to set the opacity of the object. Remember, that those options only change the visual representation of the object within the software, which won't impact how the object will look after printing.

# Right Side Panel: Object Management



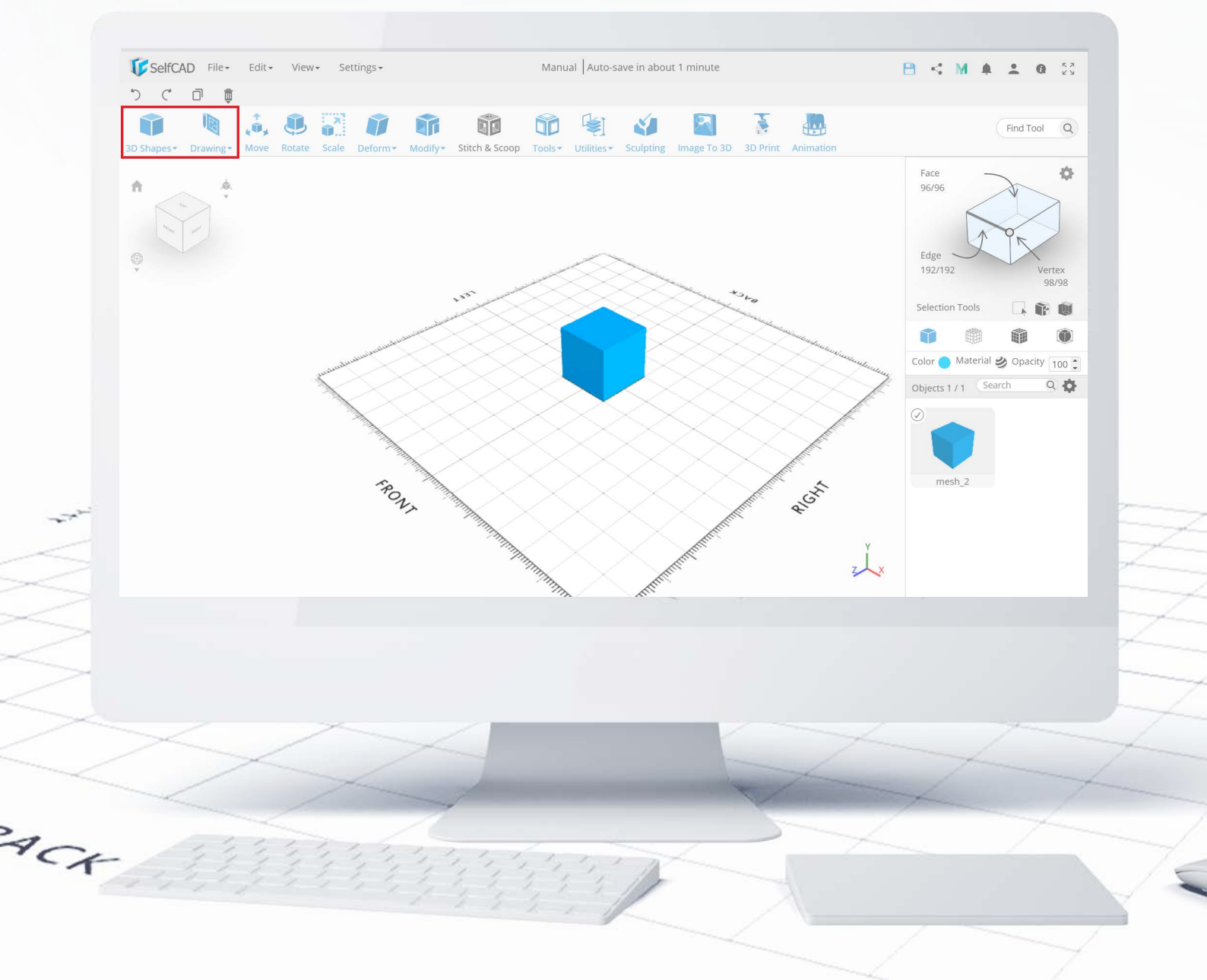

And at the very bottom is the space to work on **objects** already added to the grid. The **settings panel** here allows you to **Lock**, **Hide or Isolate** objects - options that have already been introduced when I explained the options in the **Main Menu**. There's also a search panel to look for specific shapes previously added to the grid (which you can rename here if you so wish). **Show All** truly speaks for itself, as it only shows every previously hidden object.

# The Main Toolbar



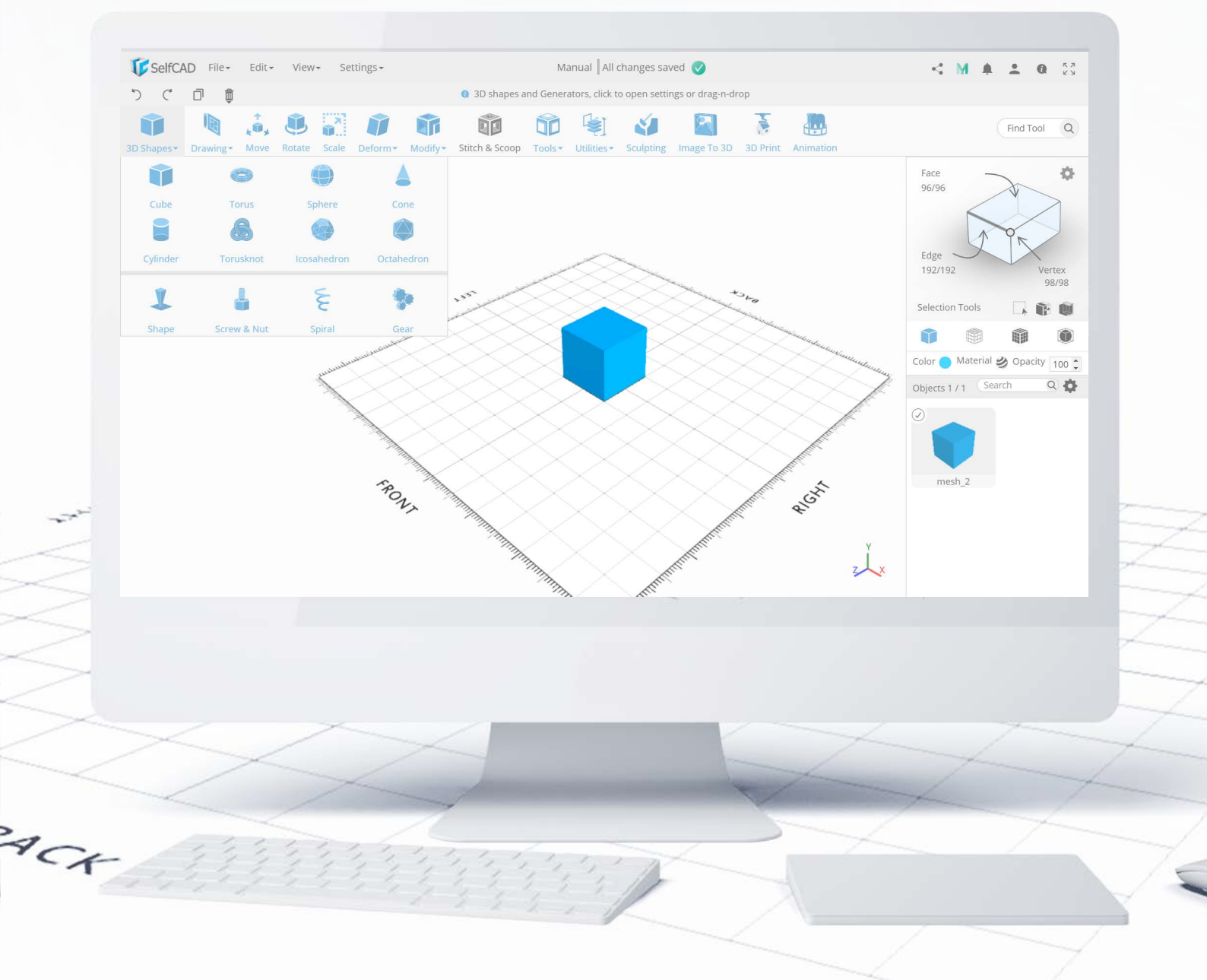

And now I'll cover each of the **tools**. As I said earlier, they are arranged in a logical order of work. When you think about modeling you need to think about it as a process: at first, you need to create a model, then you will be able to transform it, model it and finally print it - and that's exactly how the categories of tools are arranged in SelfCAD.

# The Main Toolbar: Create



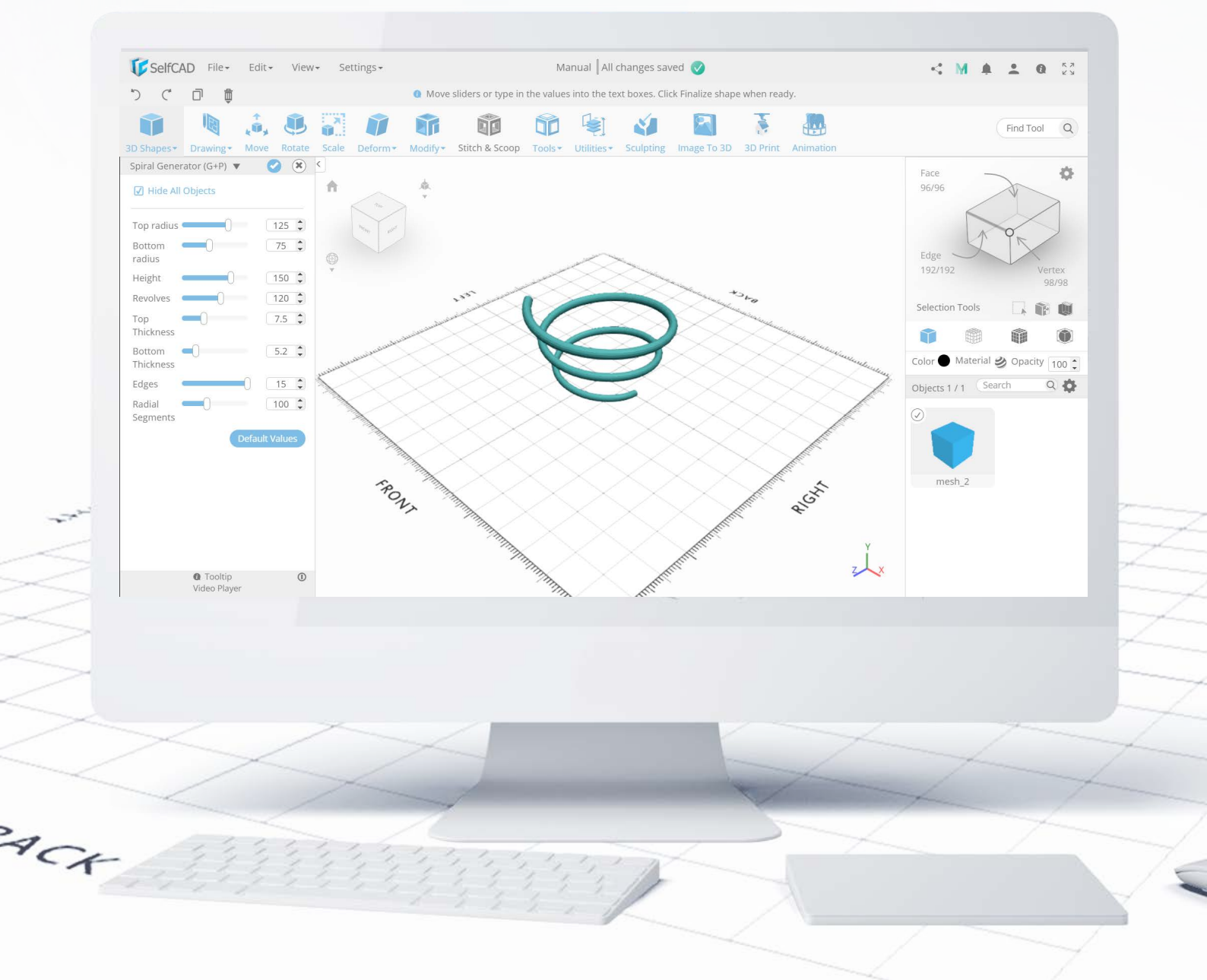

The first section is called **Create**, and it allows you to add new shapes to your project. In SelfCAD you'll find a variety of simple 3**D Shapes** ready for customization, as well as **Tools to Draw and Sketch** completely new designs.

# Create: 3D Shapes



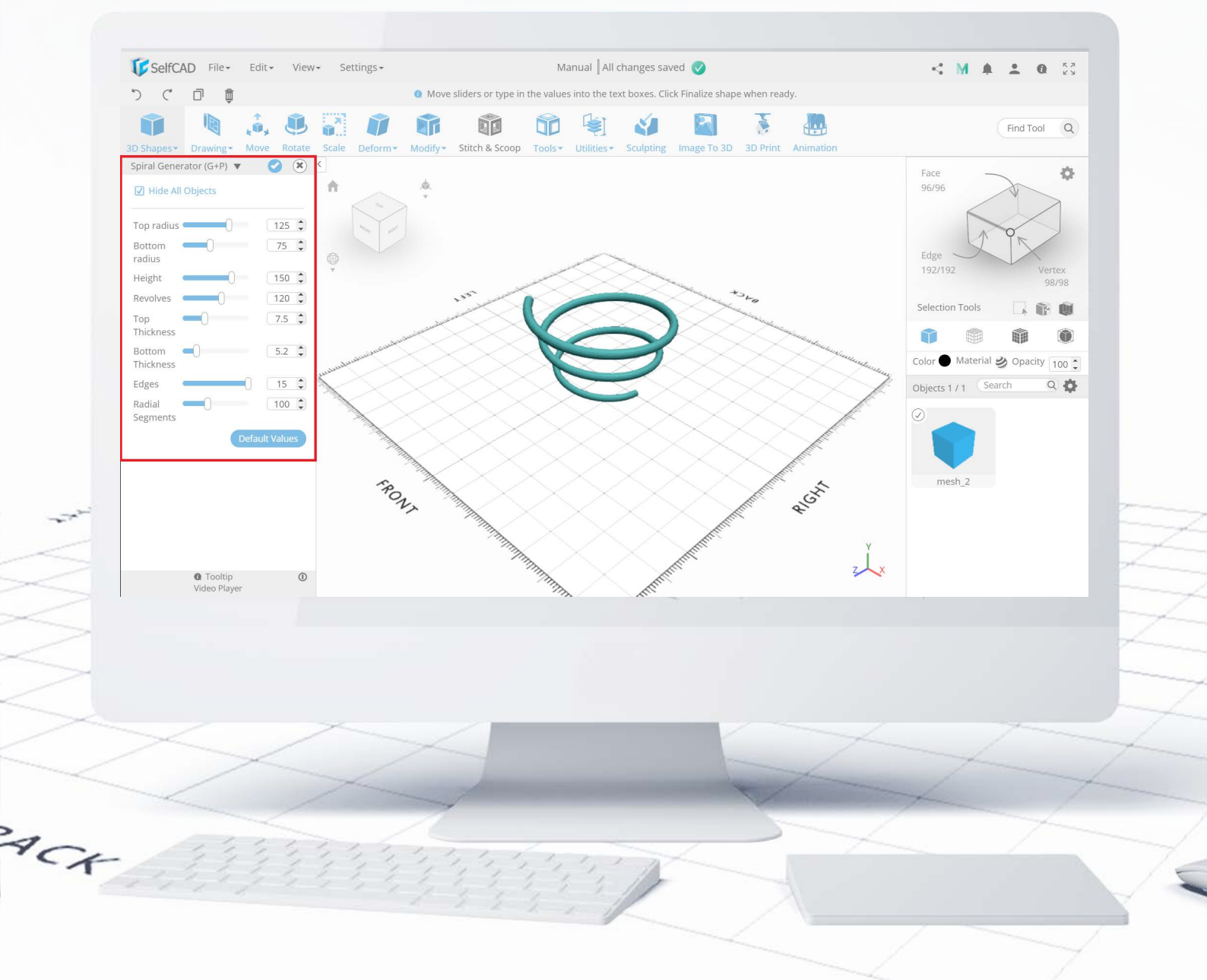

**3D Shapes** allow you to add premade figures to your project. By hovering the cursor over the category itself, you'll see the list of figures the software has to offer. As you can see there is a divider in the lower part of the drop-down (which you'll see in other tools as well). When it comes to 3D Shapes there are two ways to add them to the workspace - you can simply drag them to the grid, or click on them. The second option will open a Tool Settings panel with all of the options for customization, while the first option skips this step, and directly adds a default version of the shape straight to the grid.

# 3D Shapes: Complex Shapes



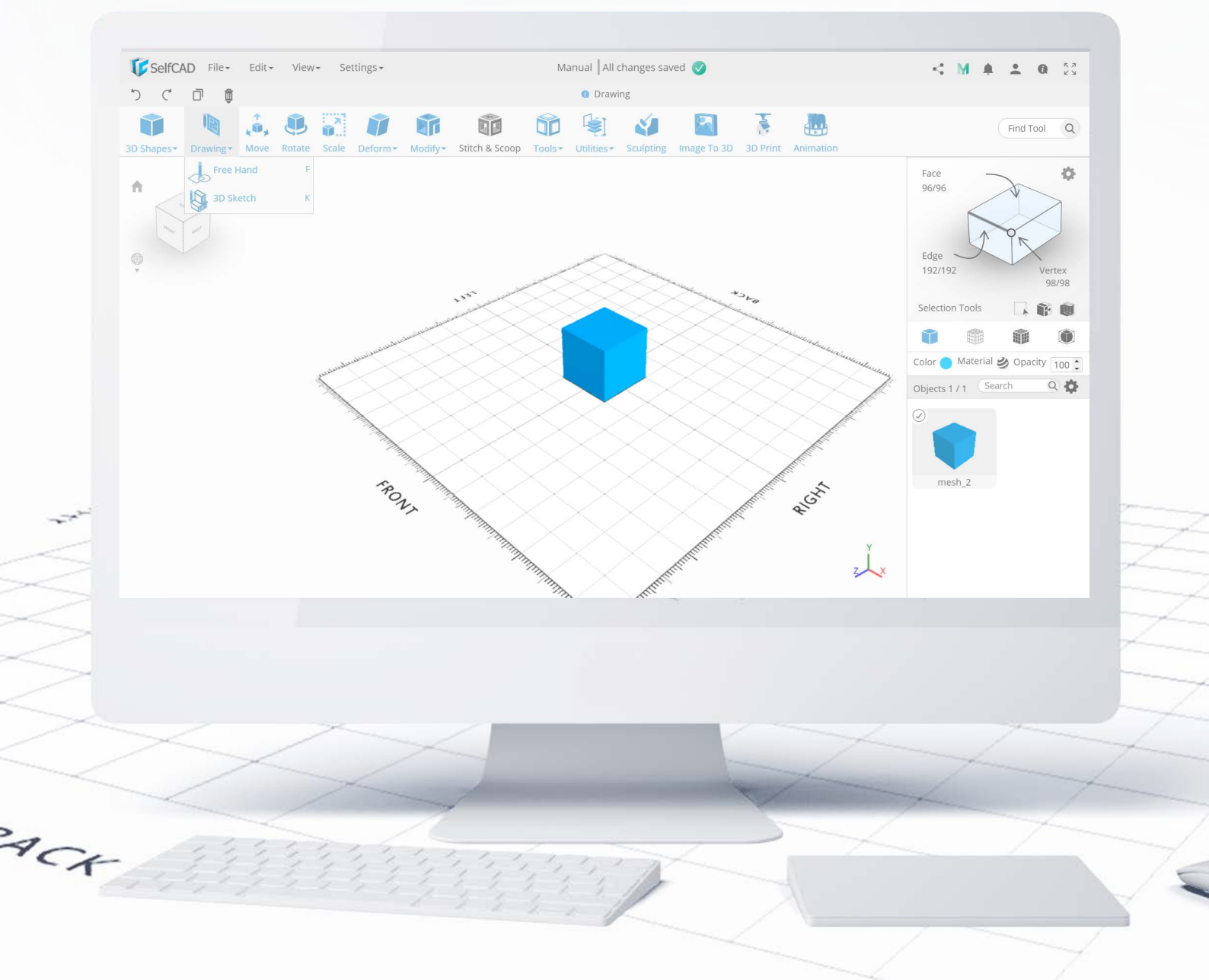

When it comes to the figures below the divider it's simply better to **customize** them before adding them to the grid. Because of their unique build, their options for customization cannot be replicated by other tools.

# 3D Shapes: Customization



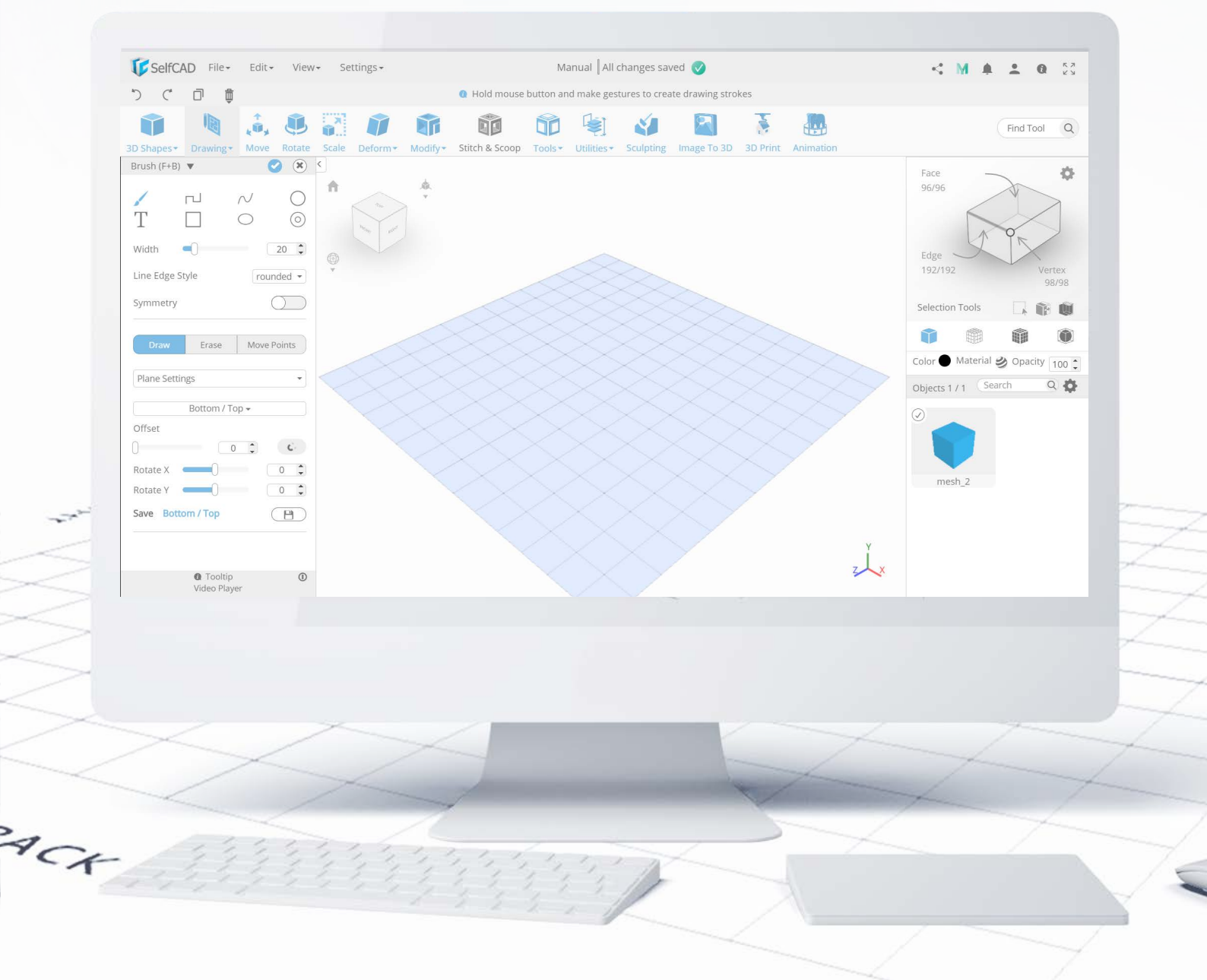

If you choose the second option of adding shapes to the grid, you'll be able to modify them in a way determined for each shape. There are some similarities between options for shapes, such as size and the number of segments that the figure consists of, but most of the options are unique.

# Create: Drawing



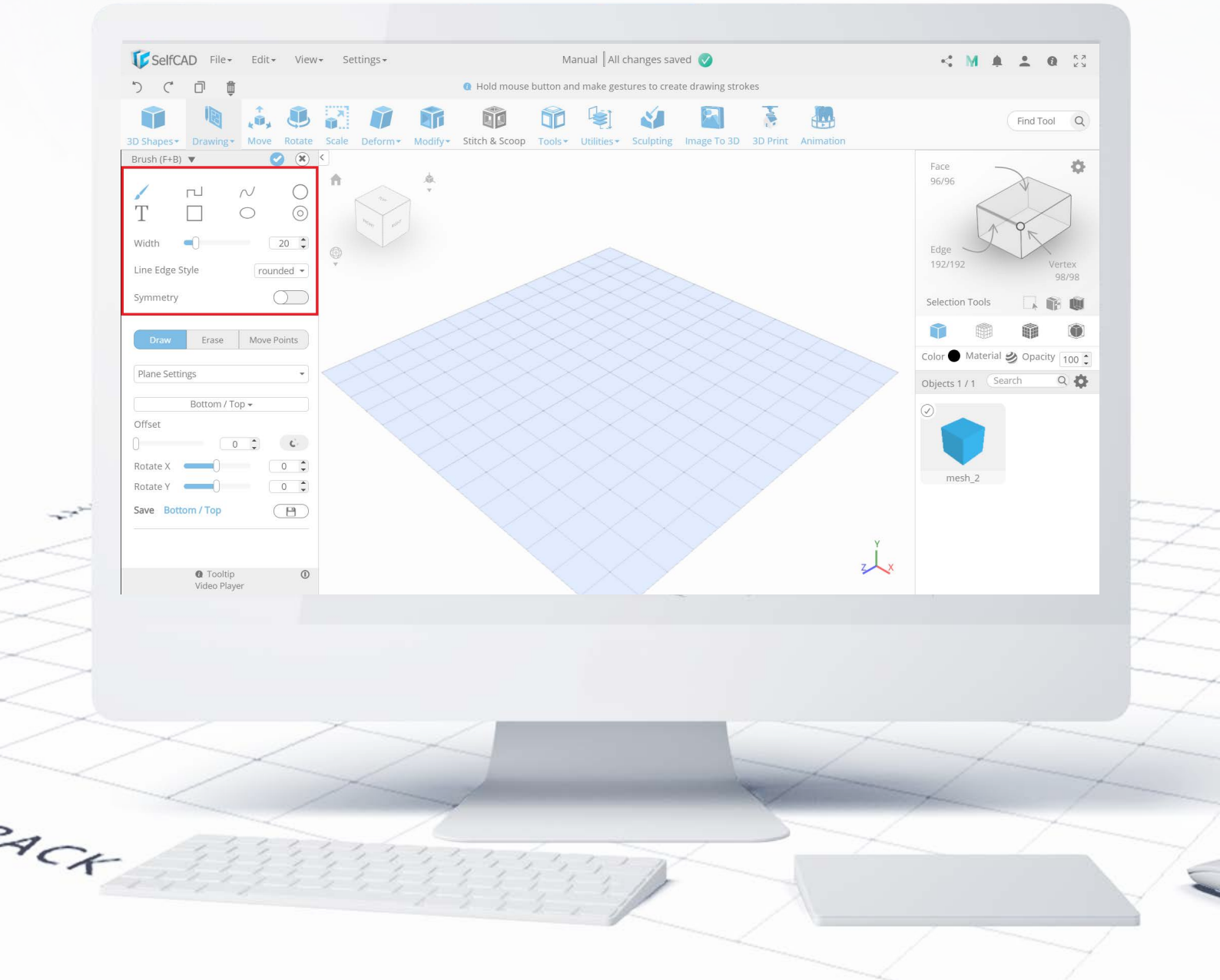

**Drawing** slightly differs from 3D Shapes, as it allows you to create original designs without any restrictions. This category offers two different tools for drawing.

# Drawing: Free Hand



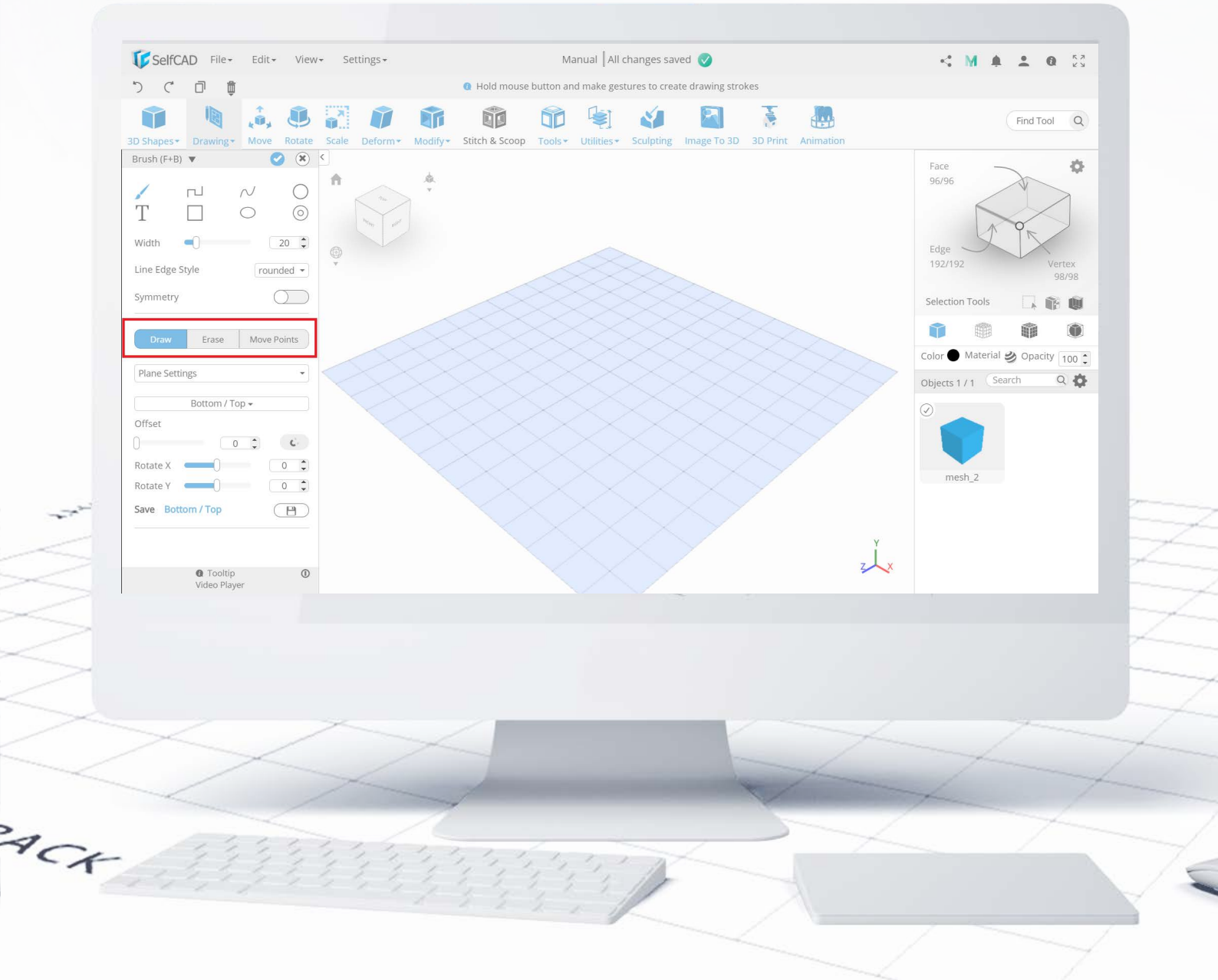

The first tool is called **Freehand** - which as you could expect - allows you to freely draw and customize the 3D model. There are multiple options available for customizing it.

# Free Hand: Brush



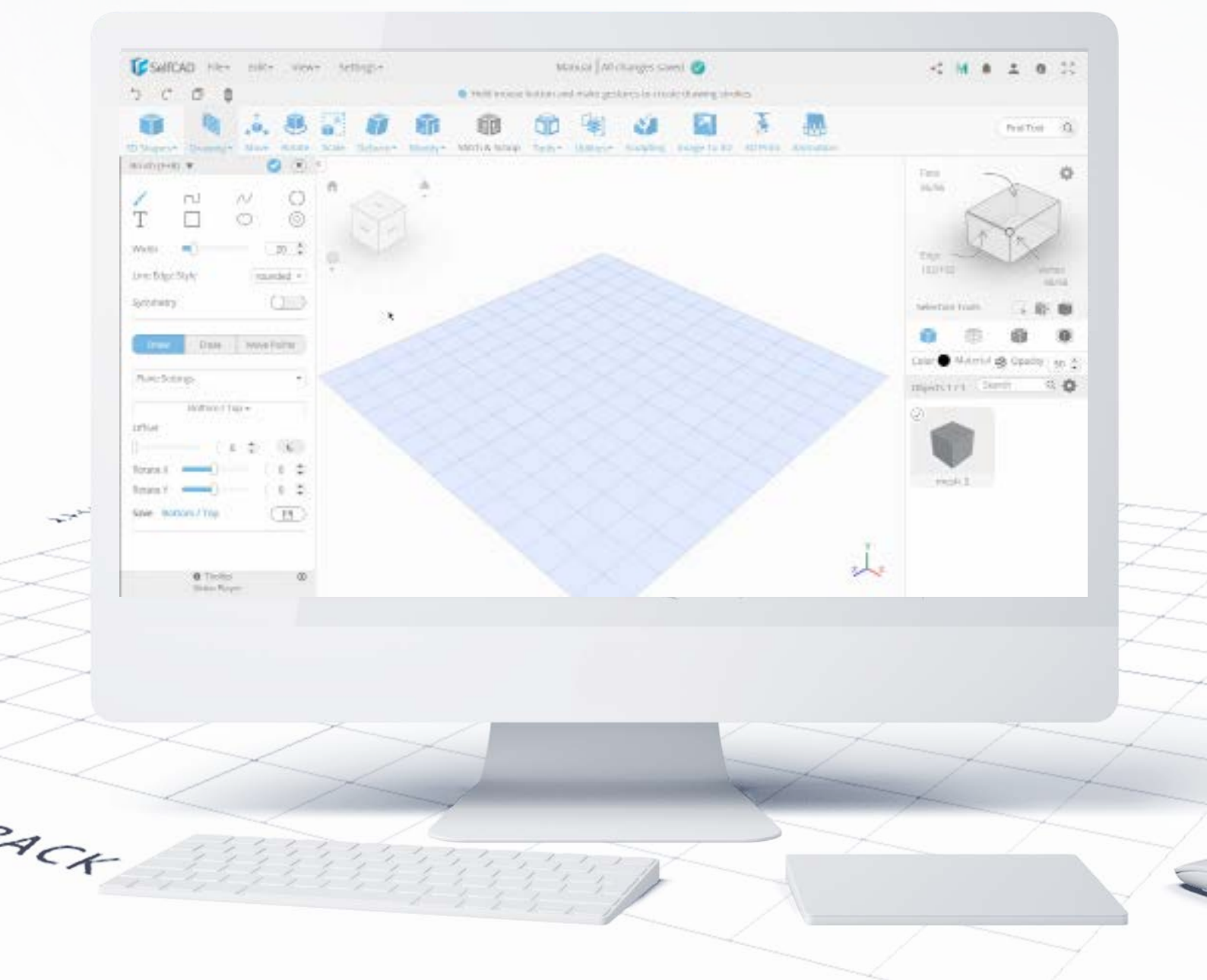

The first segment provides the options to choose and c**ustomize the brush**: beyond the simple brush, you'll find some basic shapes as well as options to customize them (each shape of the brush has its own set of customizable options). There is also a handy option to draw symmetrically on the axis.

# Free Hand: Modes



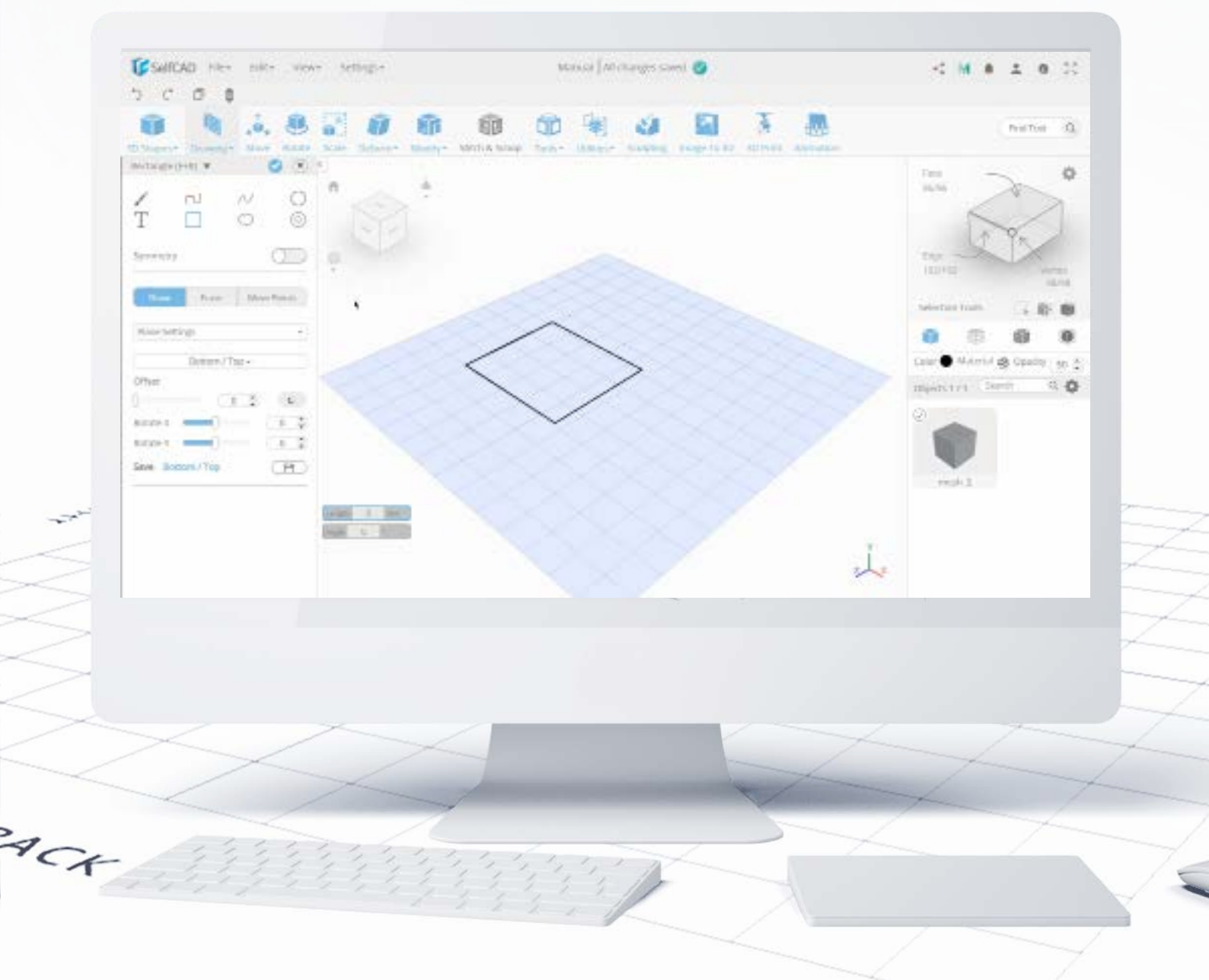

The Second section provides different **drawing modes**. I'm going to show you each of them on separate slides.

# Modes: Draw



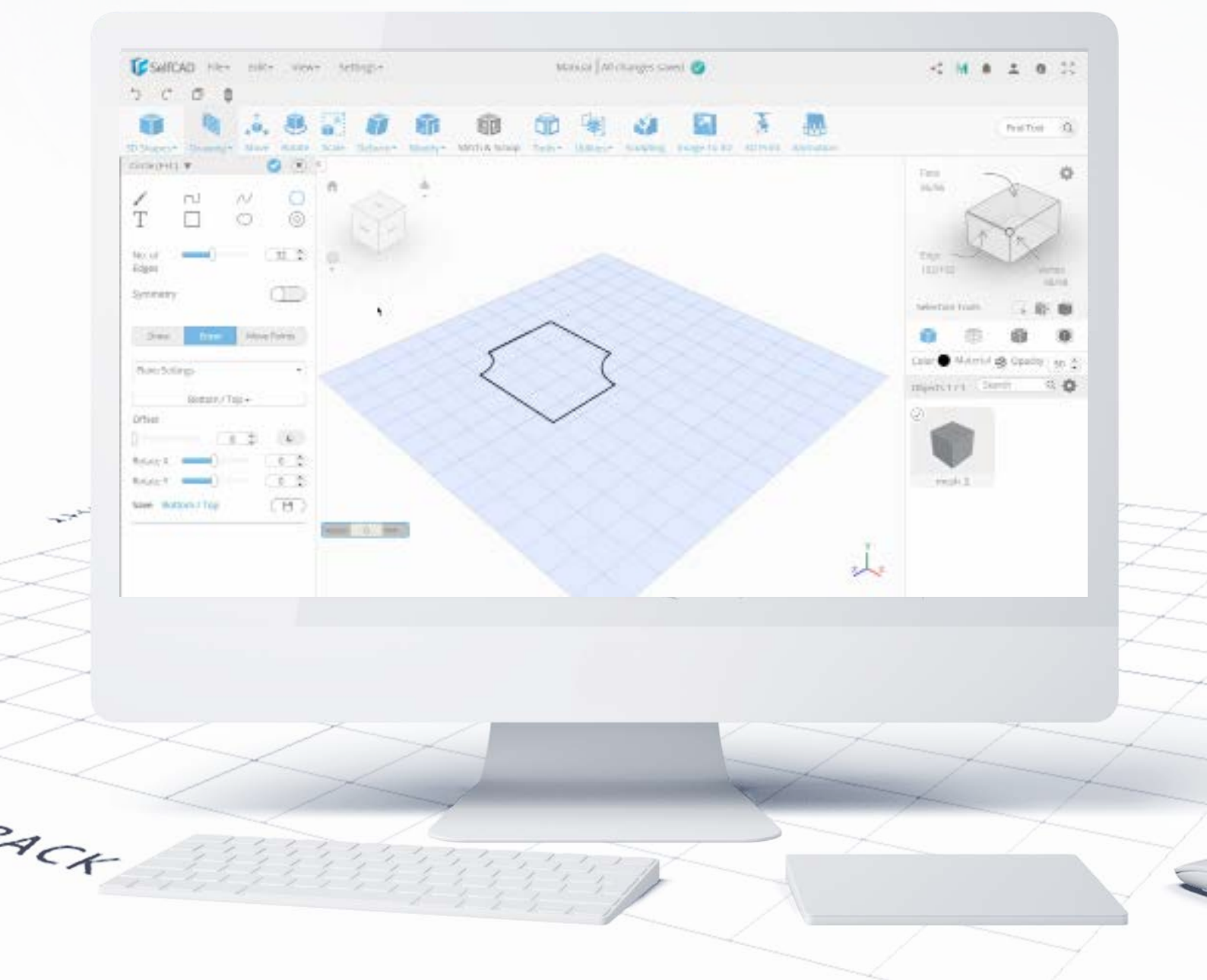
The first mode allows you to simply **Draw an object** with the help of a chosen brush. As you can see, I've drawn a simple rectangle with the help of **Rectangle Brush**.

# Modes: Erase



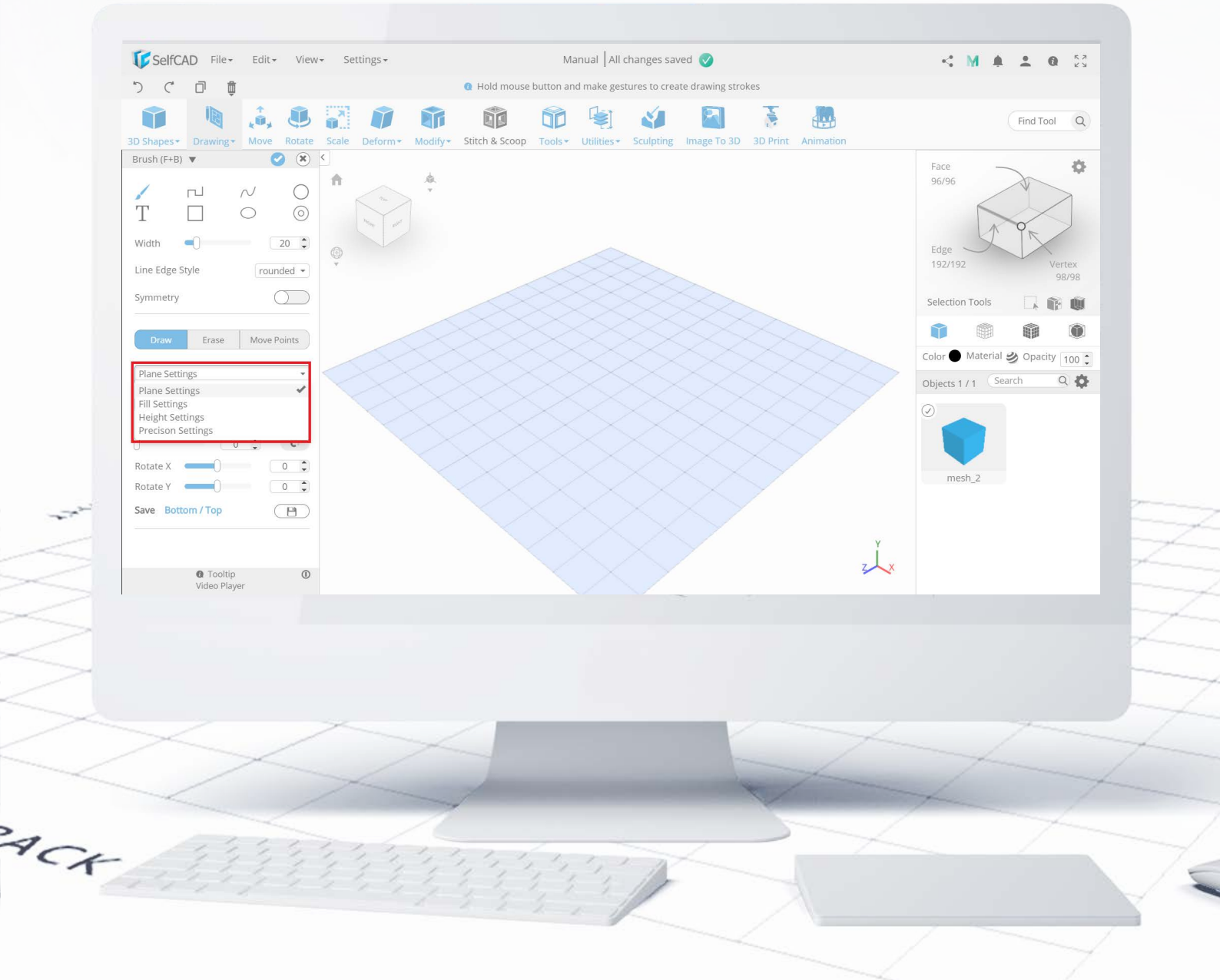
The second mode is called **Erase**, and it allows you to draw objects that you want to delete from the drawing. In the graphic above I used the **Circle** eraser.

# Modes: Move Points



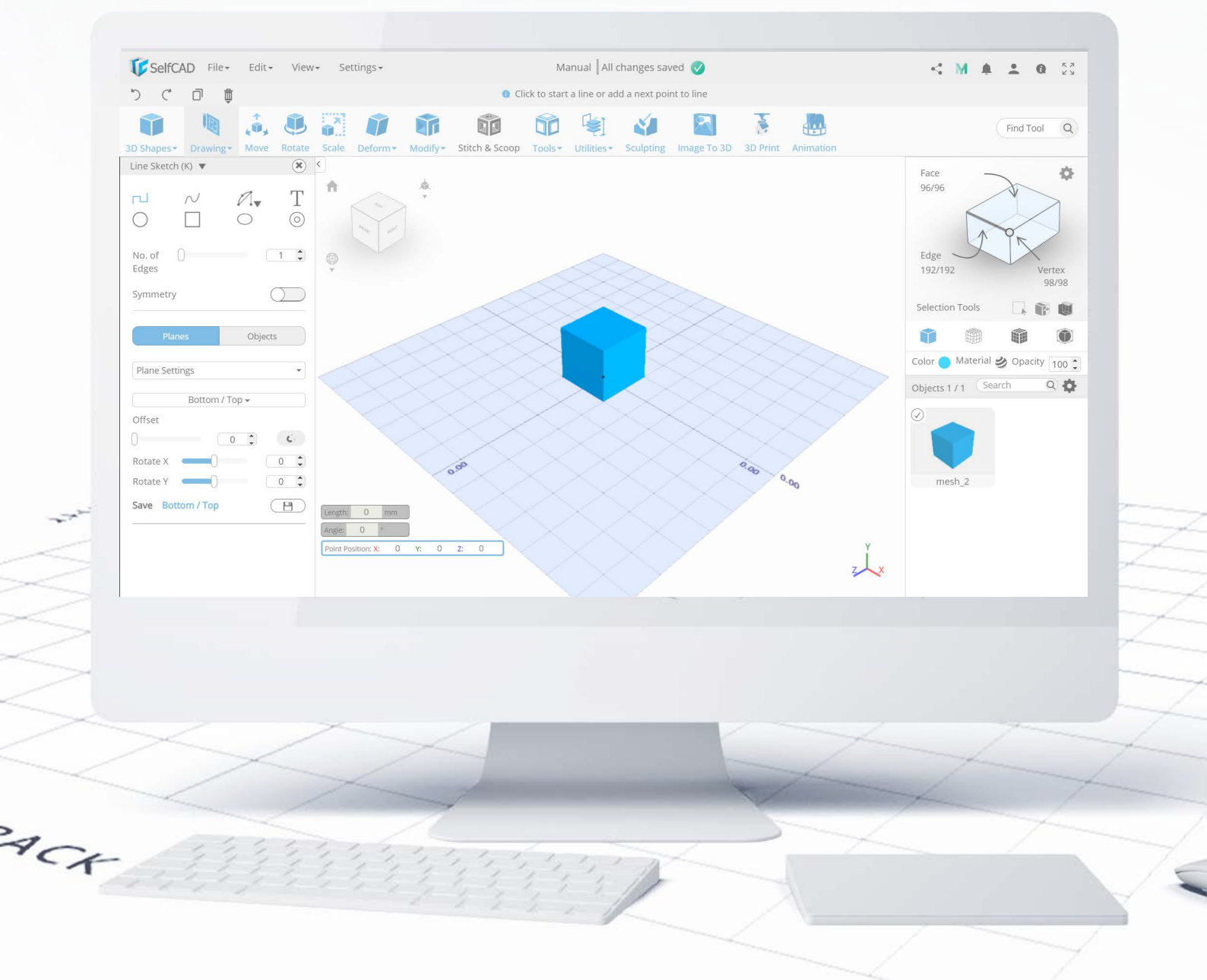
And by using **Move Points** mode, you can modify already drawn objects by moving its generated edges. I had to zoom in a little so you could see them. By moving the points on the grid you can completely change the design of the model.

# Free Hand: Customization



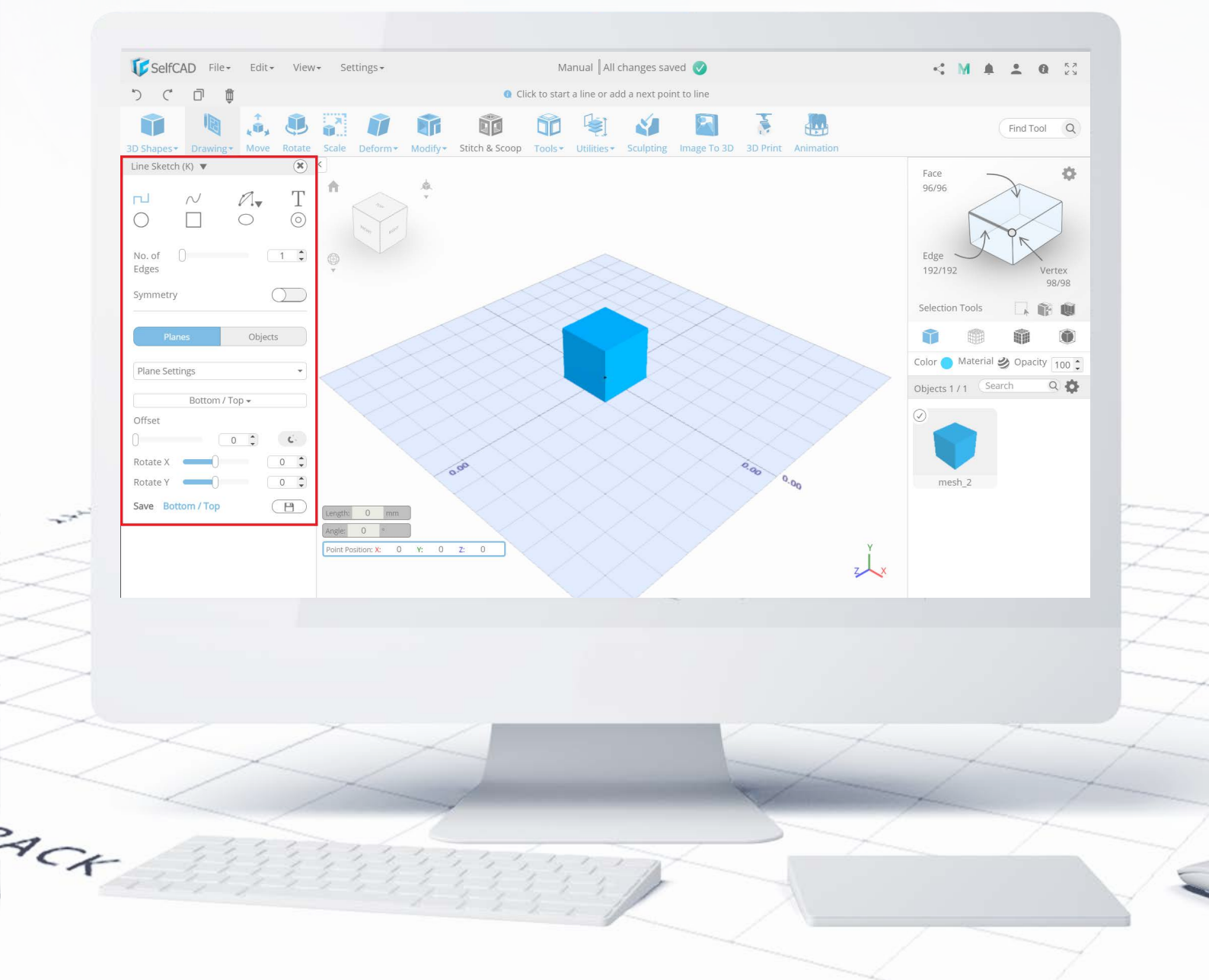

In the end, you'll find options to customize the already drawn object: **Plane Settings** allow you to specify the **Offset (position)** of the drawing, **Fill Settings** allows you to choose between creating **Solids** and open figures, **Height Settings** changes the thickness of the 3D model, and **Precision Settings** can be used to snap your drawing to other Shapes, **Guides or Grid Vertices**. You can also set the **minimum length and angle** of each step.

# Drawing: 3D Sketch



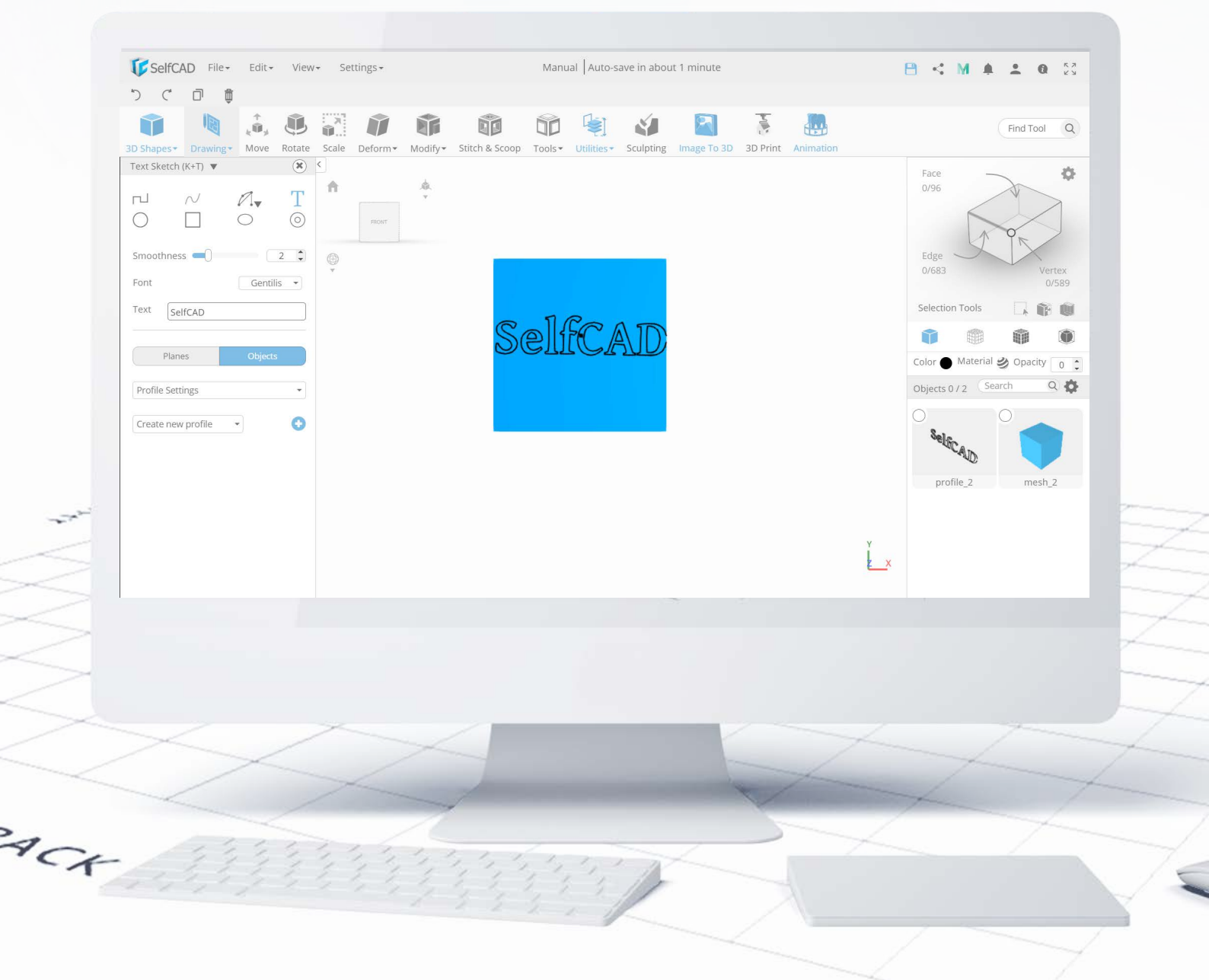

**3D Sketch**, on the other hand, works differently - it serves as a tool that builds a frame that you can later fill up with the help of other tools. It's like setting up a foundation upon which you'll create the complete model with the help of other tools.

# 3D Sketch: Customization



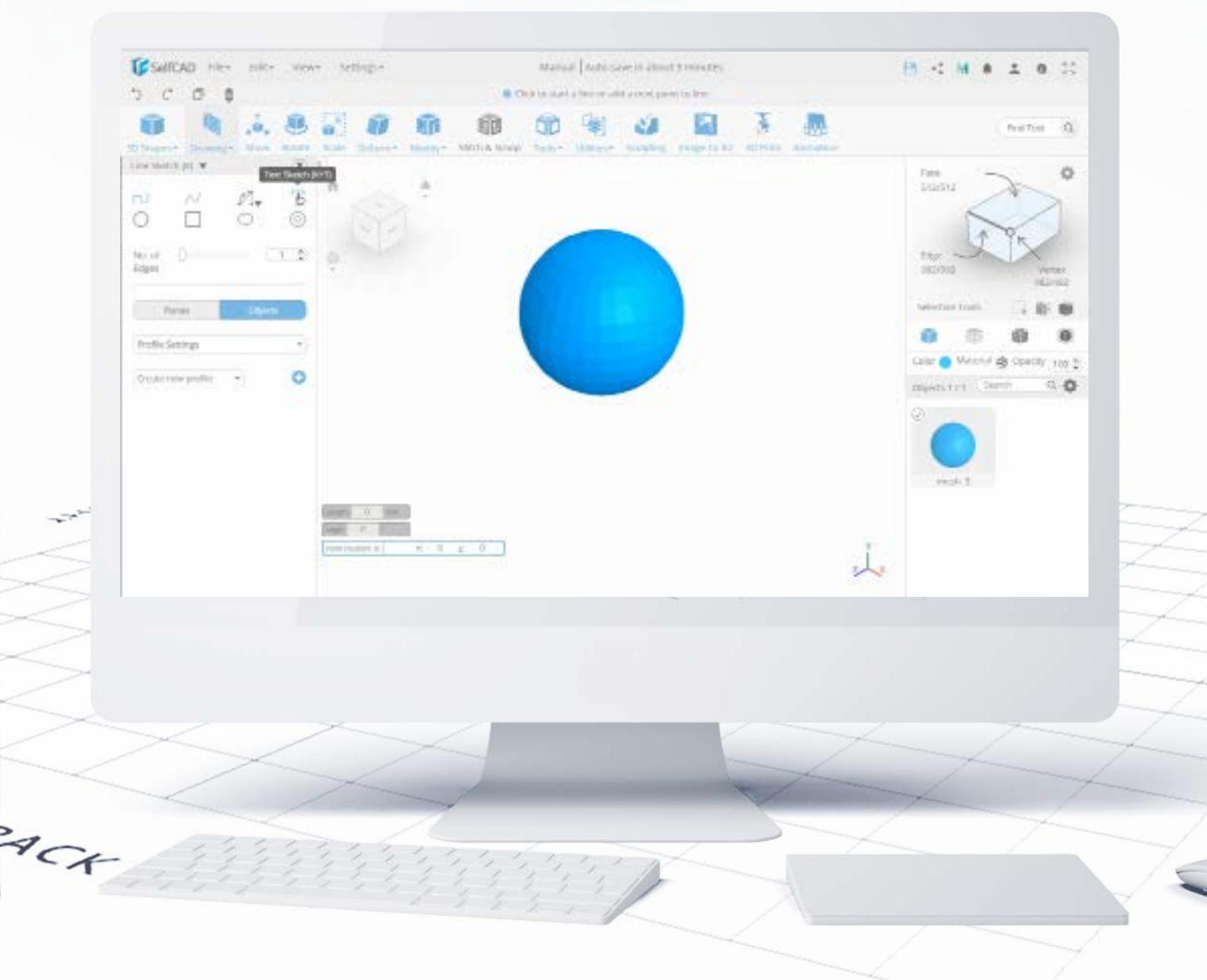

The options available here are similar to those in Free Hand: the first section focuses on brushes and the second one on different modes for sketches - you can choose between drawing them simply on planes or on other shapes. Both modes have their own settings.

# 3D Sketch: Drawing on Objects



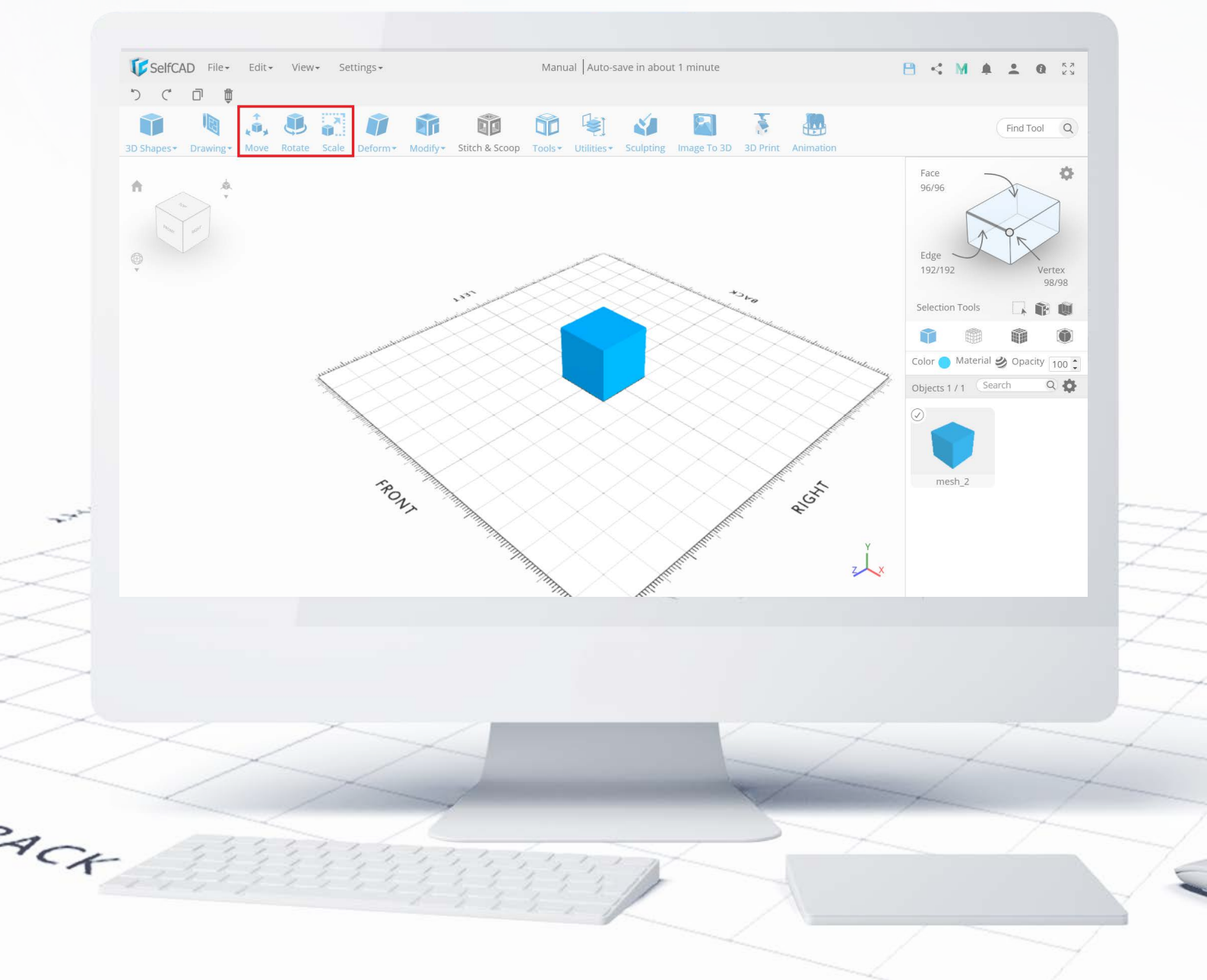

**Drawing sketches** on already existing shapes is particularly useful. You can use this feature not only to draw a sketch on the surface of another 3D model but also to create a **profile** on it, that you can later engrave on the figure and model it further.

# 3D Sketch: Bending



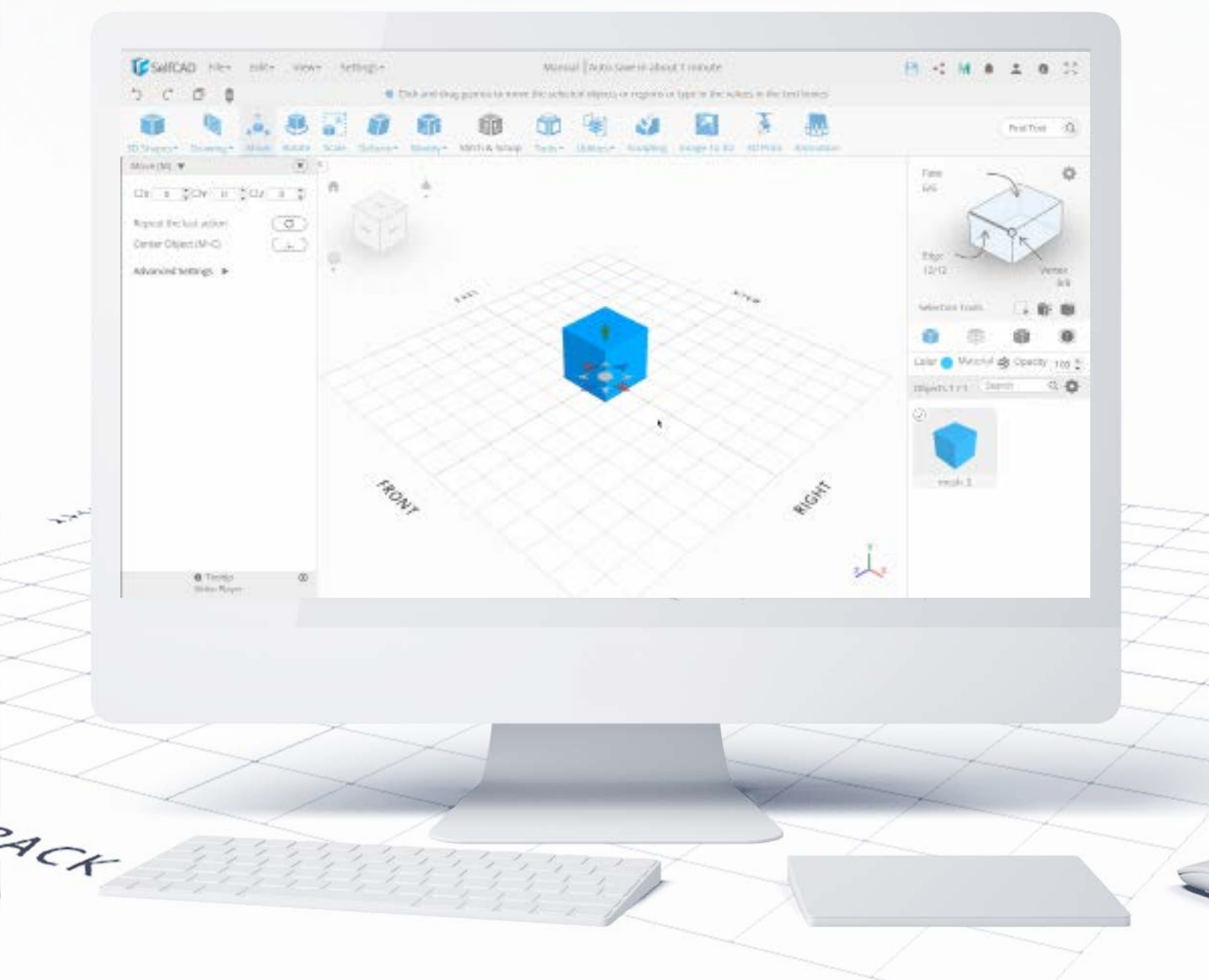
You can also use 3D shapes do bend the sketches on them. Simply use the draw on Objects setting and draw a sketch on an adequately bend surface, and the sketch will snap to it. You can later either move the bent sketch away or delete the shape you used to bend it on - it's up to you.

# The Main Toolbar: Transform



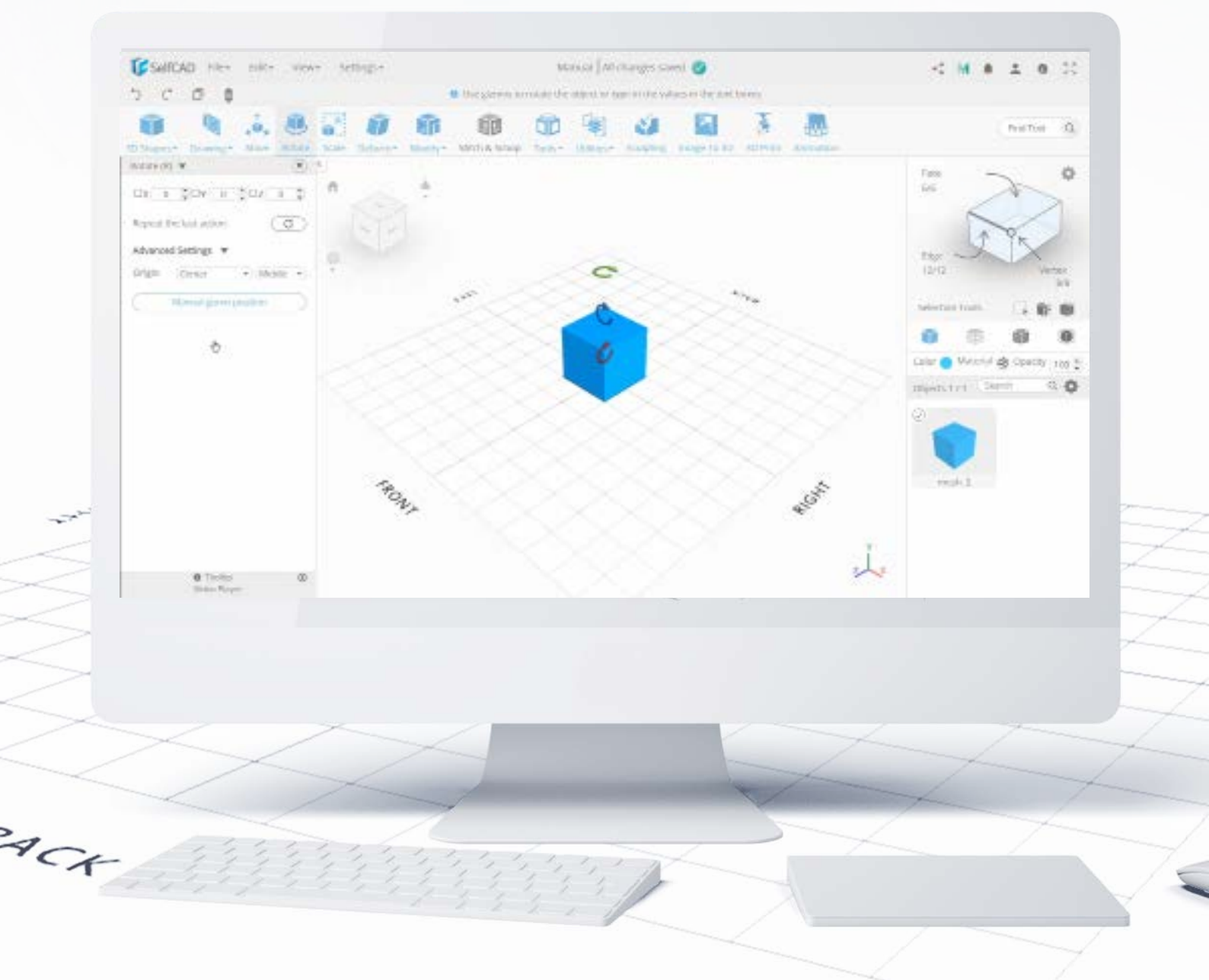

Now that you know how to create 3D models it's time to learn how to transform them. The second section is dedicated to **Transformations** - you'll find here options to **Move**, **Rotate** and **Scale** your objects, alongside their respective advanced options.

## Transform: Customization



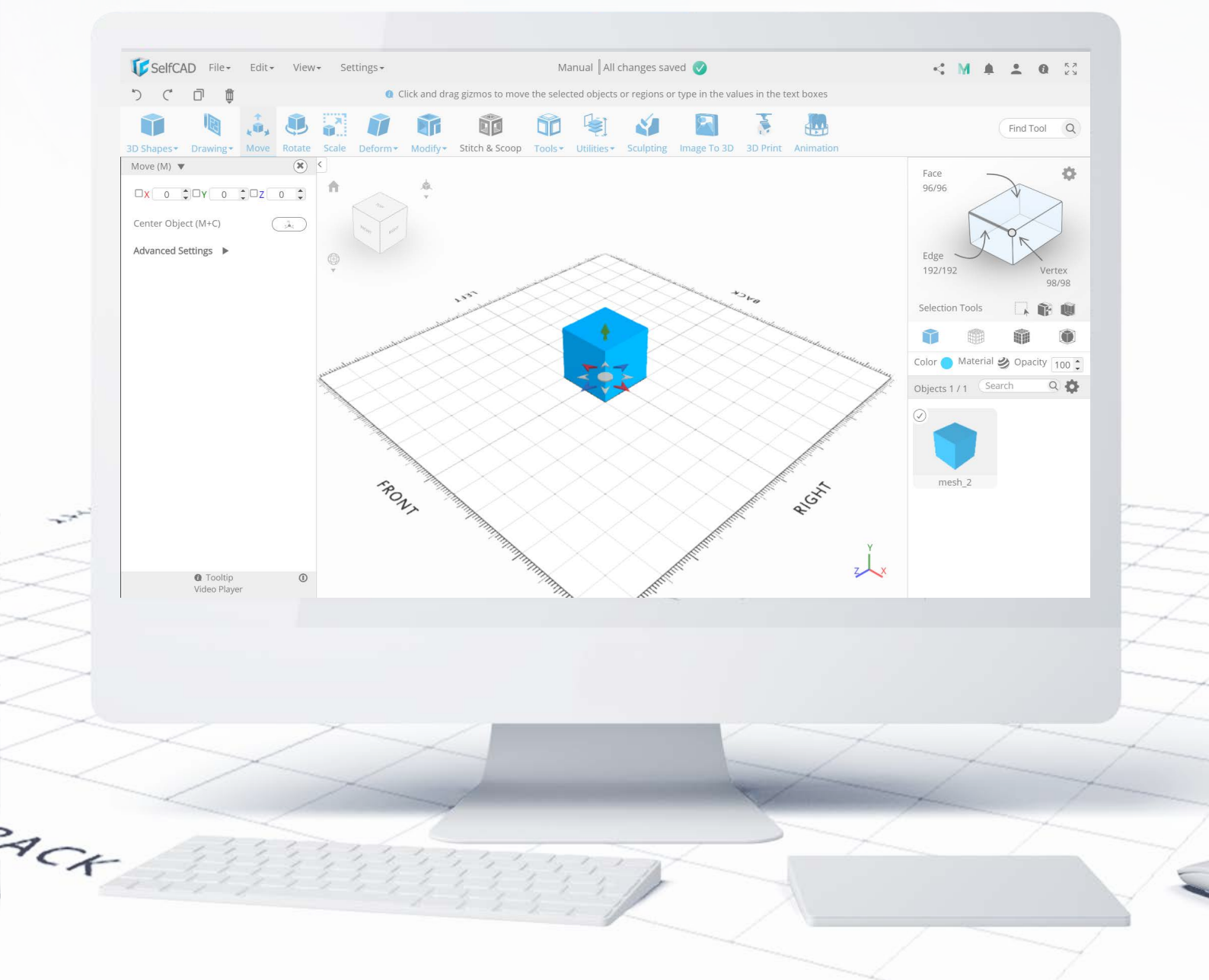

These tools work in a similar way: you can change their settings by dragging respective **gizmos**, or by typing in the exact numbers as to where you'd like to move your figure, how much you'd like to rotate it on certain **axis**, or just how much you'd like to scale it. Now when those options are rather straightforward, their **advanced settings** are much more interesting.

# Transform: Gizmo's Position



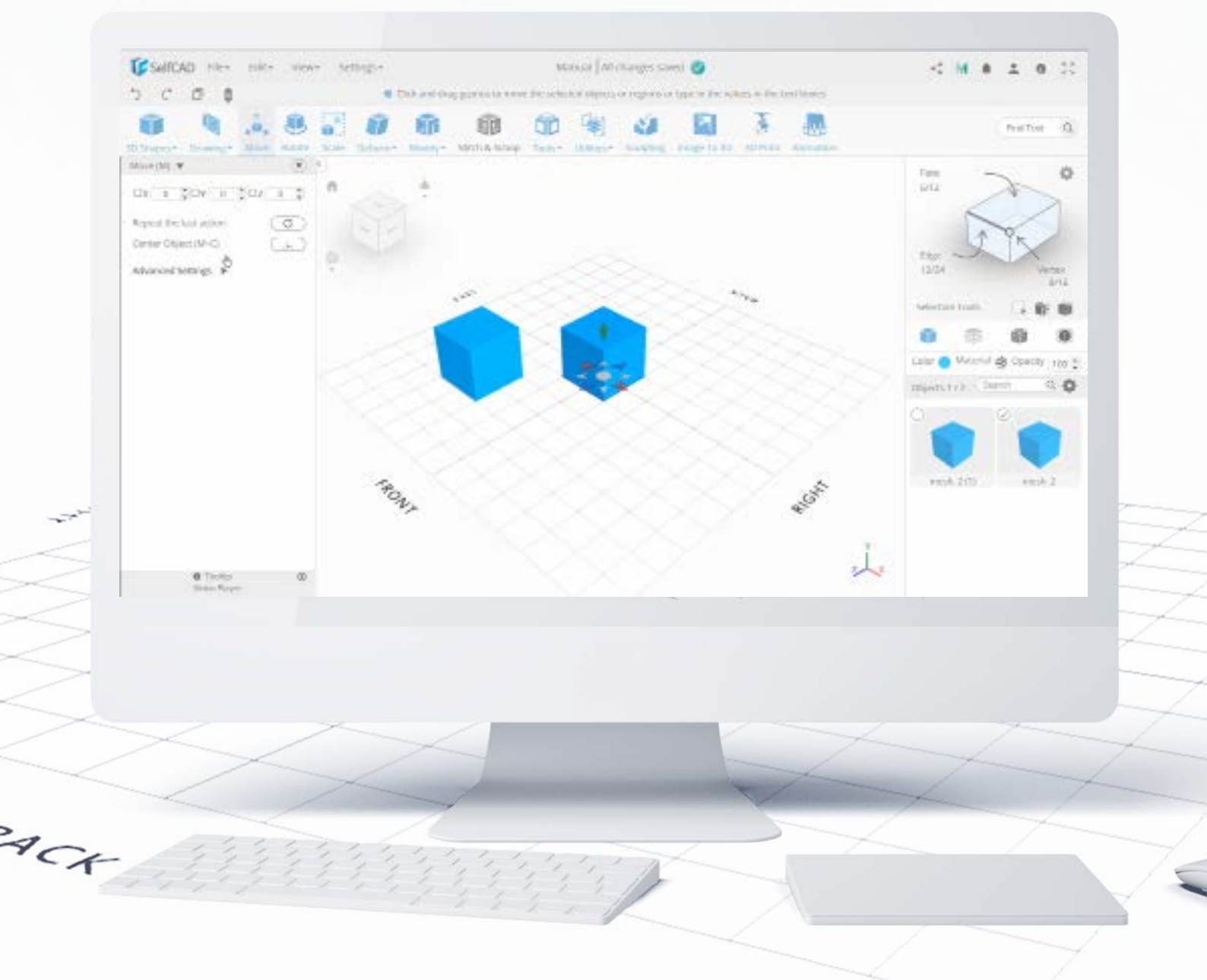

One of those advanced settings is the **Gizmo's position**. You can think about it as a point of reference - it sets up the origin around which the tool will apply the change. For example, the Gizmo's position in the Rotate tool allows you to choose around which Edge the figure will be rotated.

# Transform: Move



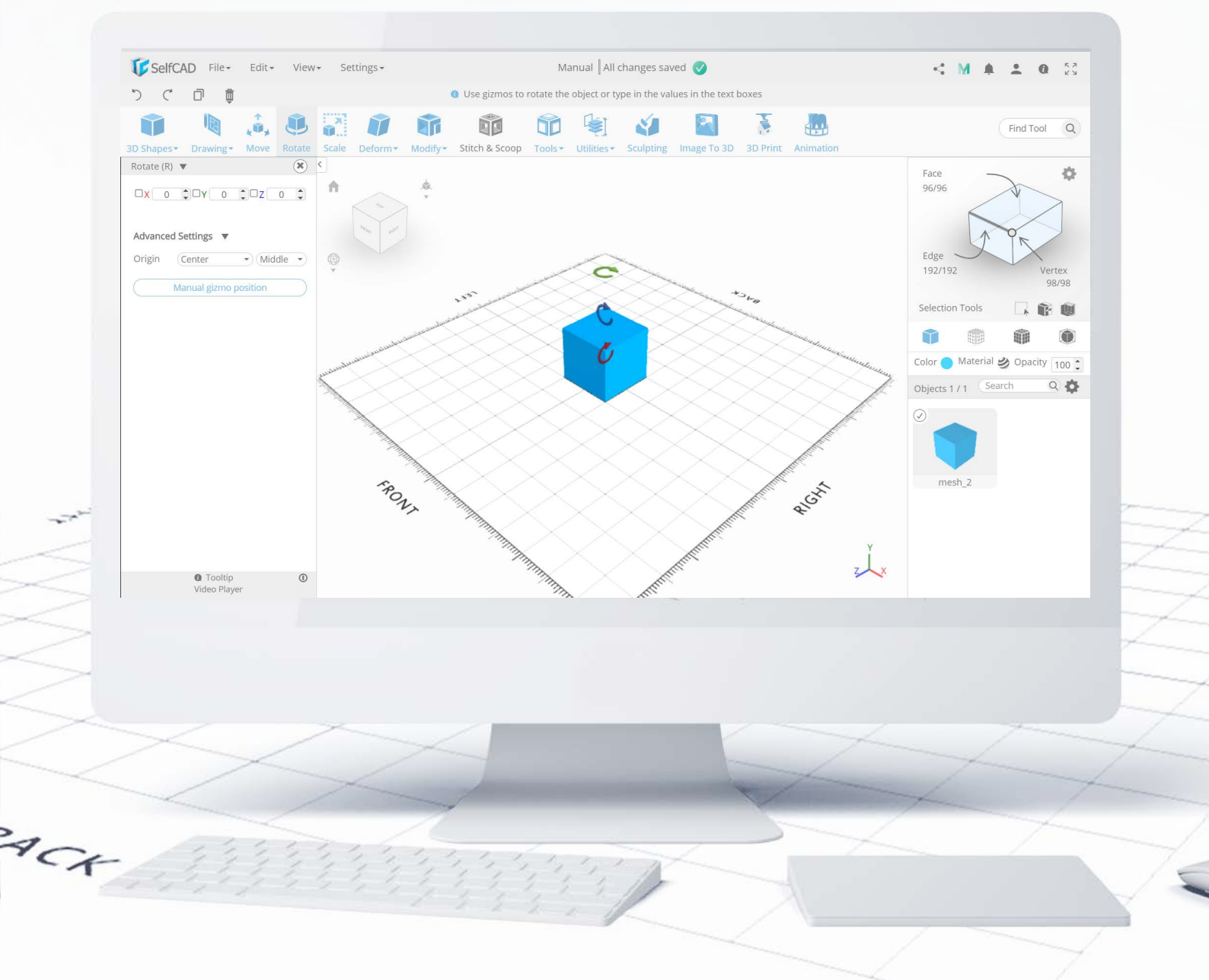

Take a look at the **Move tool**. As I said earlier, you can either drag the gizmos to change the position of the object or simply type in the exact coordinates you want to move your object to. You'll find here a pretty handy option to **Center Object** which will snap it to the middle of the grid. The most interesting option though, is the Magnet tool in advanced settings.

# Move: The Magnet



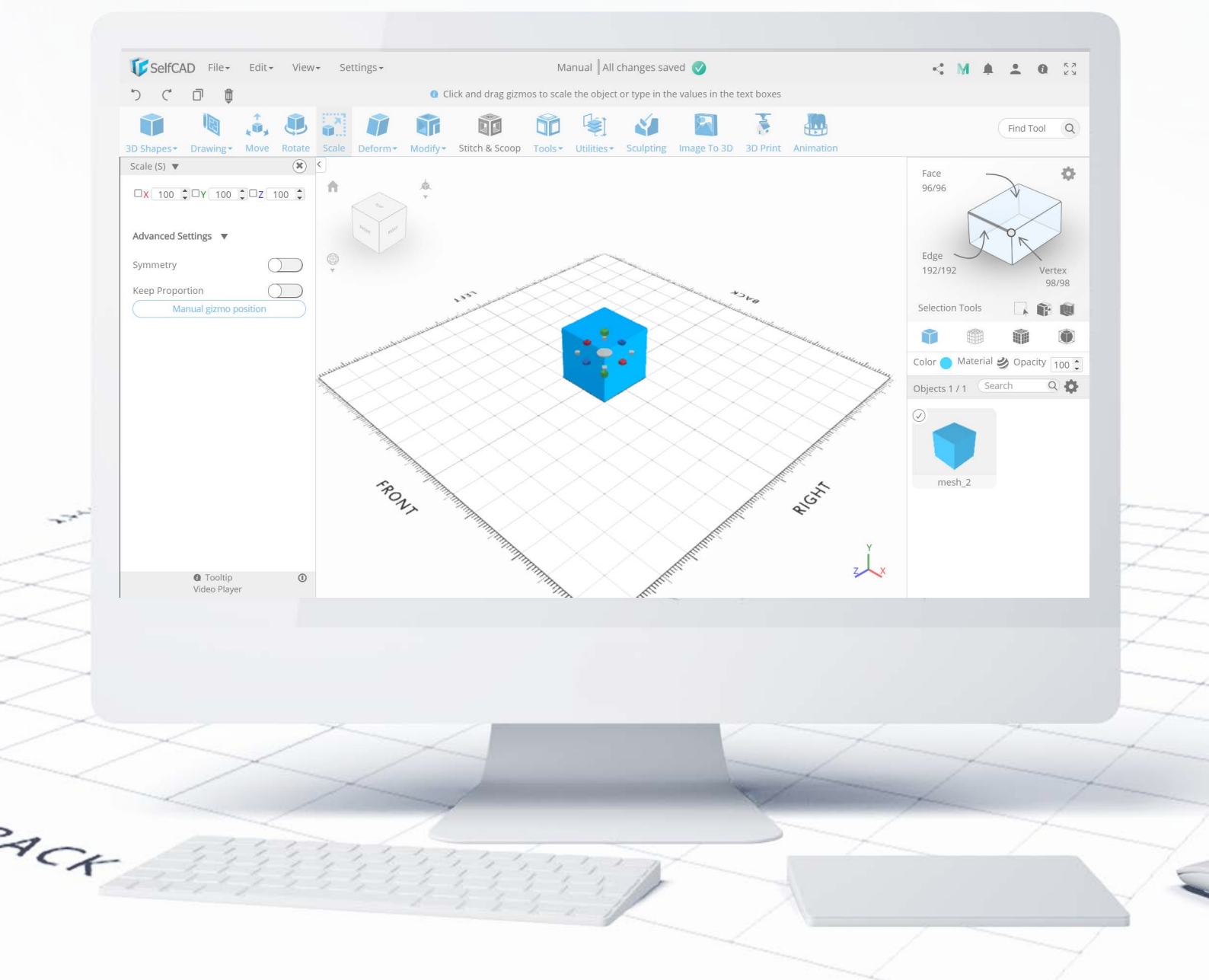

You can use the **Magnet** to drag one figure onto another by just dragging it around the workspace. It works with Gizmo's position just as well, so there is always an option to select the exact place at which you'd like your figures to snap to each other.

# Transform: Rotate



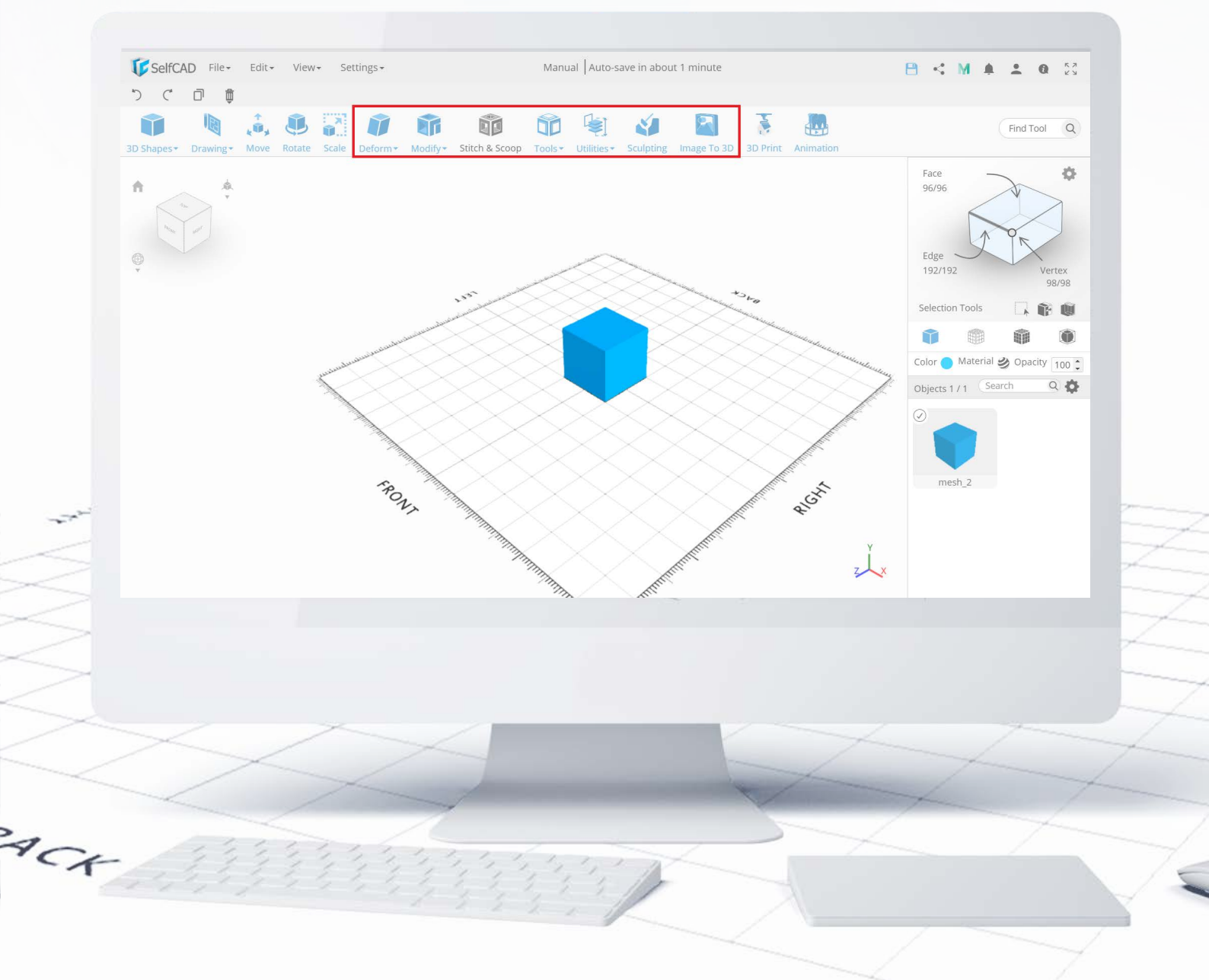

The **Rotate tool** works on the same principles as the Move tool - you can drag the gizmos on the screen to rotate your object or type in the exact angle you want to rotate it.

# Transform: Scale



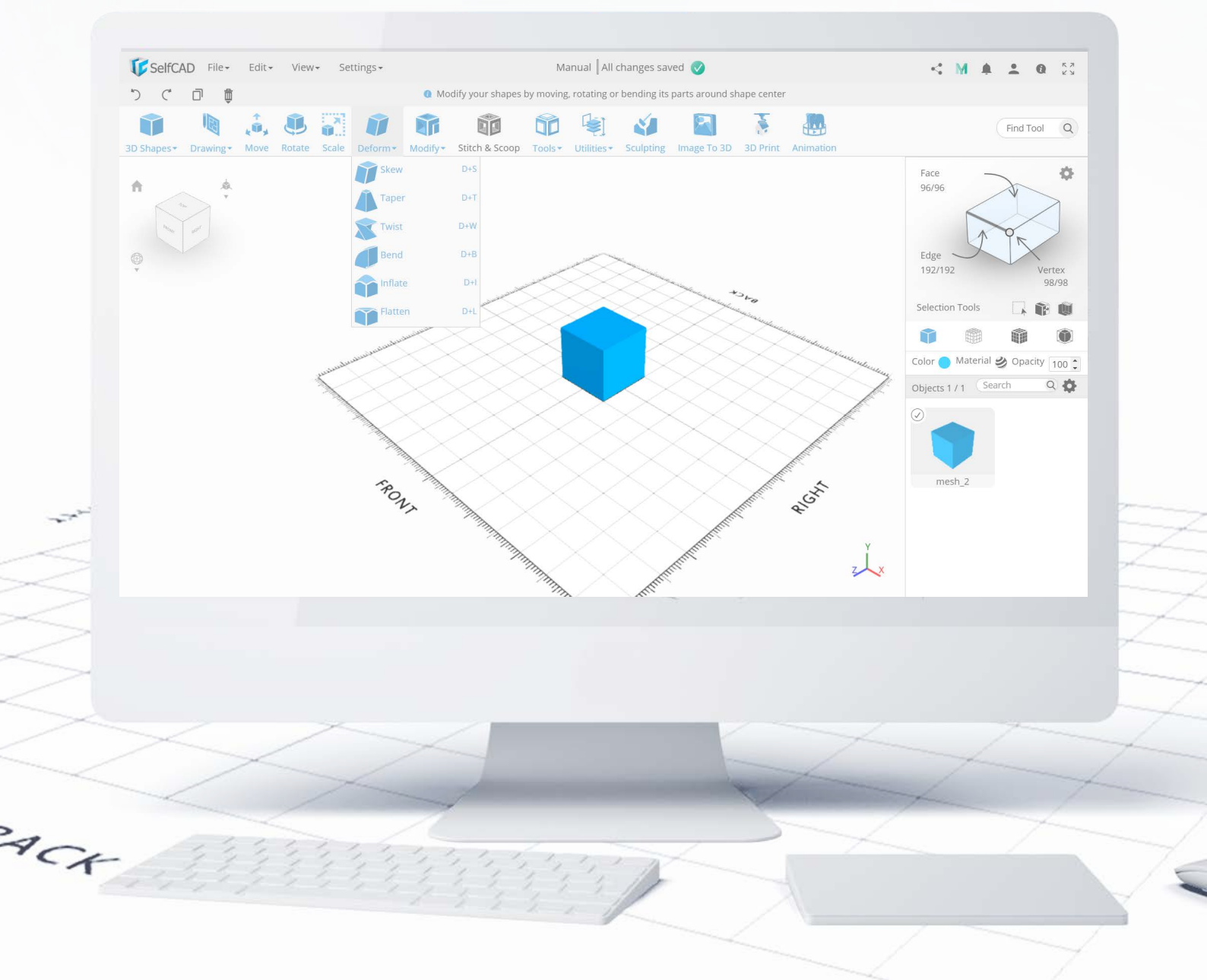

**Scale** works in the exact same way the previous two tools did, but you'll find here 2 additional options - one to keep the **Symmetry** and the other to **Keep Proportion**. **Symmetry** scales the object in both directions on a single axis, and **Keep Proportion** scales in equally in all dimensions.

# The Main Toolbar: Model



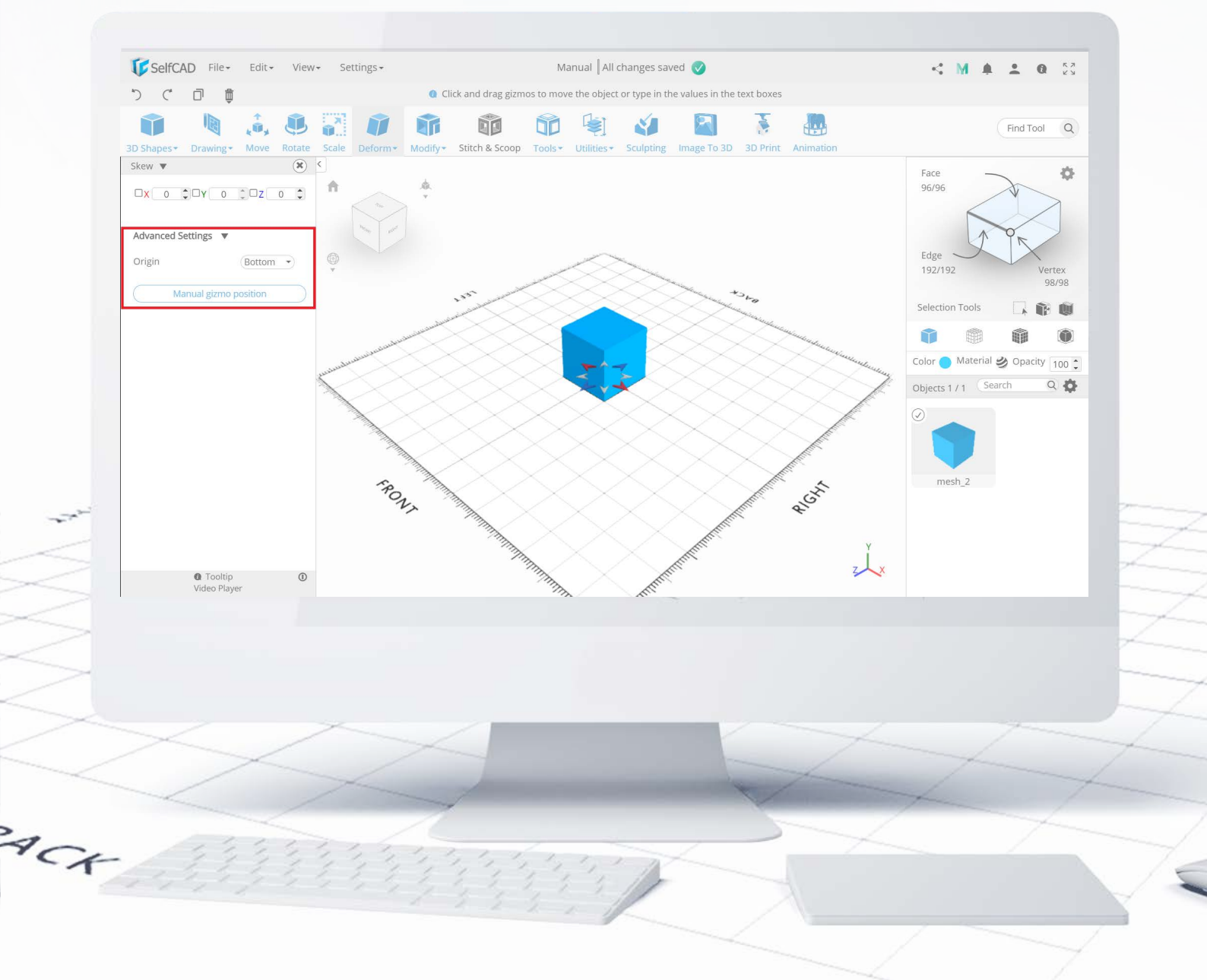

Now that you know how to create 3D models and how to transform them, we can focus on the most important part of every 3D software. The third section contains the very heart and soul of every 3D modeling software - the **Modeling section**. You'll find here a wide variety of tools dedicated to shaping your models (or their parts) in many different ways.

# Model: Deform



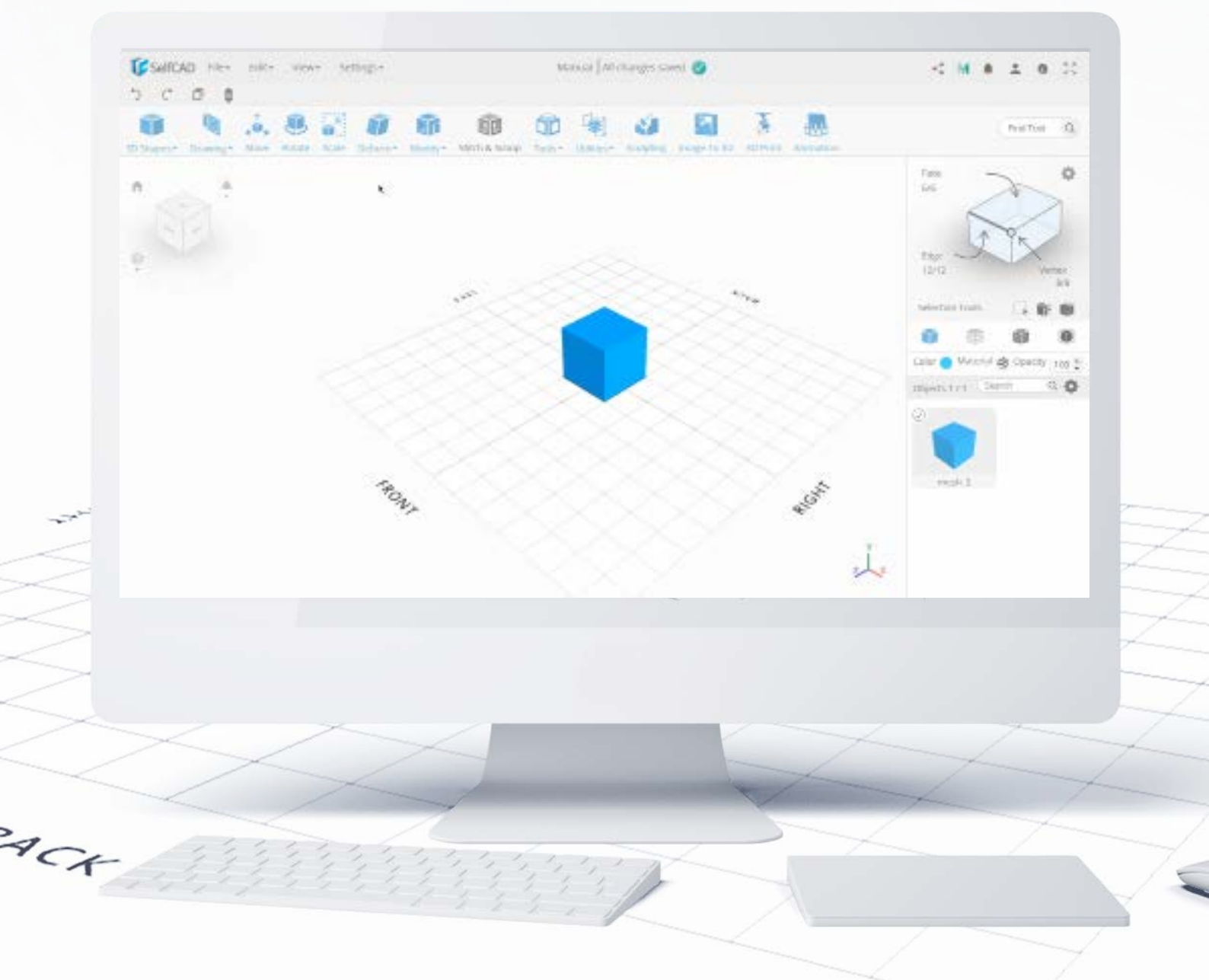

Take a look at the **Deform** first. Tools in this category work exactly in the way you'd expect - they deform shapes (or their parts) in different ways and add a certain effect to them, but they do not interfere with the amount and the shape of individual segments that create them.

# Deform: Gizmo's Position



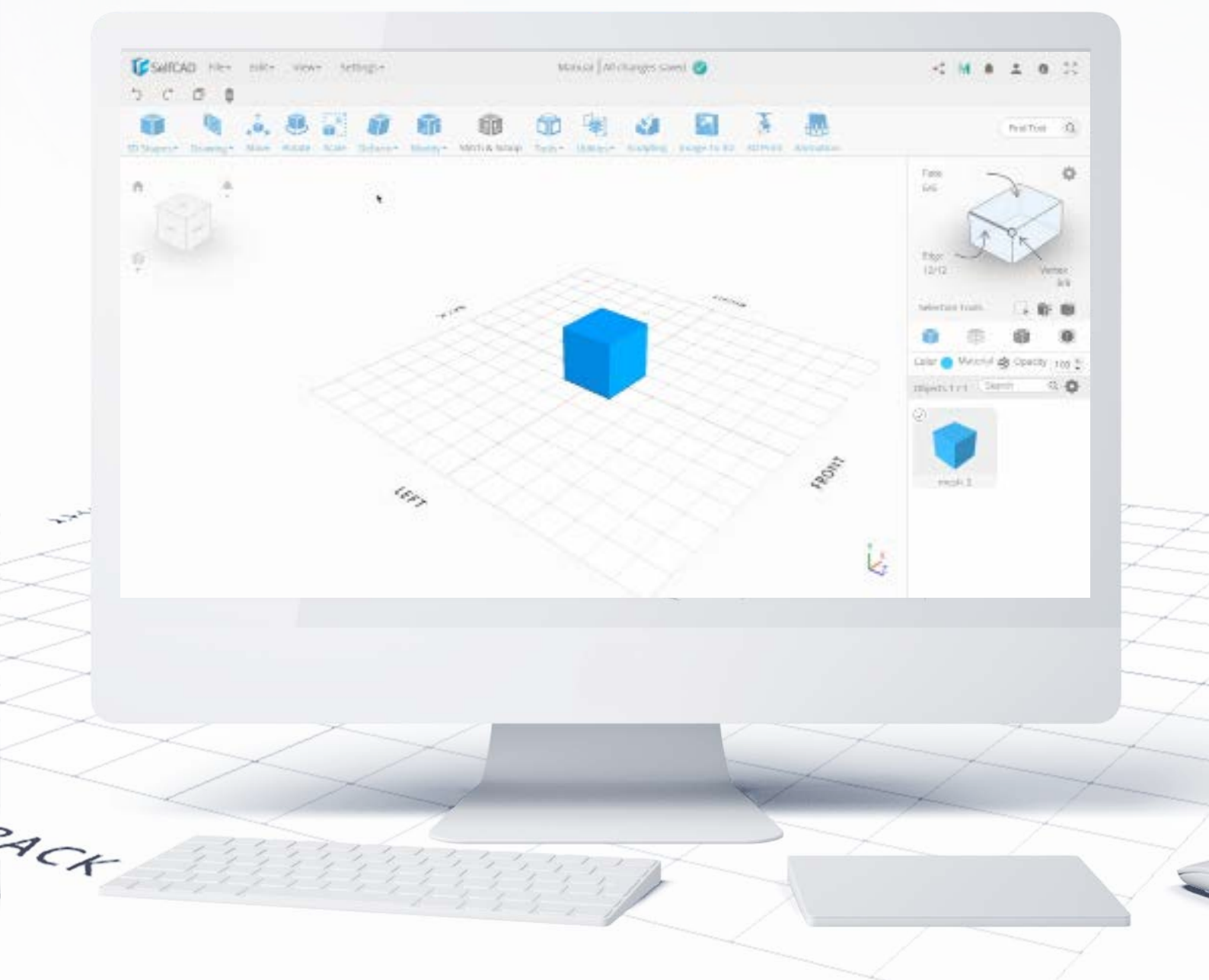

Deform tools work well with gizmo's position, which gives you the ability to choose the exact place at which the deformation will take place. As I said previously - tools in this category add certain effects to figures, but they don't change its amount of segments, so the final effect depends on the amount of segments that the model consists of - with fewer segments, the results will be blocky and often unaesthetic.

# Deform: Skew



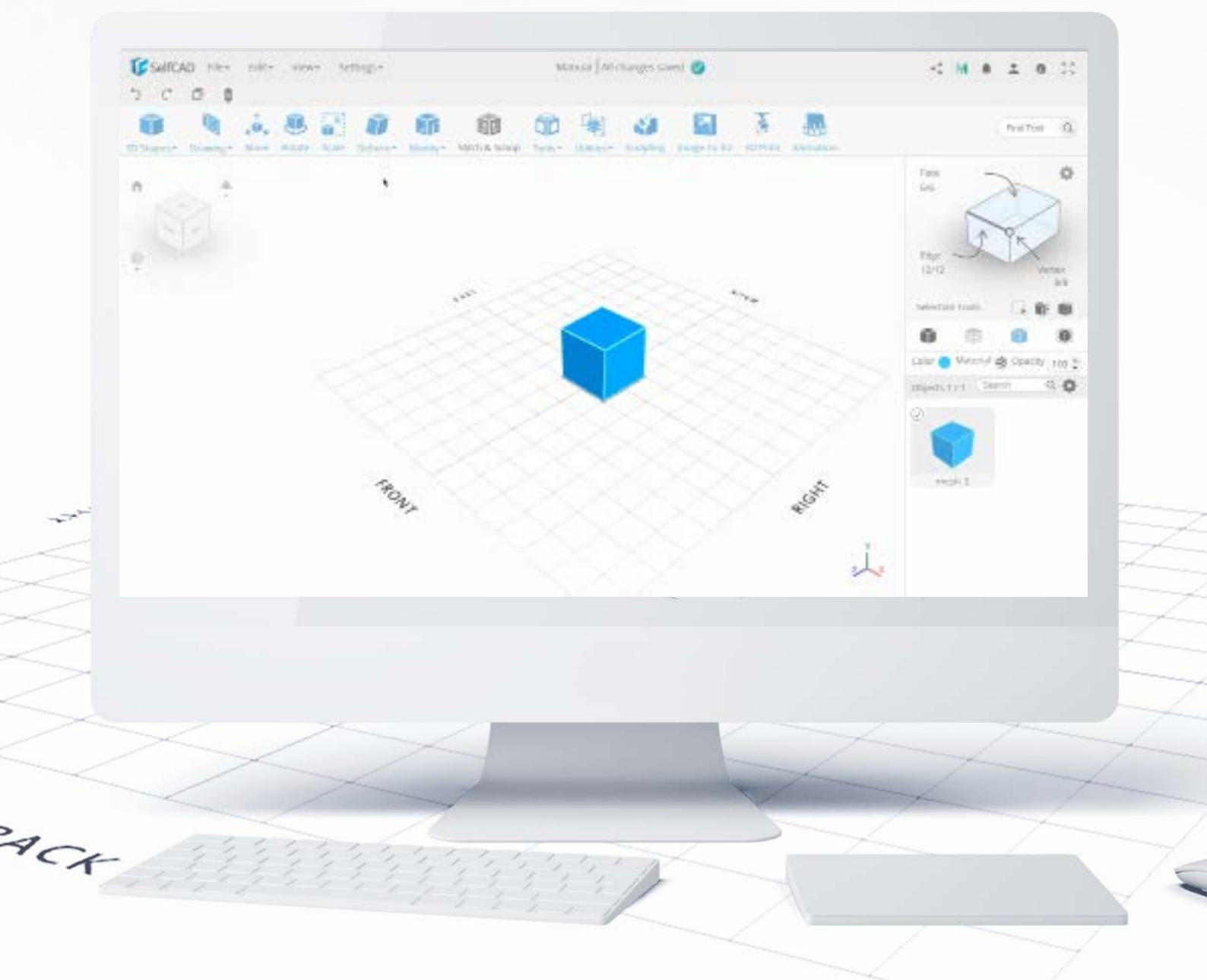

You should know by now, that tools in SelfCAD have very obvious names. **Skew** allows you to simply skew the figure, and just like it's been the case with Transformation, you can do it either by dragging respective gizmos in a certain direction or by typing in the numbers.

# Deform: Taper



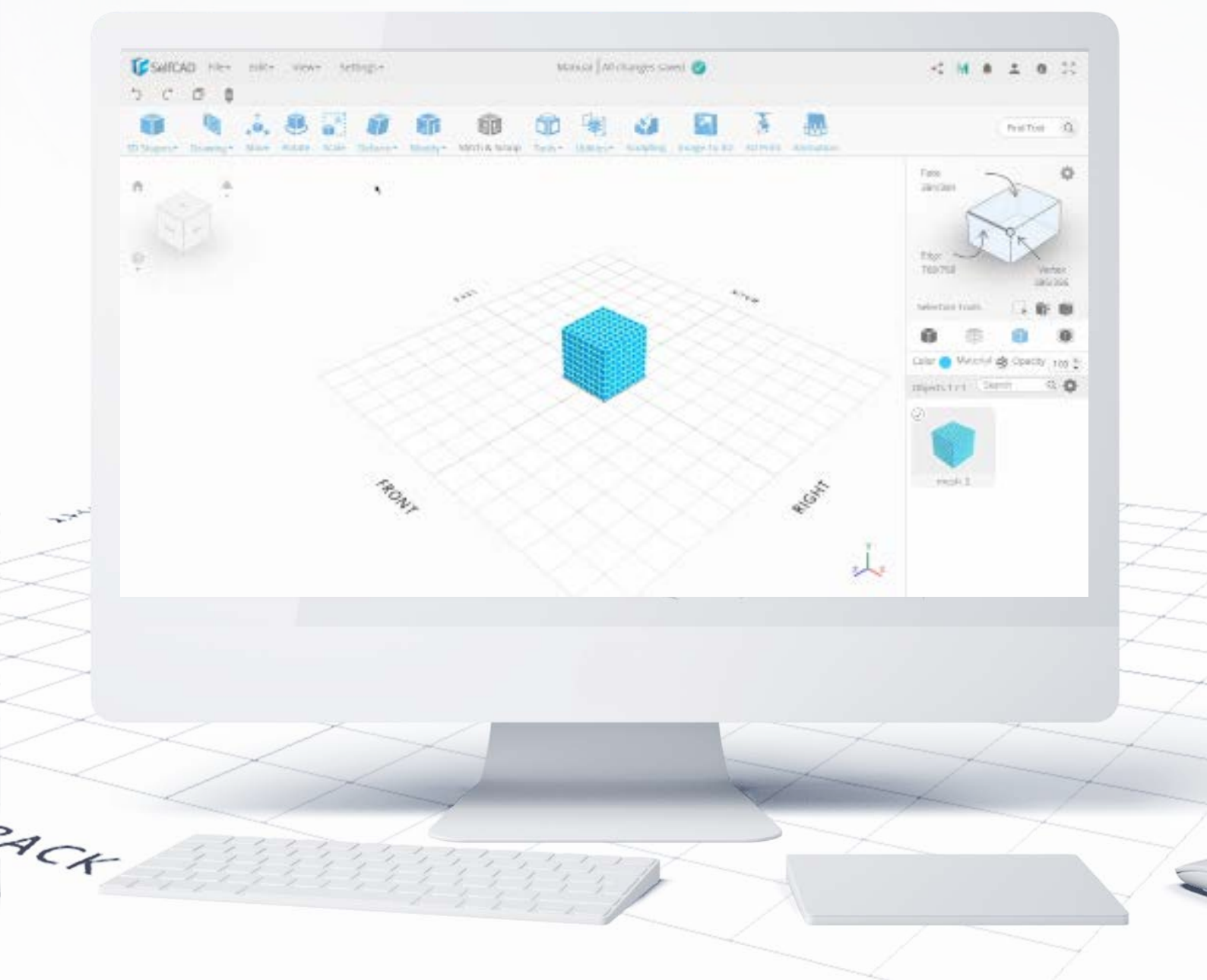

**Taper** works on the exact same premise. I'll show you how the Gizmo's position affects the tools in this category. By using Taper you'd normally Taper the top of the model, but by changing gizmo's position to the top, you can force the deformation to take place at the bottom.

# Deform: Twist



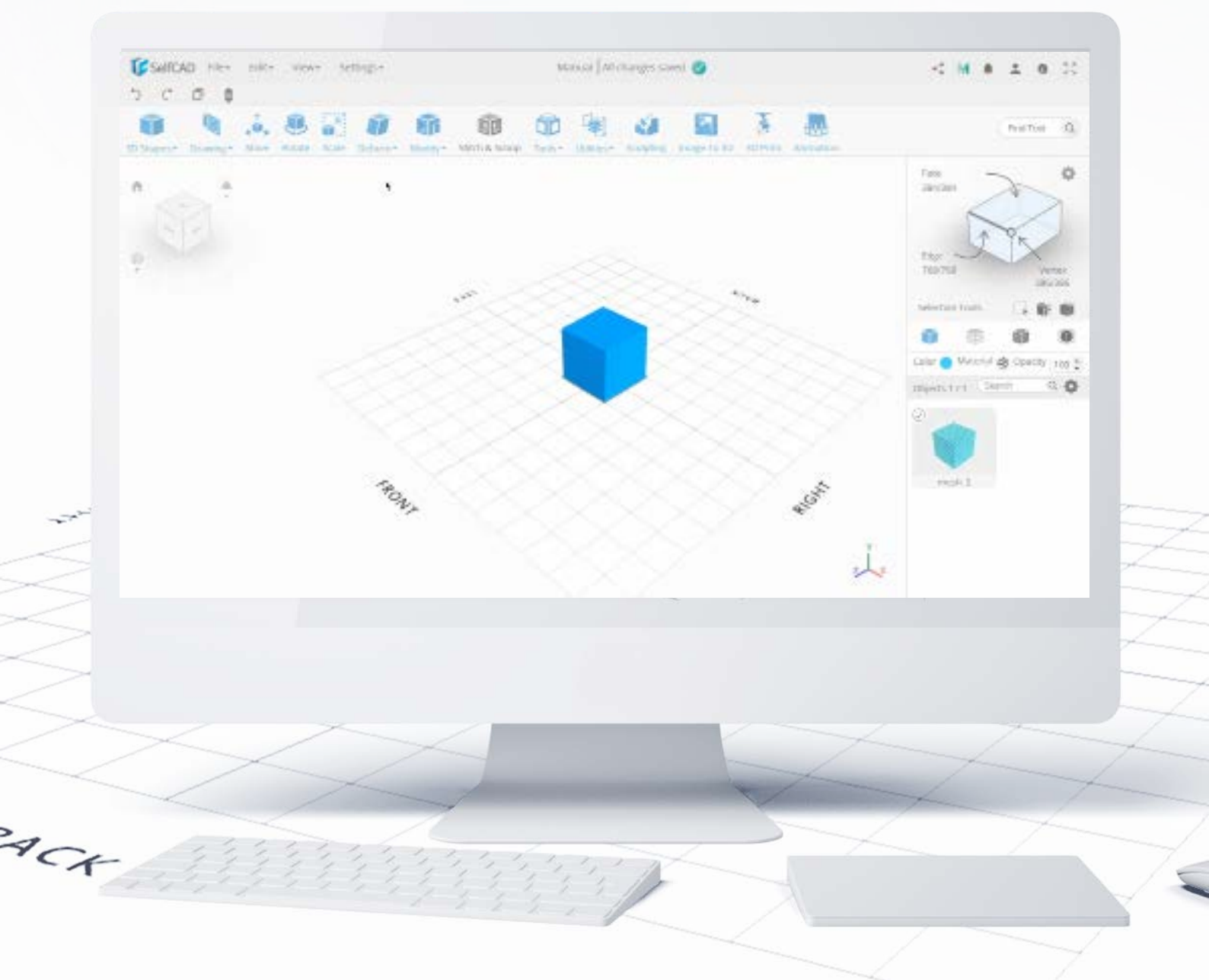

The same logic applies to **Twist**. I said in the beginning, that the deformation is only as good as the number of segments that the figure consists of. Take a look at this cube - each of its sides consists of only a single segment - because of this, the deformation looks simply crude, and if you overdo it, the figure will break in the middle.

# Deform: Twist 2



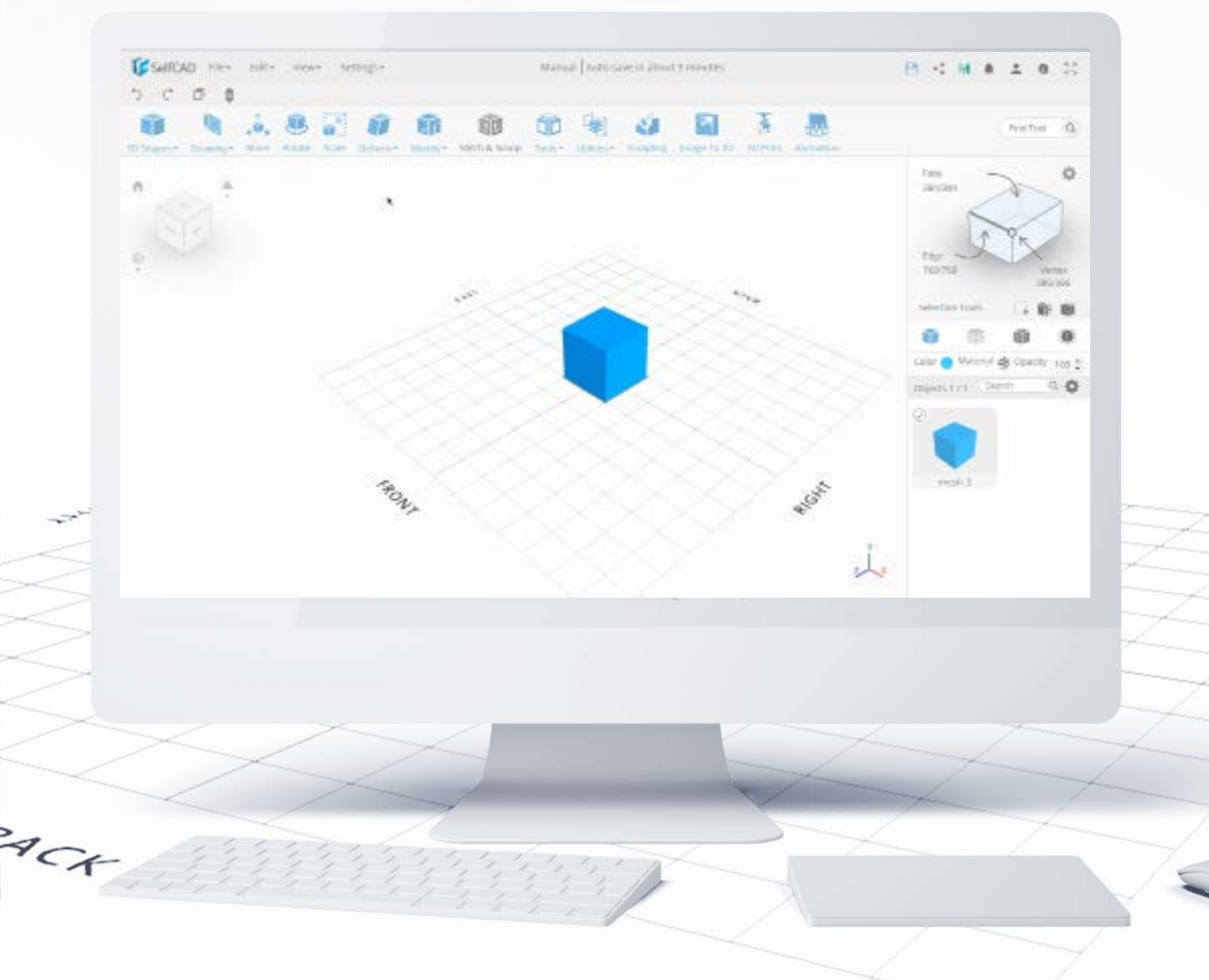

And now take a look at the exact same deformation but with a cube that consists of multiple segments. As you can see above, the deformation looks much more smooth.

# Deform: Bend



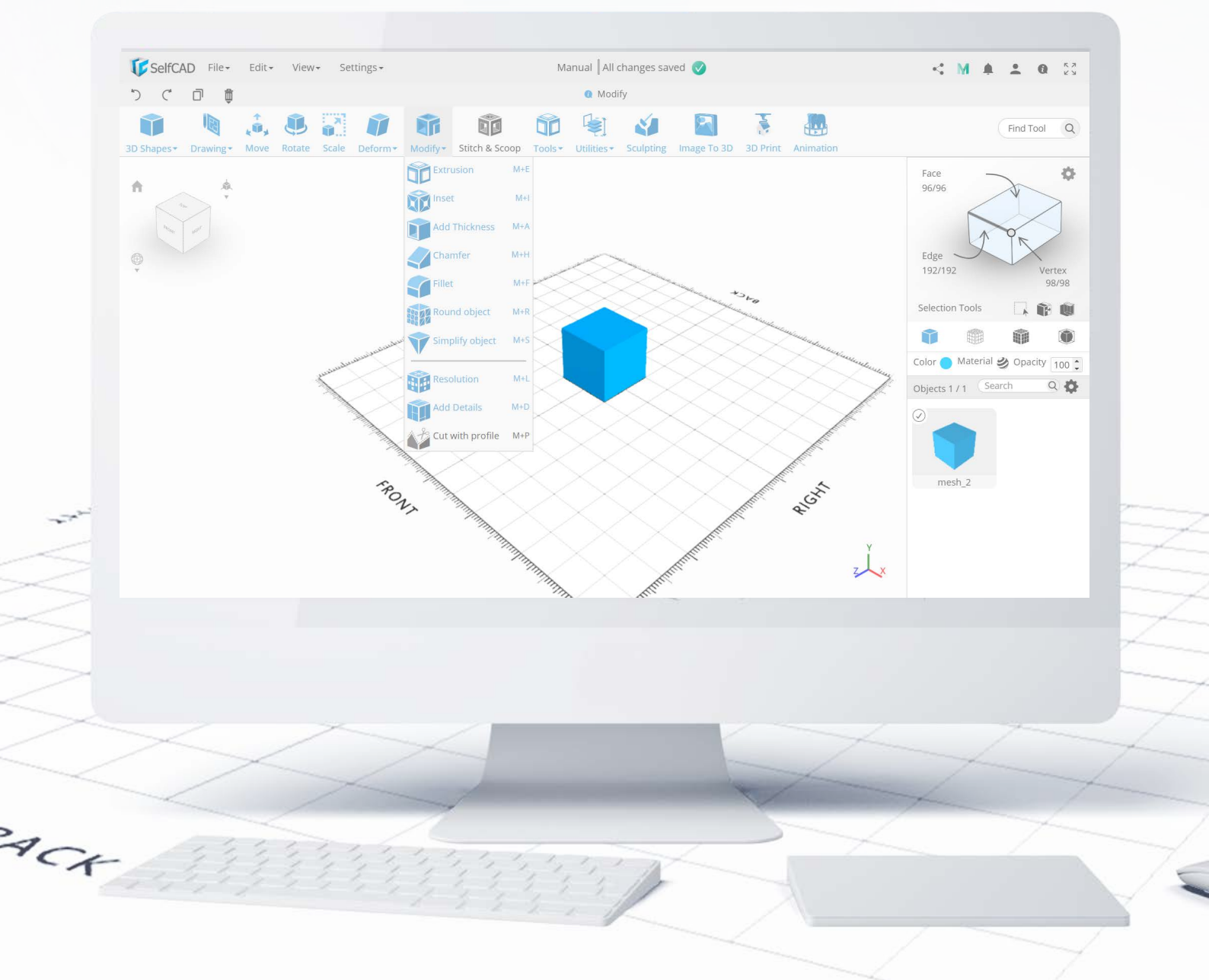

Just like with the others, the name of the tool speaks for itself and it operates on the exact same premise as the others do. However, you'll find here another **Advanced Option** called **Dynamic Origin** - it basically forces the model to wraps itself in an attempt to create a perfect circle. Of course - if it will be successful or not, depends heavily on the number of segments of the figure.

# Deform: Inflate and Flatten



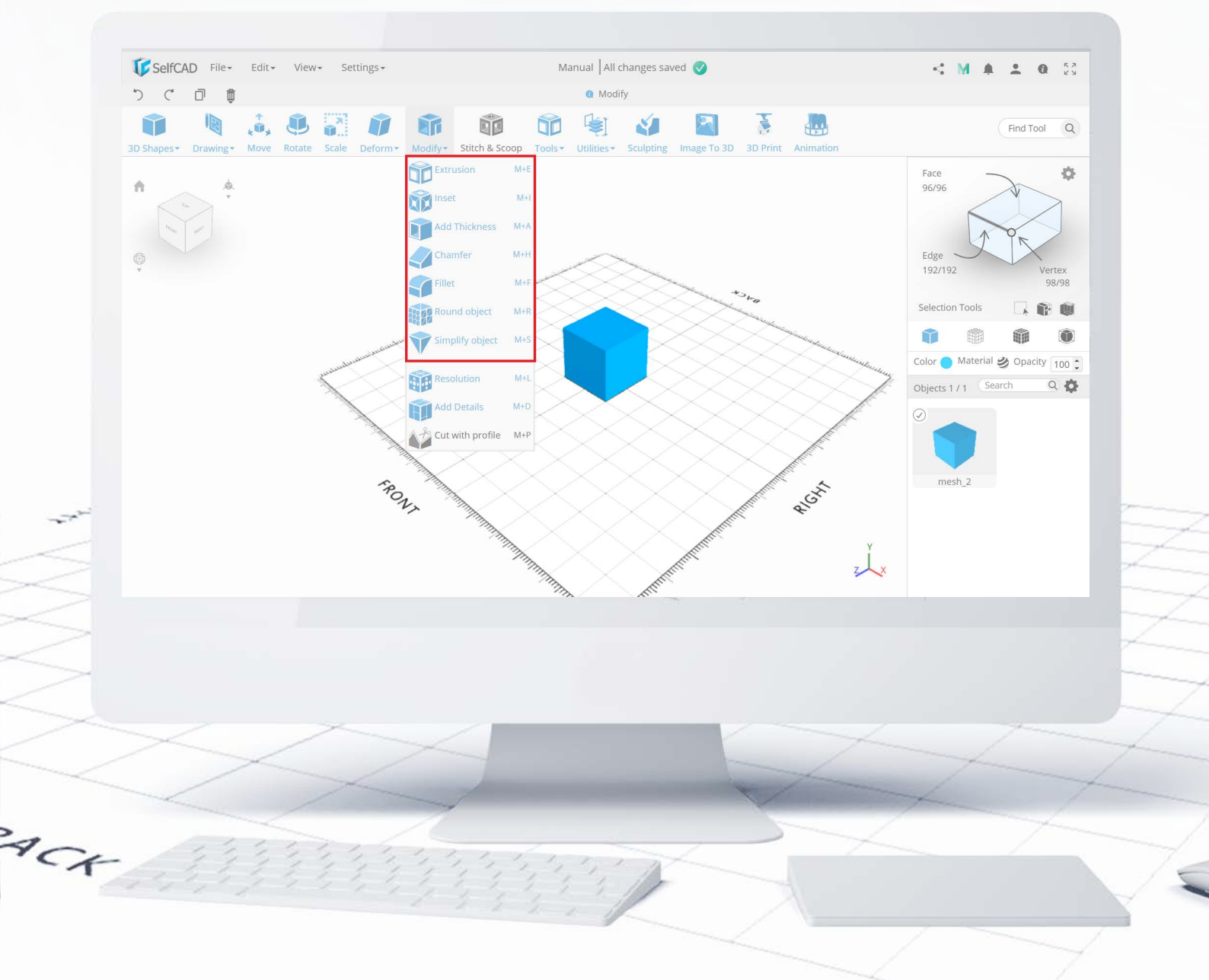

Just like their names suggest, these tools allow you to **Inflate and Flatten** surfaces. In both of them, you'll find the advanced option to **keep Symmetry** while using them, which will **Inflate or Flatten** them equally in both directions on the axis.

# Model: Modify



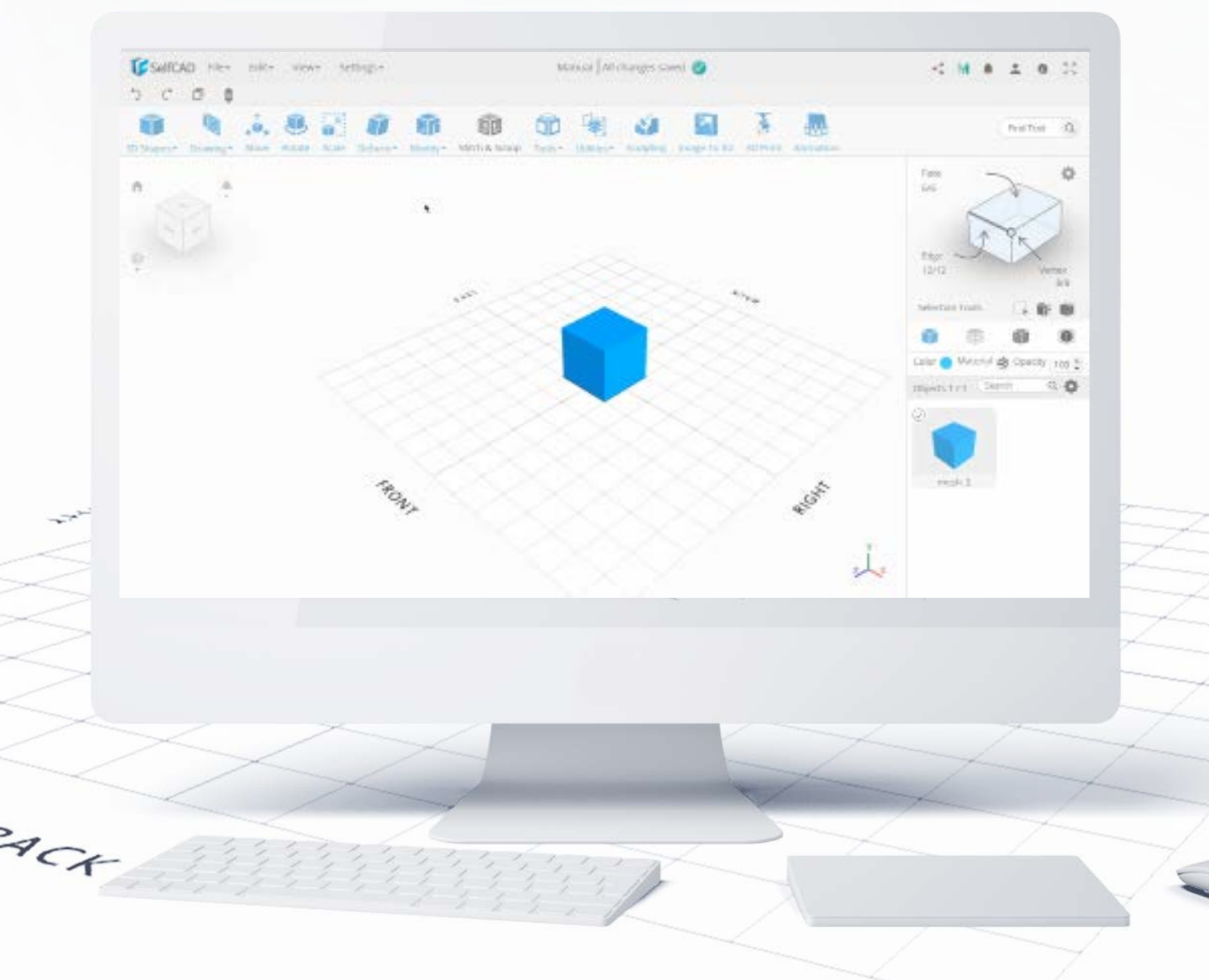

Next in line, we have the **Modify** category. It's very similar to Deform, as it adds certain effect to your 3D Model, but they do it in a more intrinsic way - tools in this category not only change the shape of your model like the tools in Deform do, but they change the amount and shape of the segments that create the model as well.

# Modify: The First Section



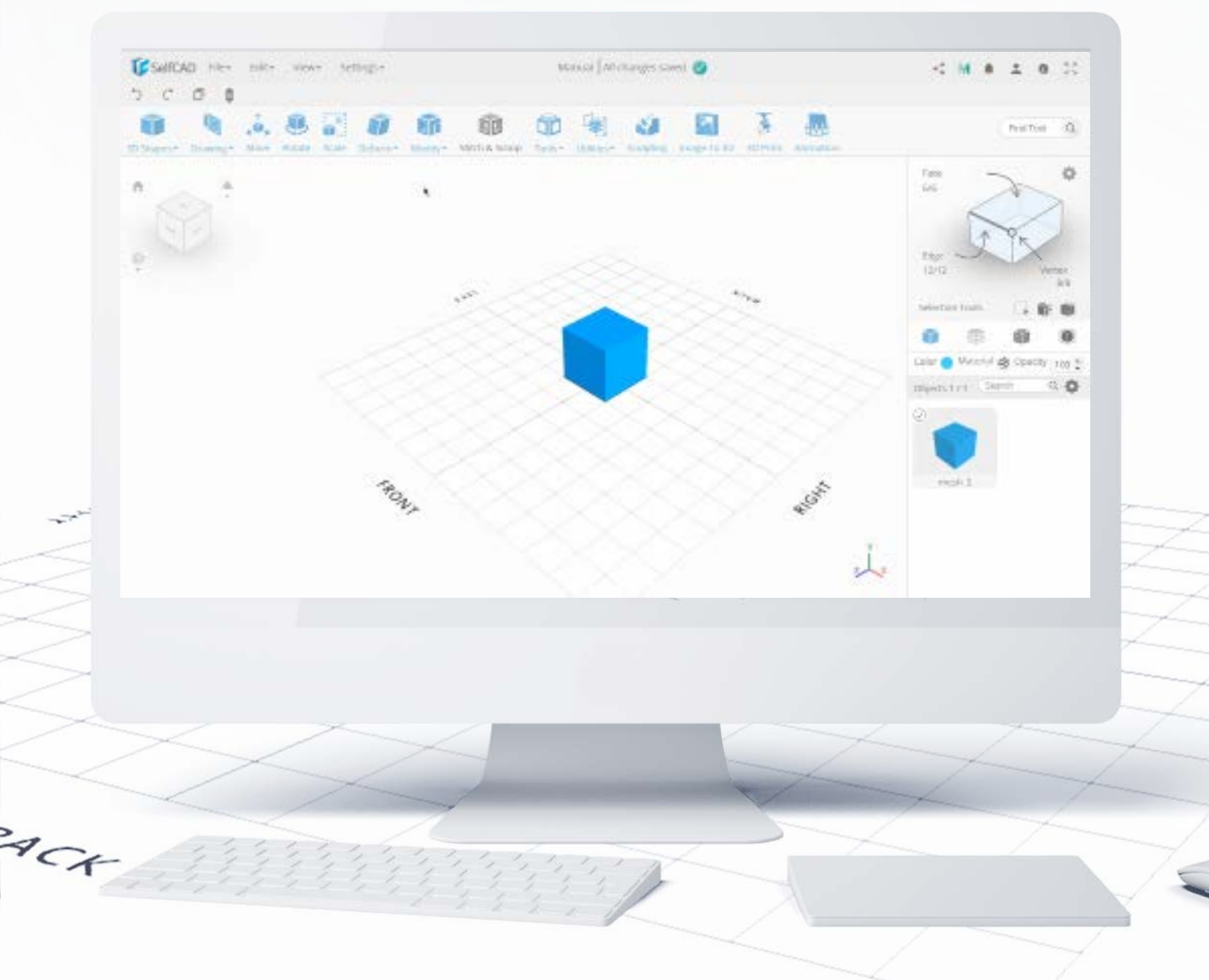

The tools above the divider will change the way how your objects look, as well as how they are constructed - each time you use one of these tools you'll alter the geometrical shape of your figure by basically cutting out a piece of the 3D model.

# Modify: Extrusion



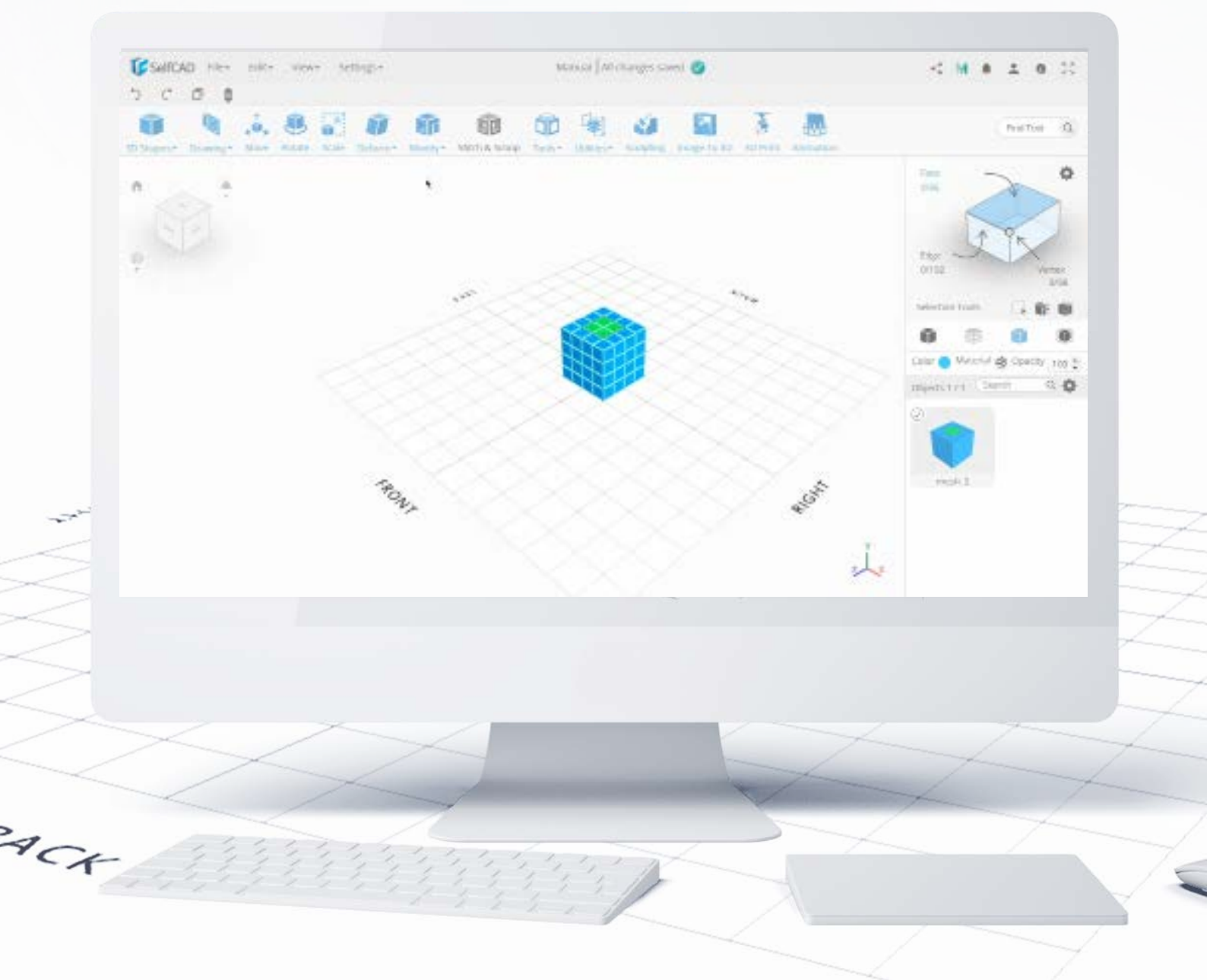

**Extrusion** in its default form allows you to extrude polygons of the figure, and you can manipulate the value of the extrusion by operating a slider - the positive value will extrude the polygons outwards, and the negative value will extrude them inwards.

# Extrusion: Vertex Normals



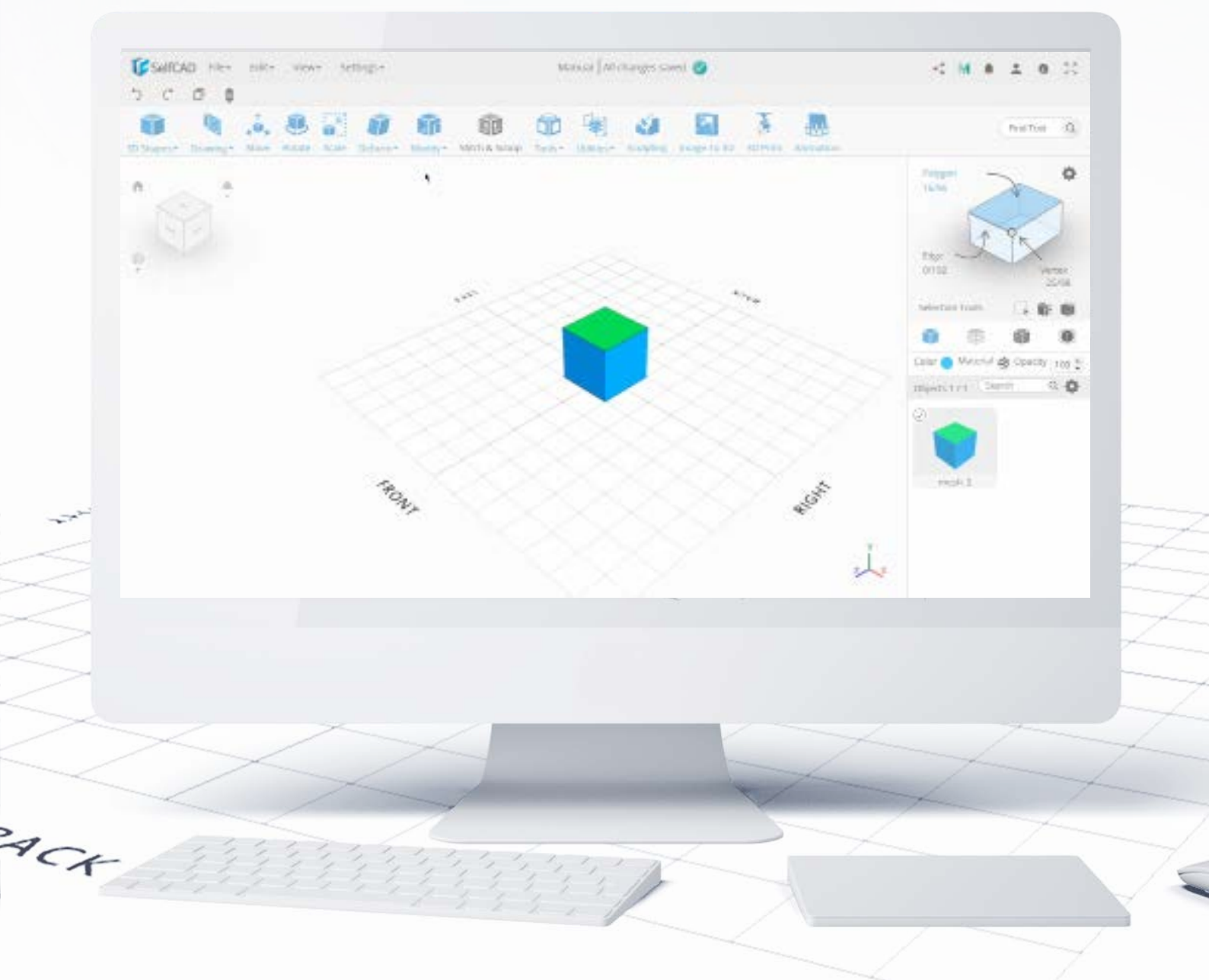

The **Vertex Normals** feature, however, allows you to simultaneously extrude and change the size of the figure or its part. In its default usage, you'll extrude the whole figure inwards or outwards.

# Extrusion: Cut



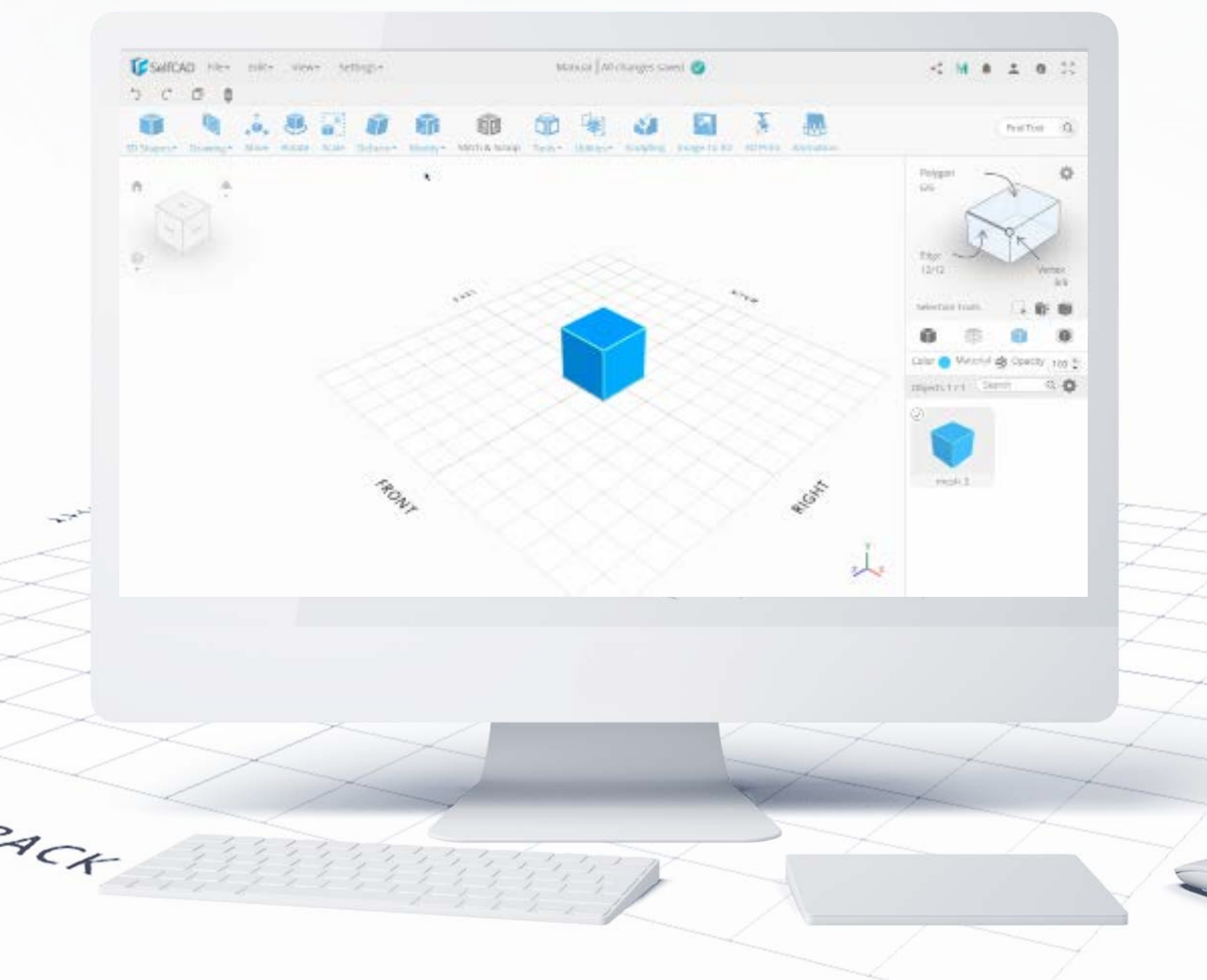

You can also use the Extrusion tool to cut the object and create holes in it. As you can see above, by using Face Selection and using the Extrusion tool on them I created a hole in the middle of the model by dragging the gizmo down.

# Extrusion: Extrude with options



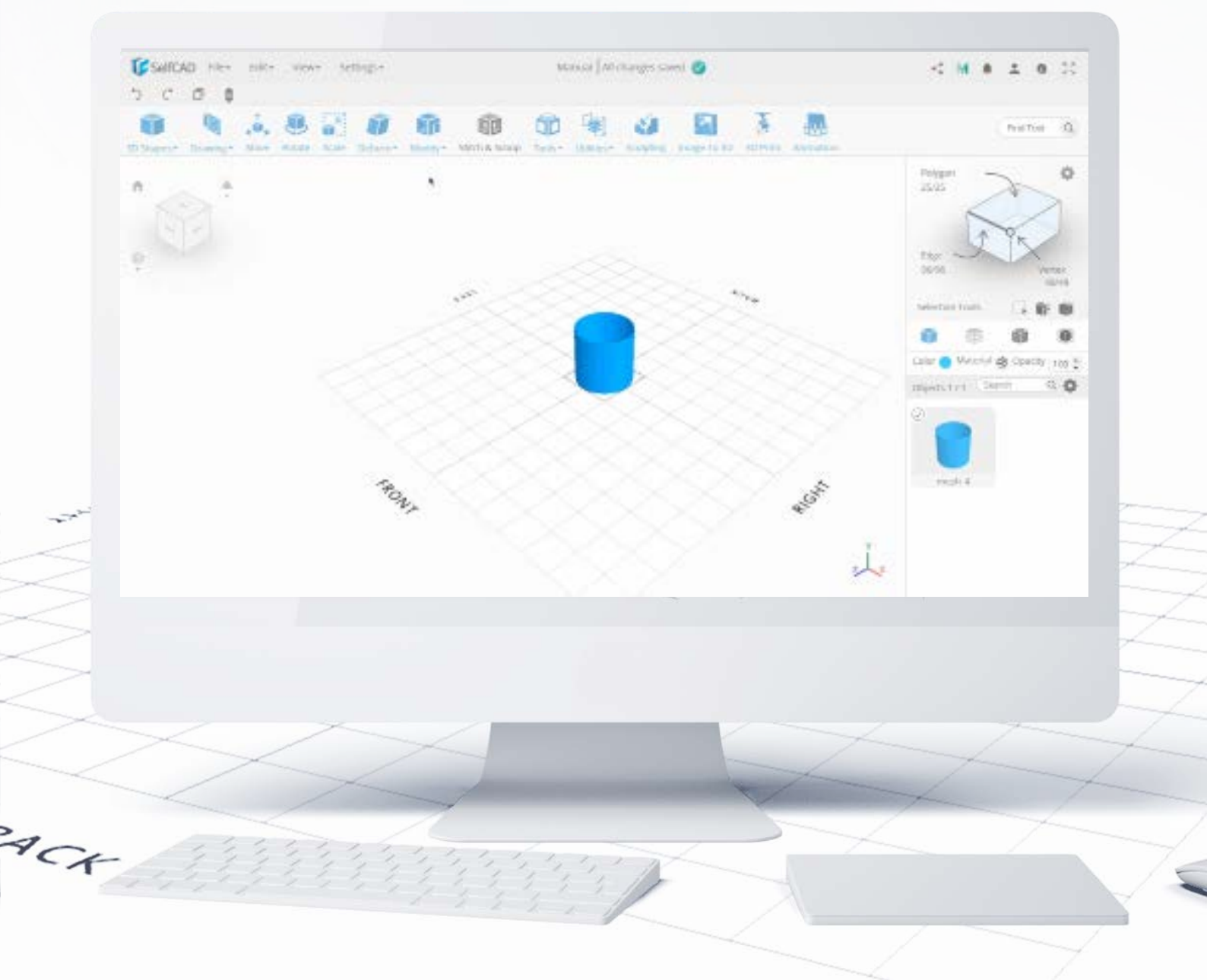

By selecting a polygon and moving to the Extrusion tool you'll notice that the **Advanced Options** showed up. Inside you'll see the **Add Option** feature, which will lead you to the drop-down list with all available options you can add to the extrusion - all you need to do is to select an option, set its value and the number of repetitions the toll should perform and confirm the changes. You can even stack different options on top of each other to add multiple effects at the same time - the amount of possibilities is staggering.

# Modify: Inset



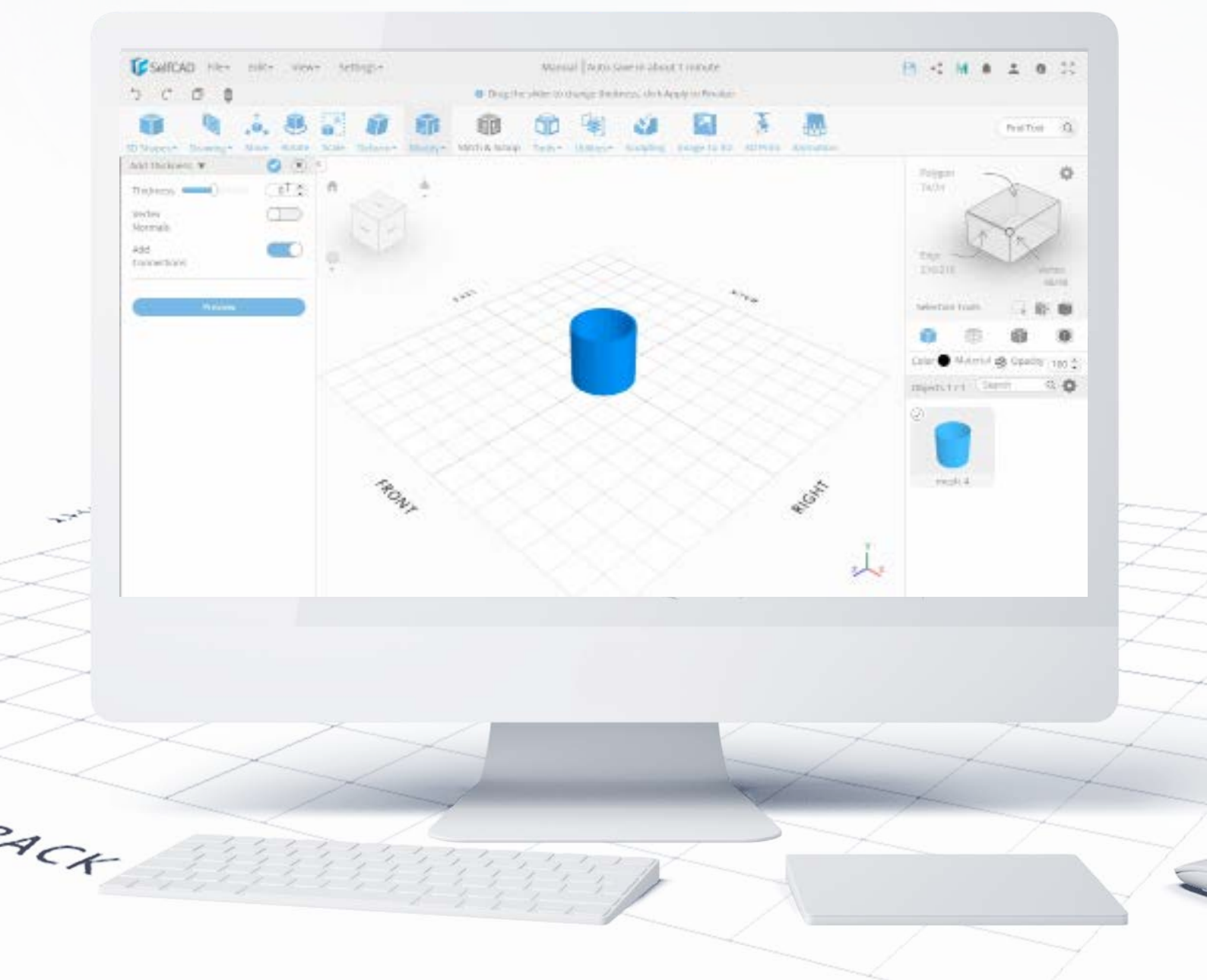

The **Inset tool** splits polygons (or faces, if they are selected) and smaller versions of it. You can change the size of the Inset by moving the slider.

# Modify: Add Thickness



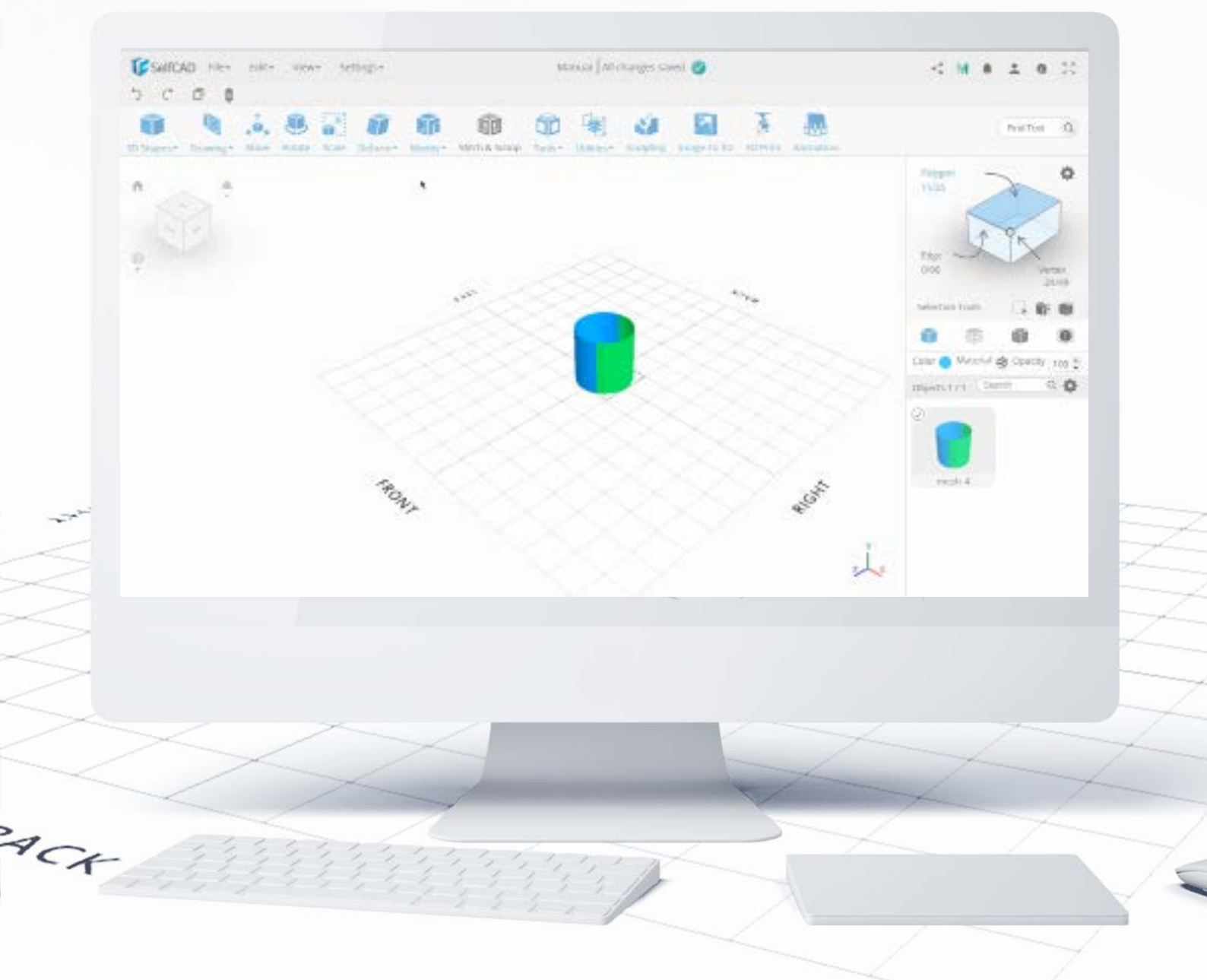

**Add Thickness** allows you to add volume to your models, and its basic usage is to add thickness to open figures (such as containers) to print them with a more sturdy frame.

# Add Thickness: Vertex Normals



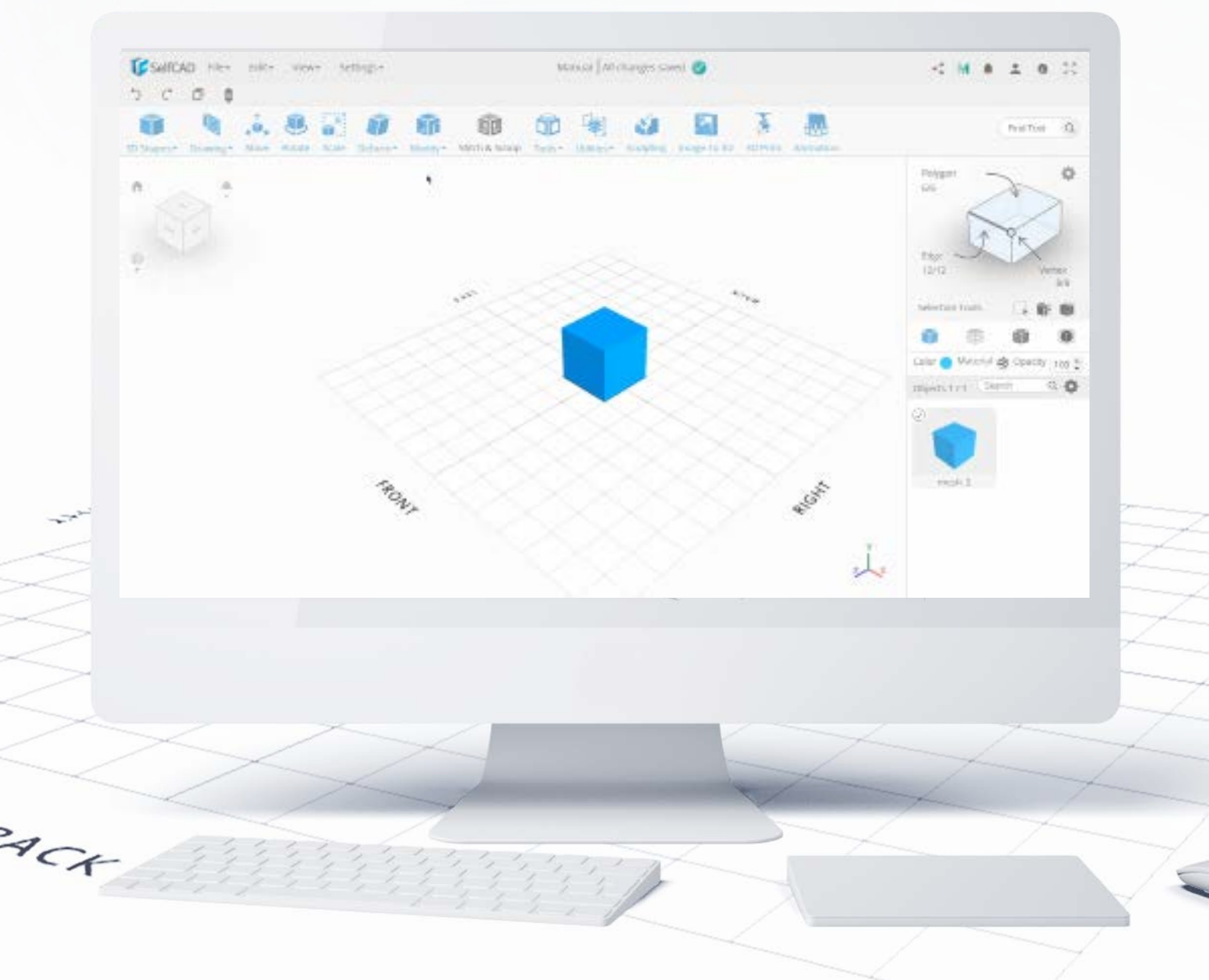

**Vertex Normals** changes the way the thickness is added - instead of expanding the faces for a specified amount (as it's the case with Adding Thickness without this option), it uses the edges as its starting point and measures the amount from them, which results in a slightly different shape as presented at the picture above.

# Add Thickness: Add Connections



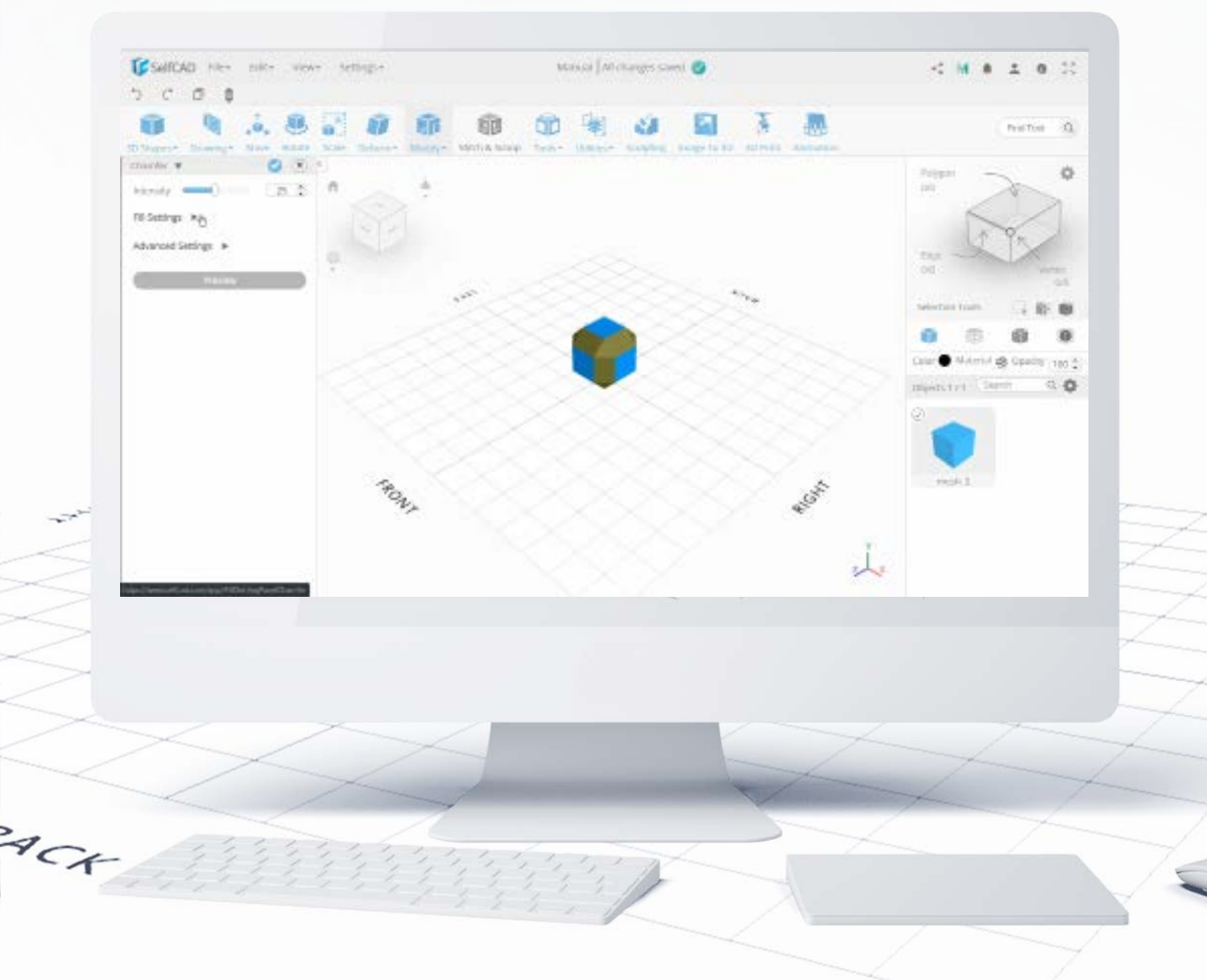

**Add Connections** is a recent addition to the software. You can use this feature to Add Thickness to selected Faces, Polygons, Edges or Vertices, and the software will connect them together. Just look at the animation above - Add Thickness in itself created a copy of a Face with set distance, and by selecting **Add Connections** feature, the newly created Face got connected to the main model.

# Modify: Chamfer



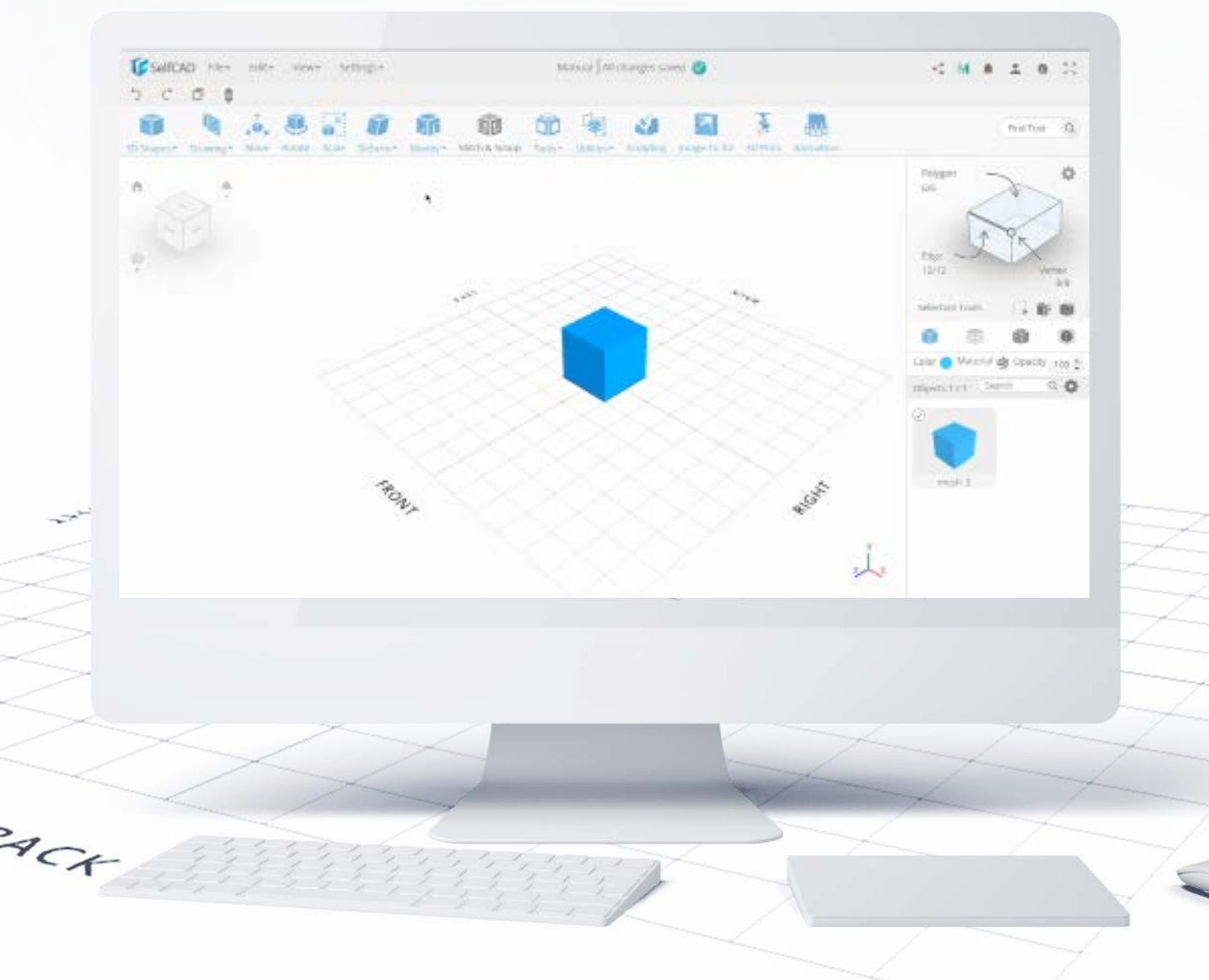

**Chamfer** basically bevels the edges of the figure. There is only one slider called intensity and I don't think I need to explain what does it do. With Fill Settings, you can choose which parts of the bevel you'd like to keep or delete.

# Chamfer: Fill and Advanced Settings




As I said, the **Fill Settings** allow you to choose which parts of the figure you'd like to keep after beveling, and you can choose from Polygons, Edges, and Corners. In the advanced settings, you can set the intensity of the bevel to be based on length or percentage.

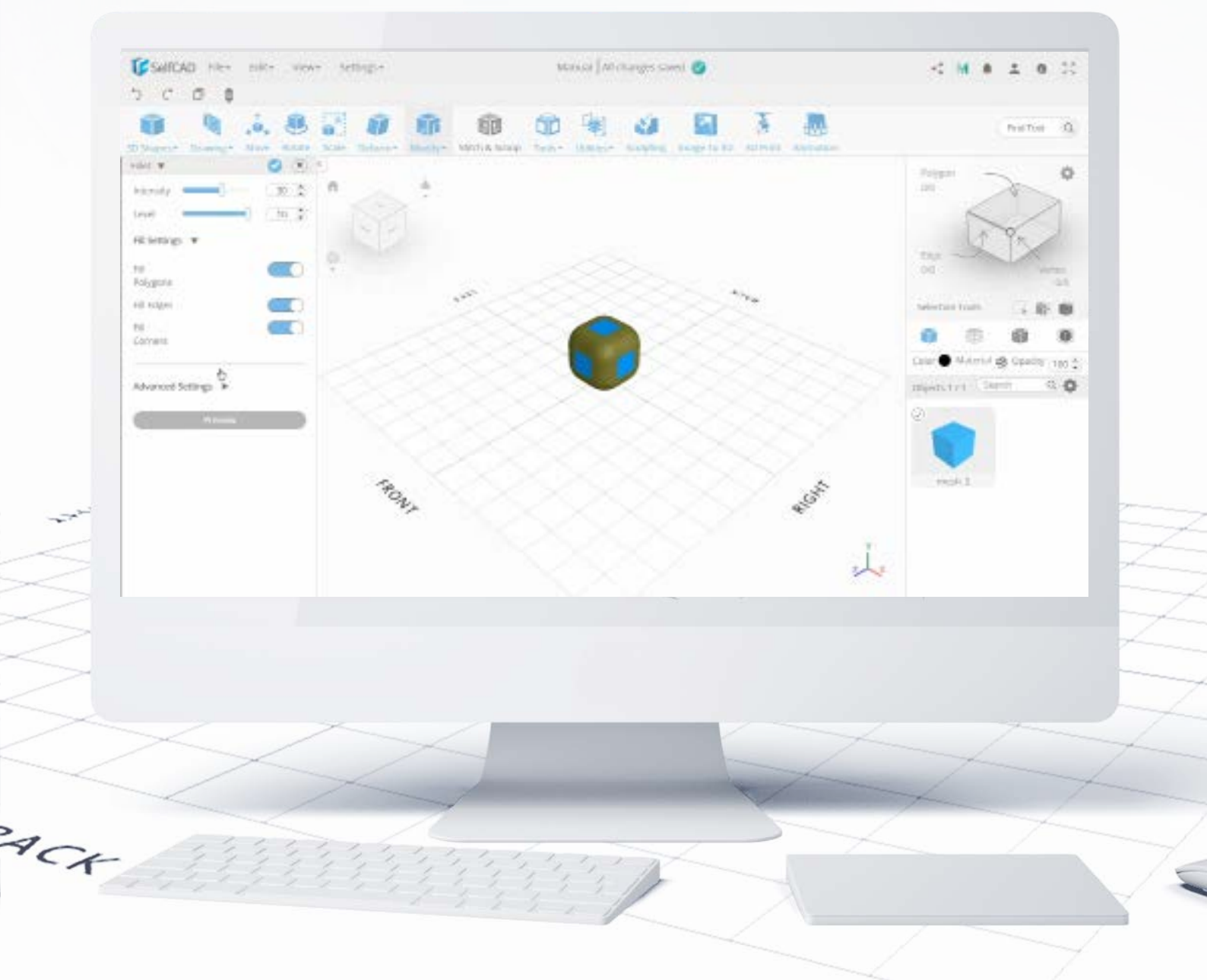
# Modify: Fillet




**Fillet** works by rounding the edges of the figure. There are customizable options to increase its intensity which will change the amount of figure that will be filleted, and its level which sets how rounded the edges will become.

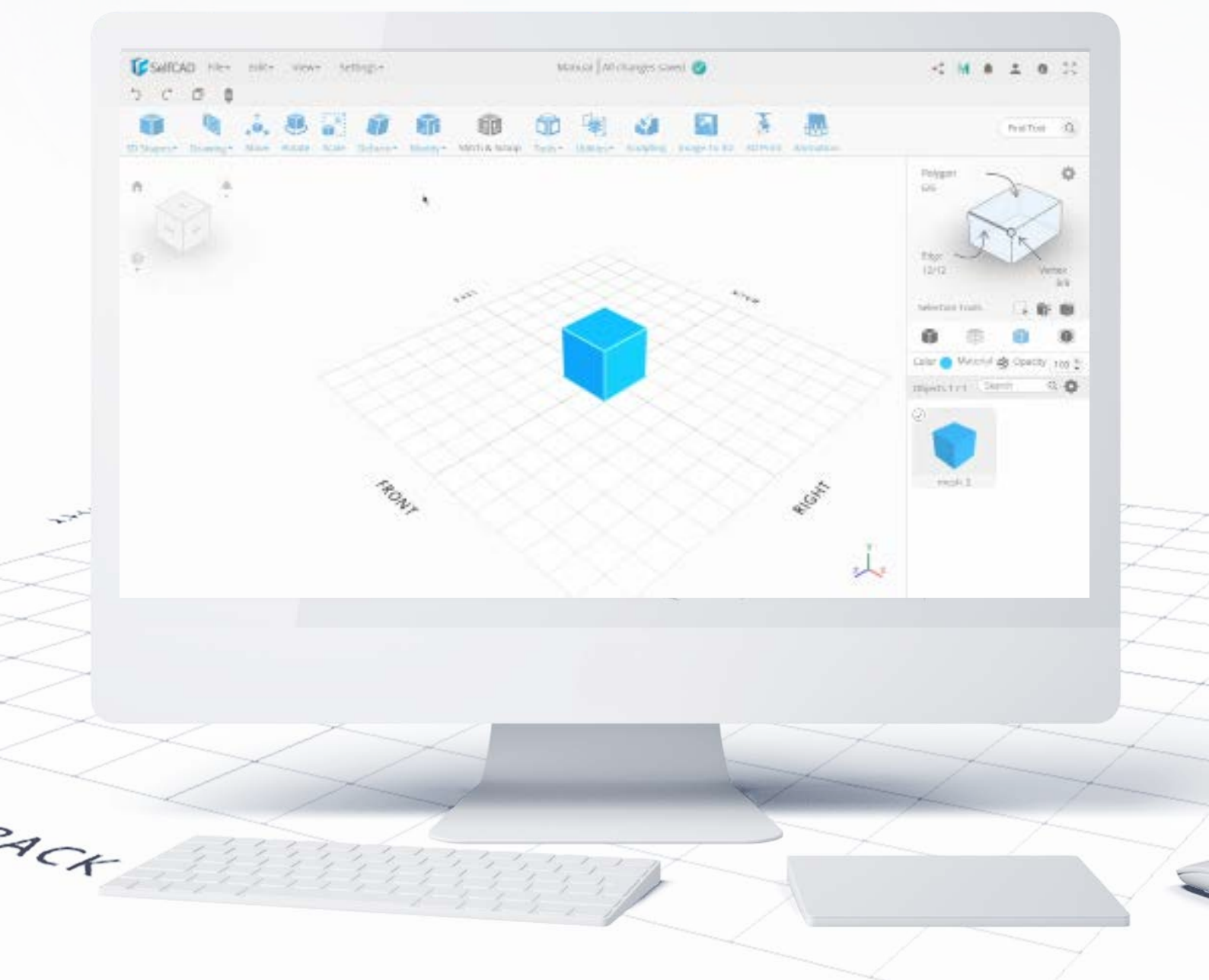
The Fill Settings works exactly like it did the previous tool.

# Fillet: Profile Offset



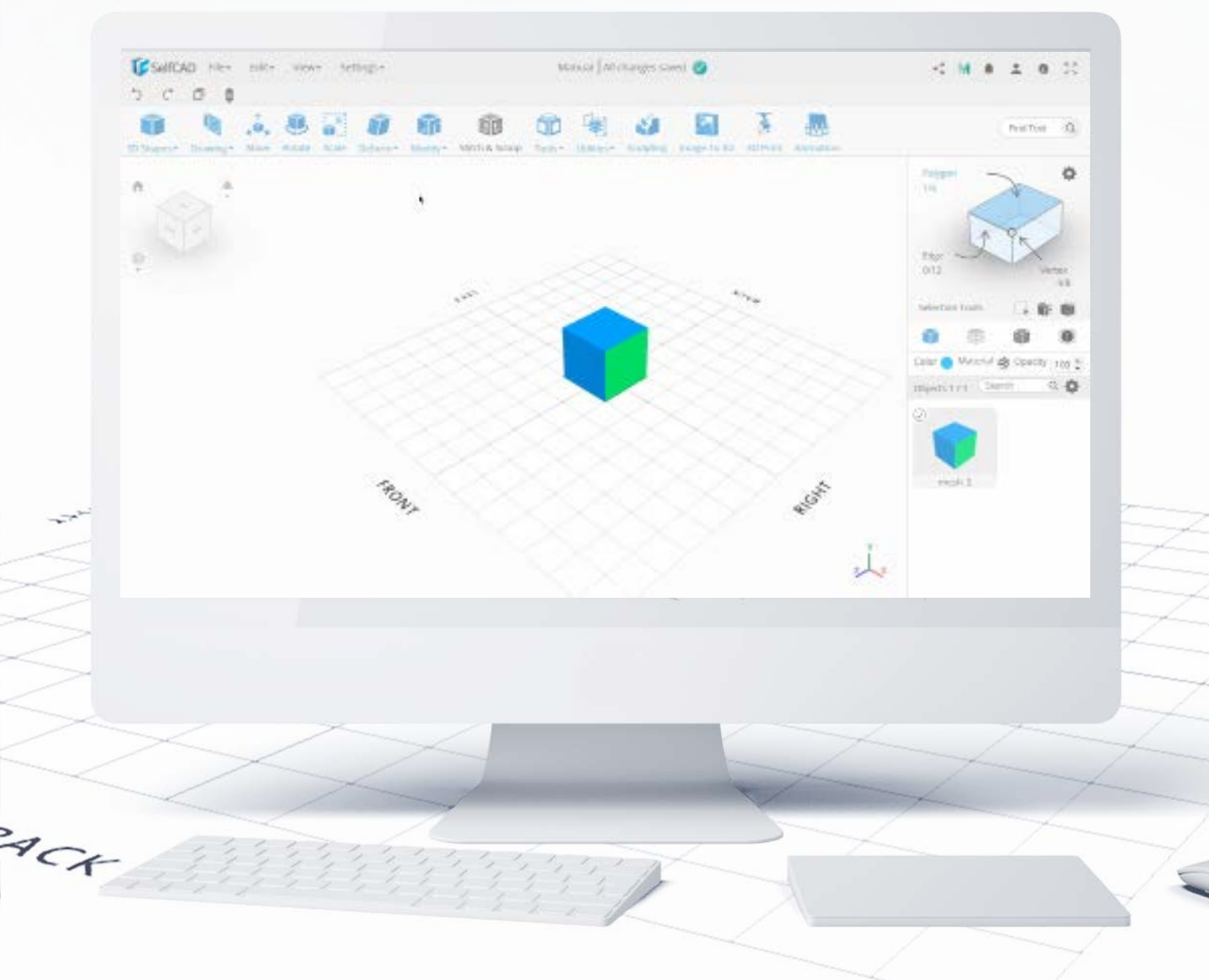

In advanced settings, you'll find the already familiar option to change the intensity to be based on the length or the percentage, as well as a **Profile Offset** setting. With this, you're able to select the direction of the Fillet. Set it to a negative value to round the edges inwards, and to a positive to expand the rounded edges outwards.

# Modify: Round Object



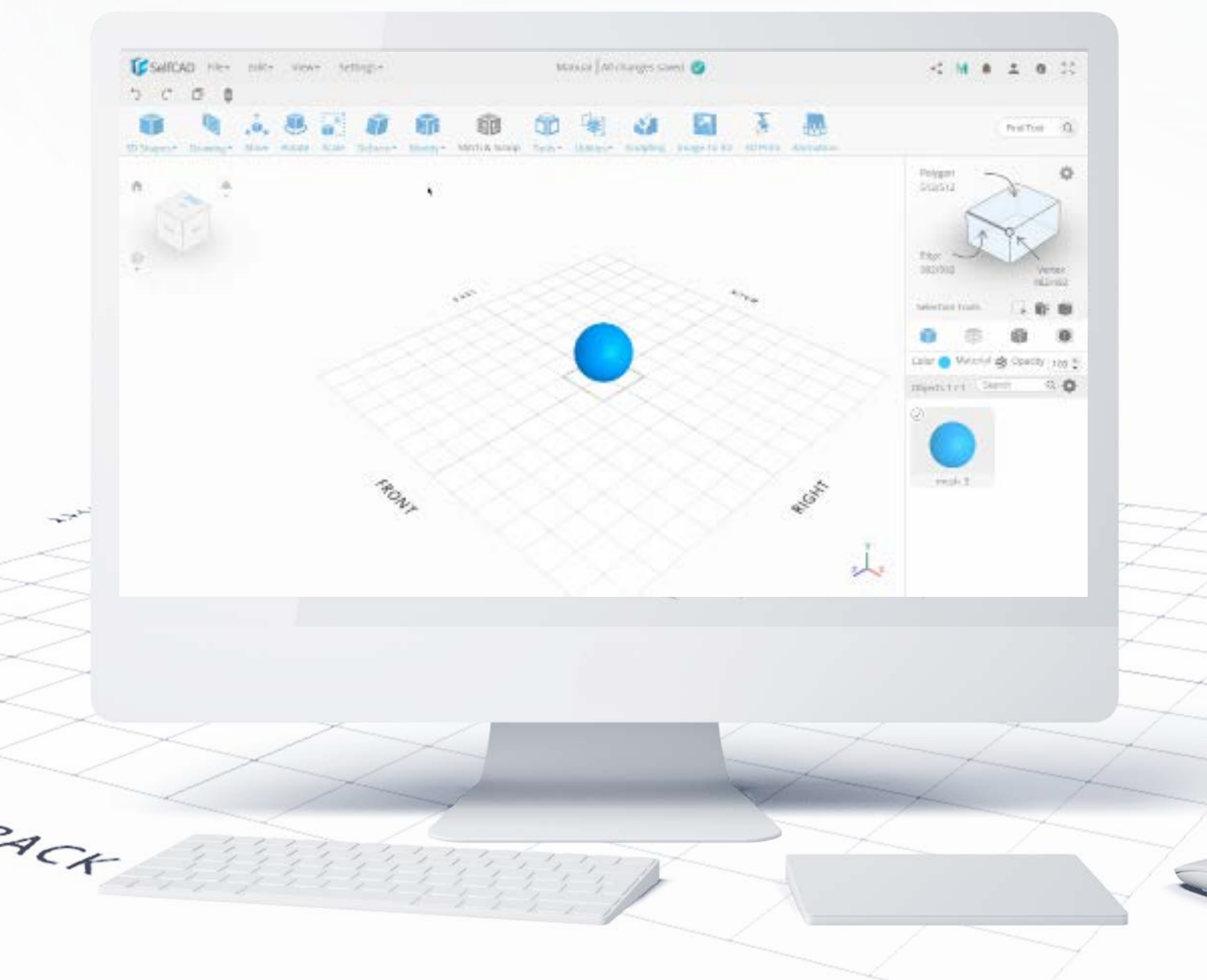

**Round Object** is somewhat similar to Chamfer, but it's not restricted to rounding just the edges of a figure, but the figure as a whole. By increasing the level of Smoothness your figure will become more and more rounded. The advanced option called Linear allows you to simply smooth the surface by adding detail to the figure without changing its shape.

# Round Object – Round Polygon



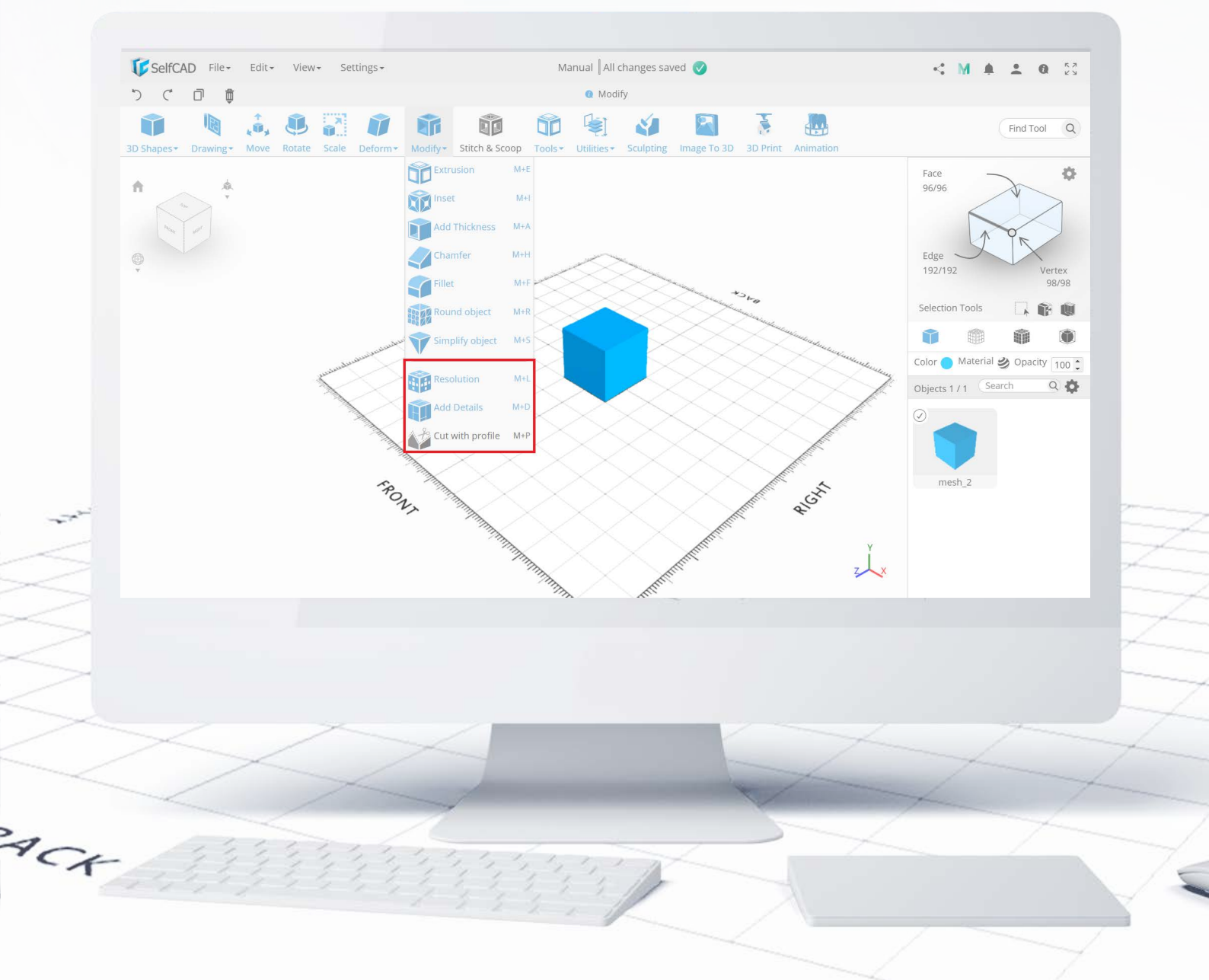

You can also round just parts of the objects - simply select a polygon you'd like to round and use the tool. In the animation above I've shown that you can round a part of the cube while leaving one side flat as a sort of a base.

# Modify: Simplify Object



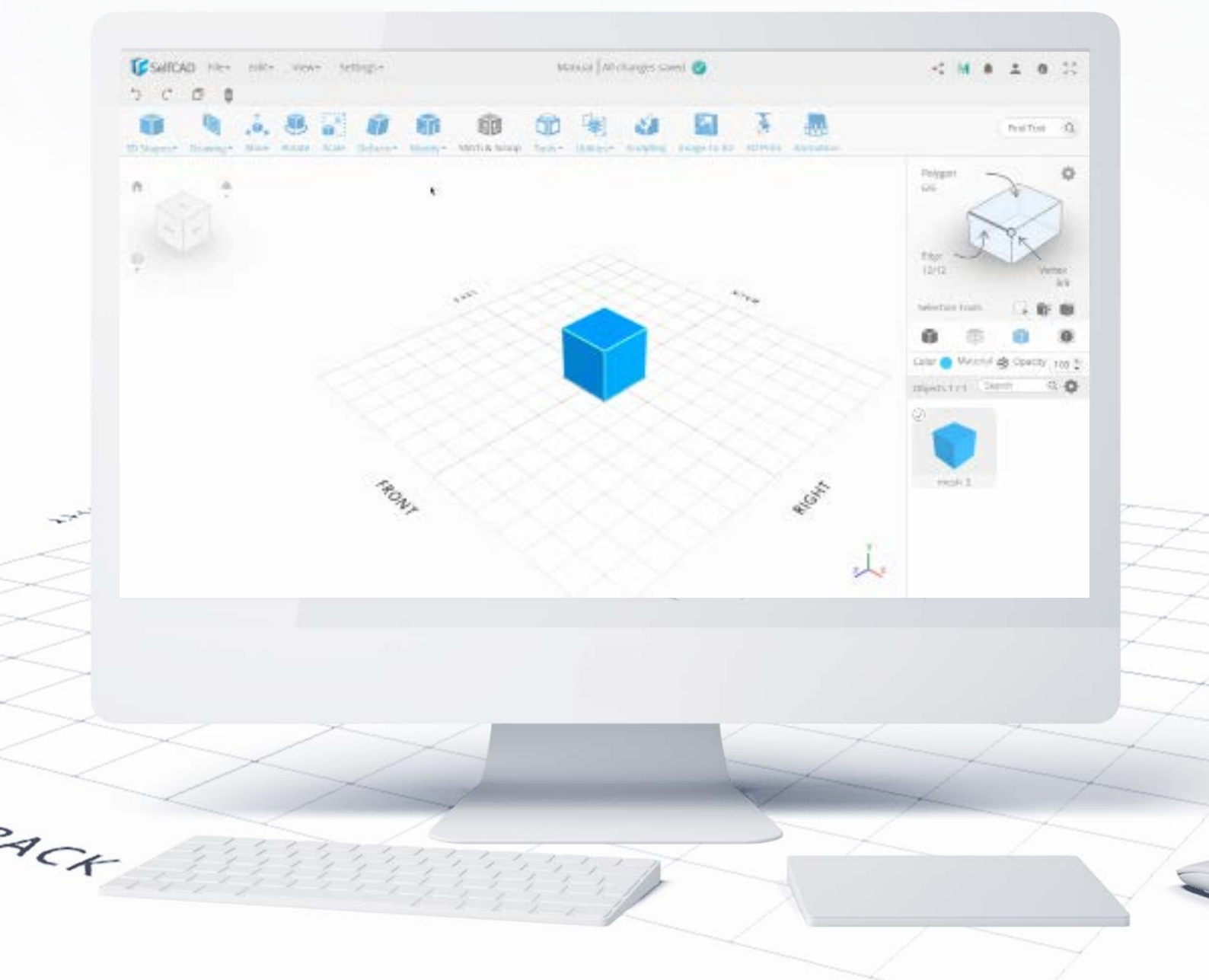

**Simplify object** works by directly deleting polygons from the figure. You can see that after using this tool on a simple sphere, it turned into something cruder. At some point, the original sphere would be turned into a single, flat polygon (2D shape). It goes without saying, that the less complex the figure, the faster it will be reduced to a single polygon.

# Modify: The Second Section



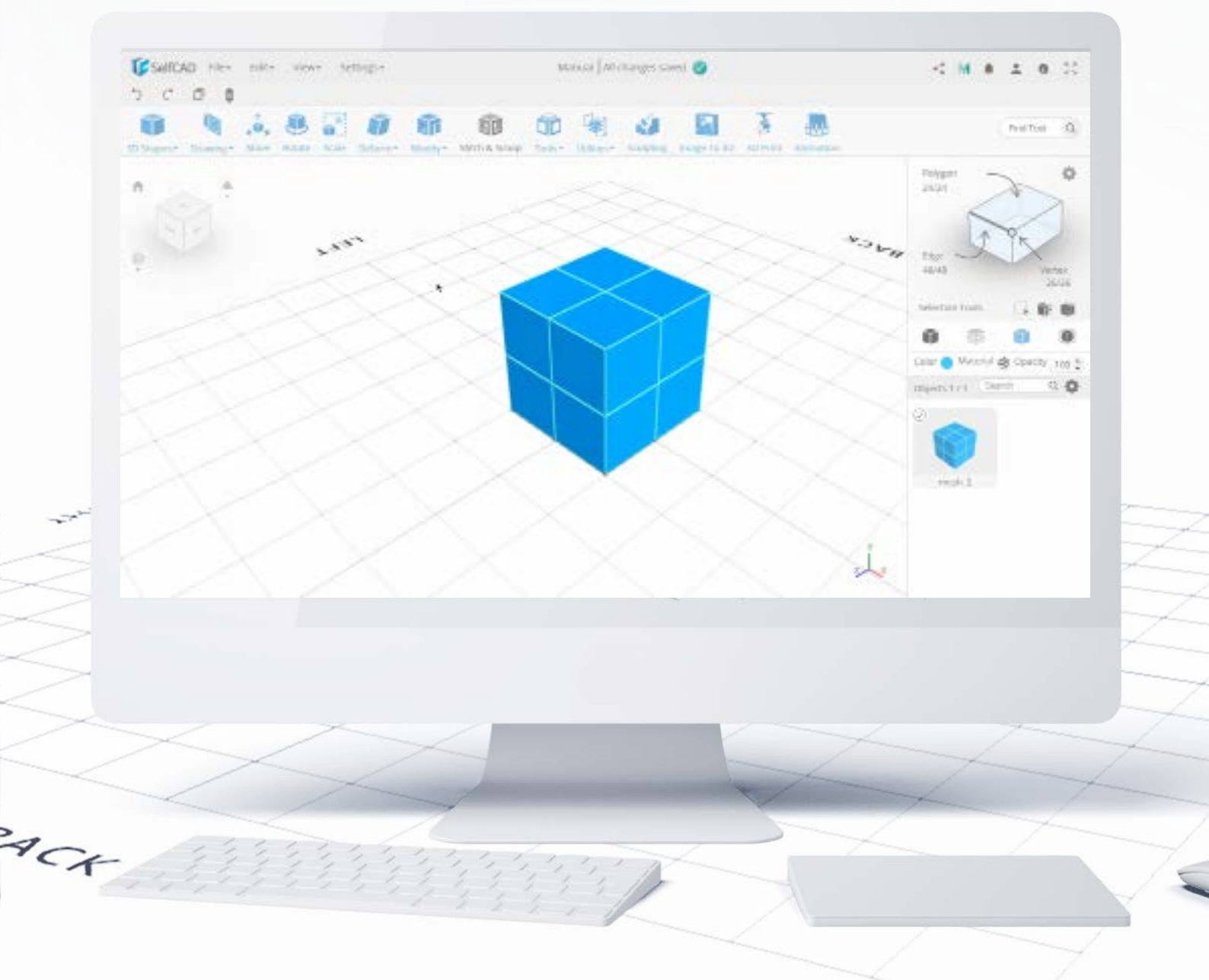

The tools below the divider don't change the shape of the model, but they change the shape and the number of segments that the figure consists of.

# Modify: Resolution



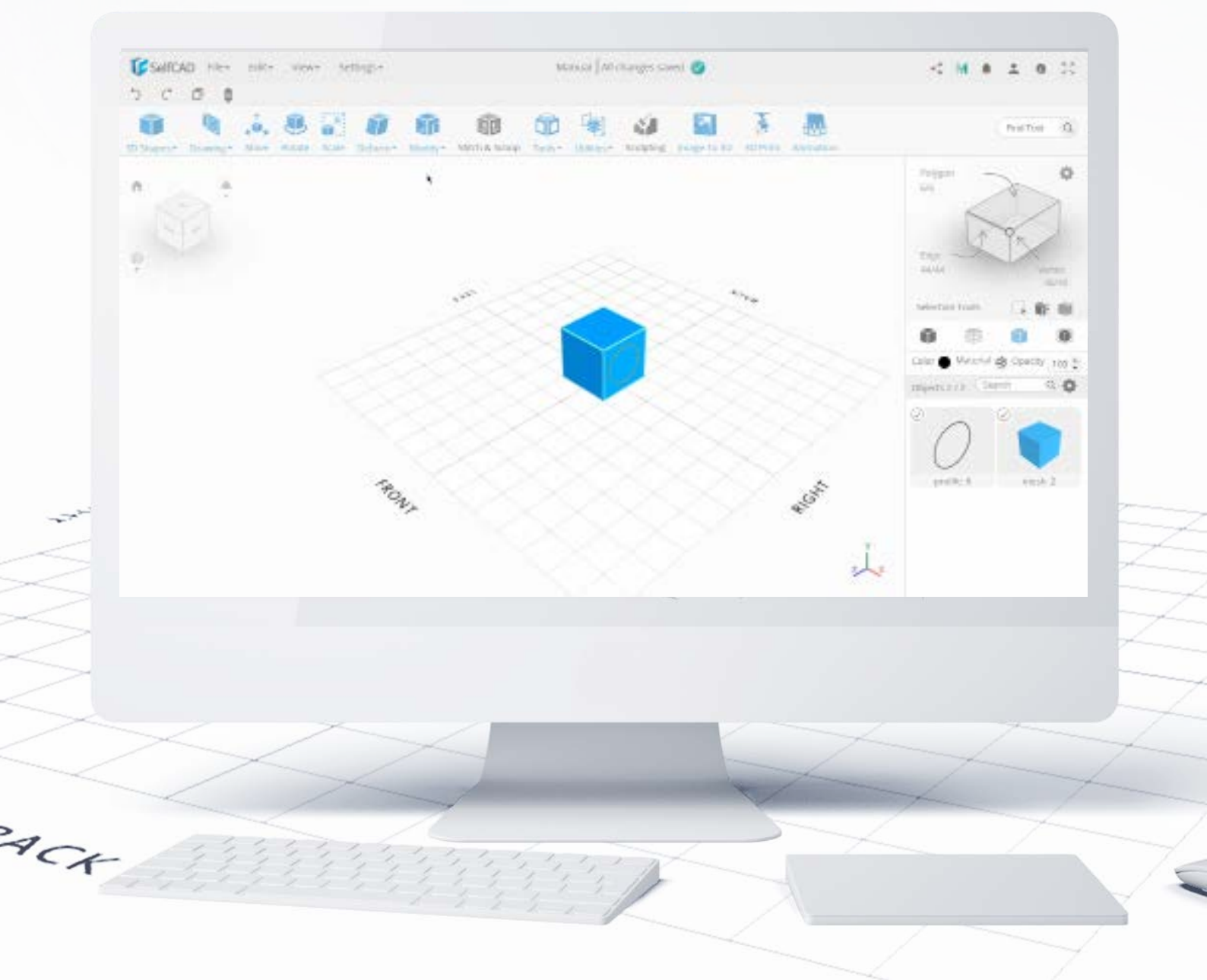

This tool allows you to change the resolution of a selected 3D Model (or its Polygon). There is only one slider to this tool, and by moving it, you'll either increase or decrease the number of segments that the figure consists of. I said before, that models with more segments can be modeled in a more precise manner - this tool is perfect for adding and removing the complexity, and in contrast to the Simplify Object tool, the **Resolution** does not change the geometry of the model.

# Modify: Add Details



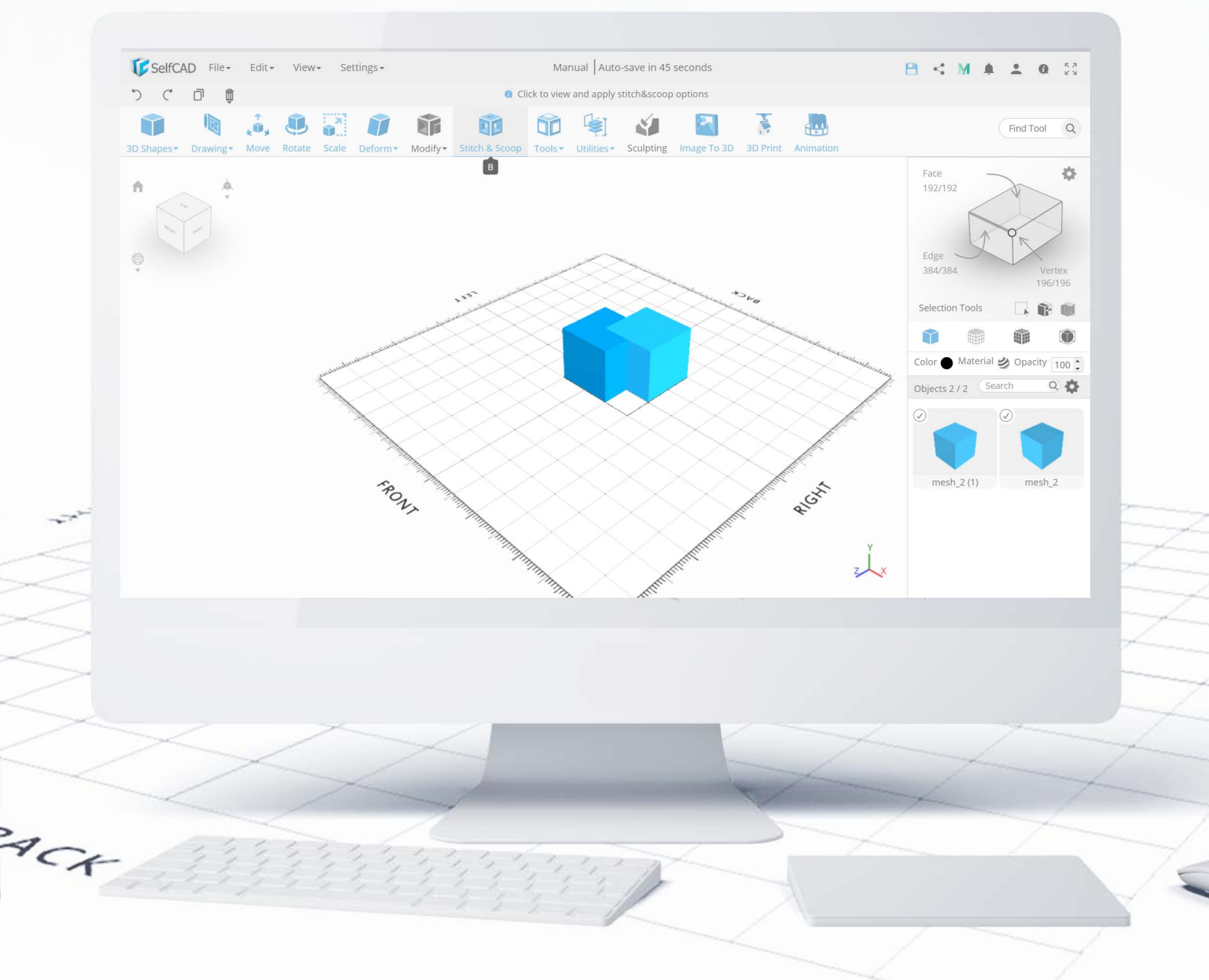
**Add Details** allows you to manually increase the level of detail of the figure, by splitting existing faces into smaller ones. You can do it either by clicking on the figure to add Vertices or by dragging an existing edge to its neighboring face to create a new edge there. The automatic loop finding will do its best to add edges all around the model.

# Modify: Cut with profile



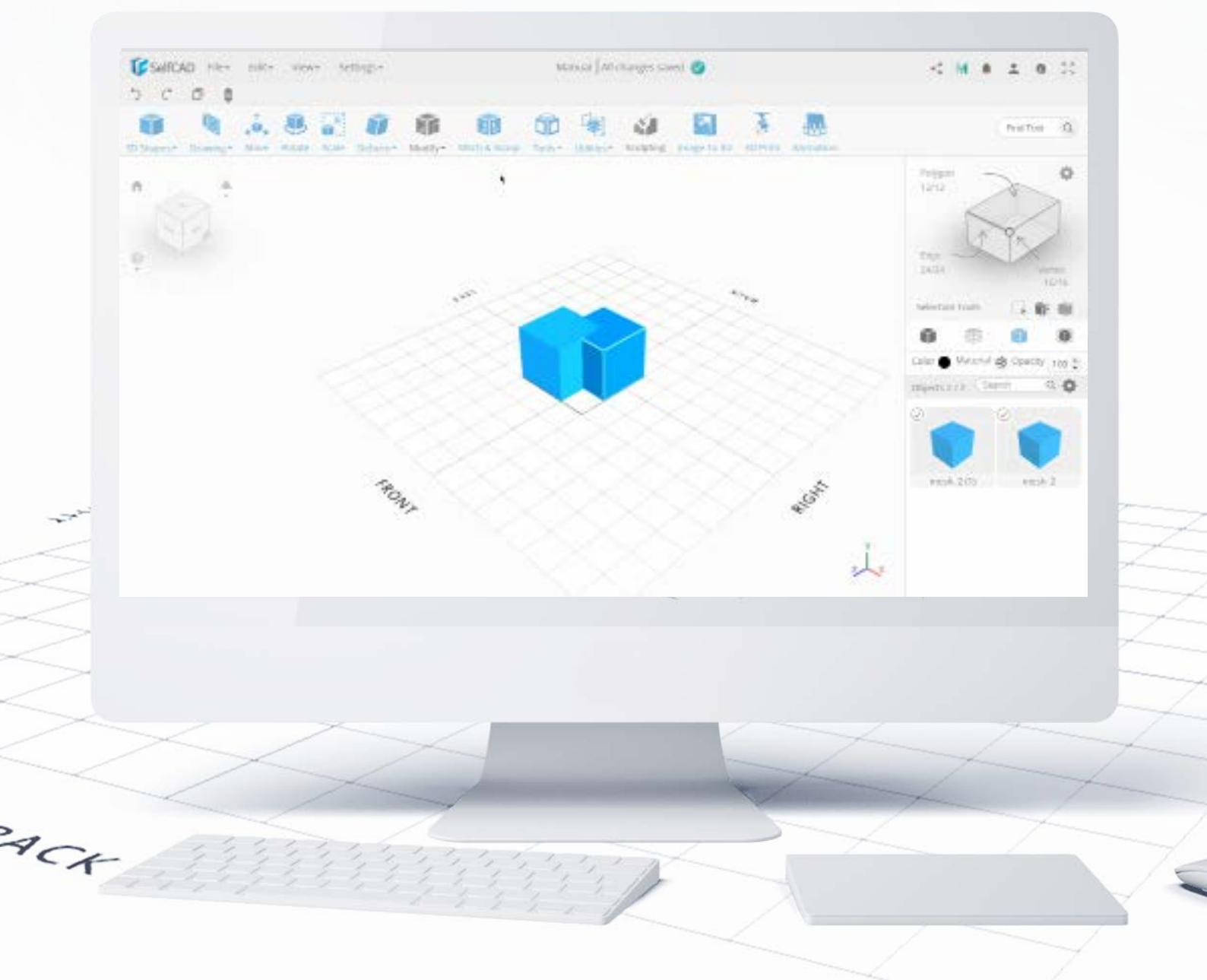

This tool allows you to engrave unique shapes on your figure. To use this successfully, you need to draw a 3D Sketch first, and then use the tool to engrave said sketch onto the model. This way, you'll create a unique profile that you can later model in separation from the rest of the figure.

# Model: Stitch & Scoop



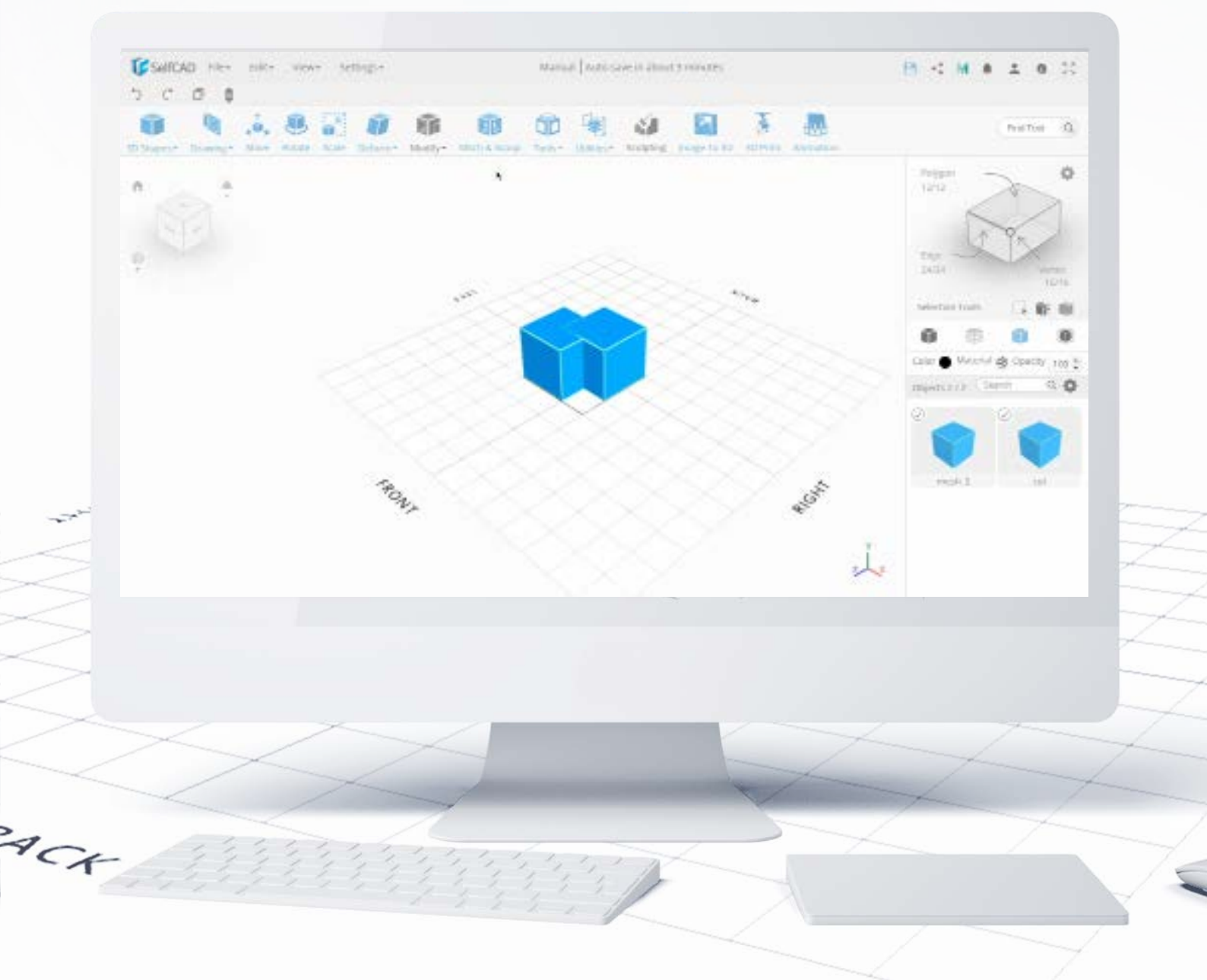

Next in line are the boolean operations, in SelfCAD called **Stitch & Scoop**. Tools that you'll find in this category don't really change the way how your model looks by themselves - they need another 3D Shape to make the change, and it's this second model that's responsible for how that change is going to look.

# Stitch & Scoop: Union



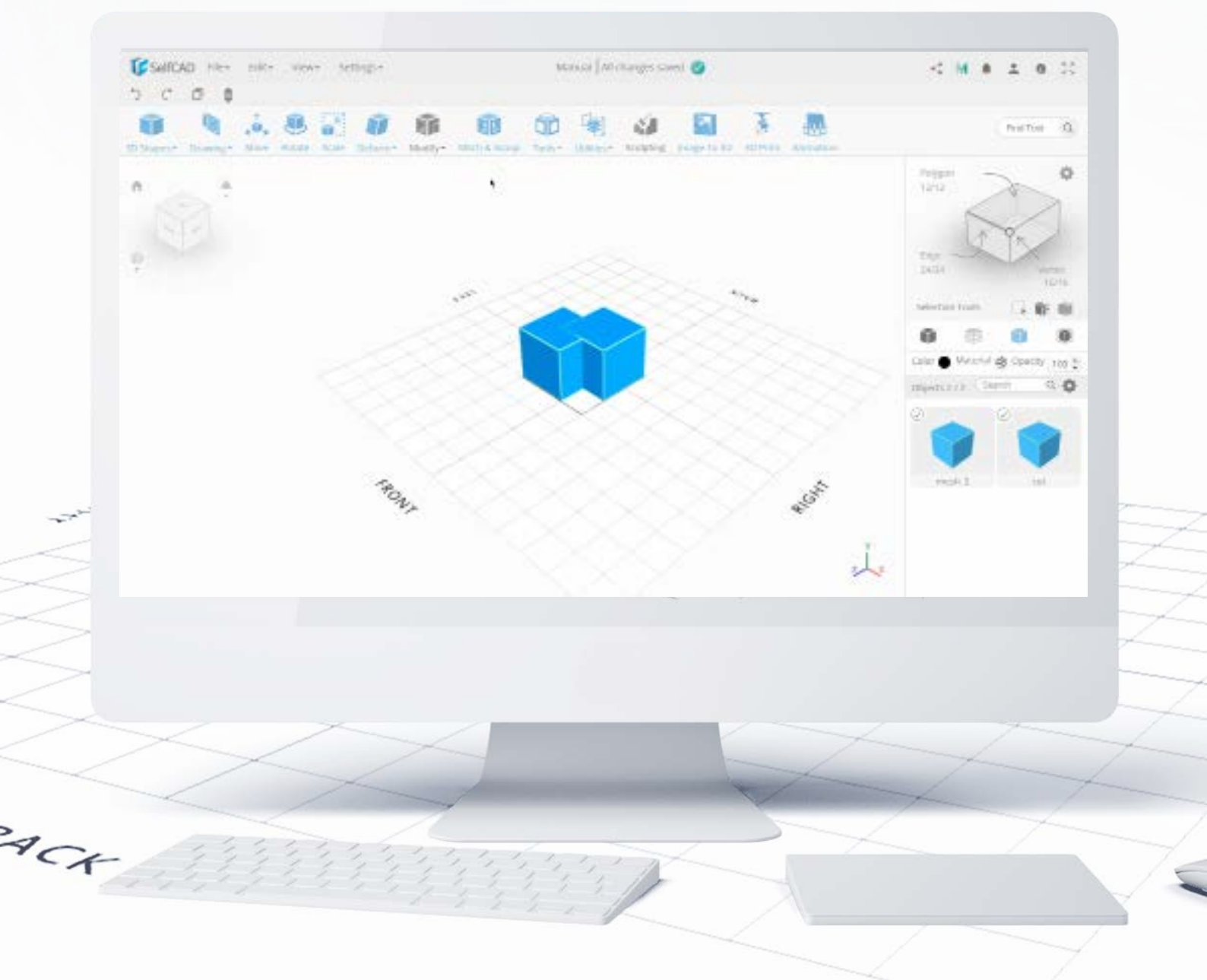

**Union** connects two (or more) objects into one and completely changes the geometry of the now united figure. It makes sure, that there are no edges left from previous figures hidden inside the new model, that could later interfere during printing.

# Stitch & Scoop: Difference



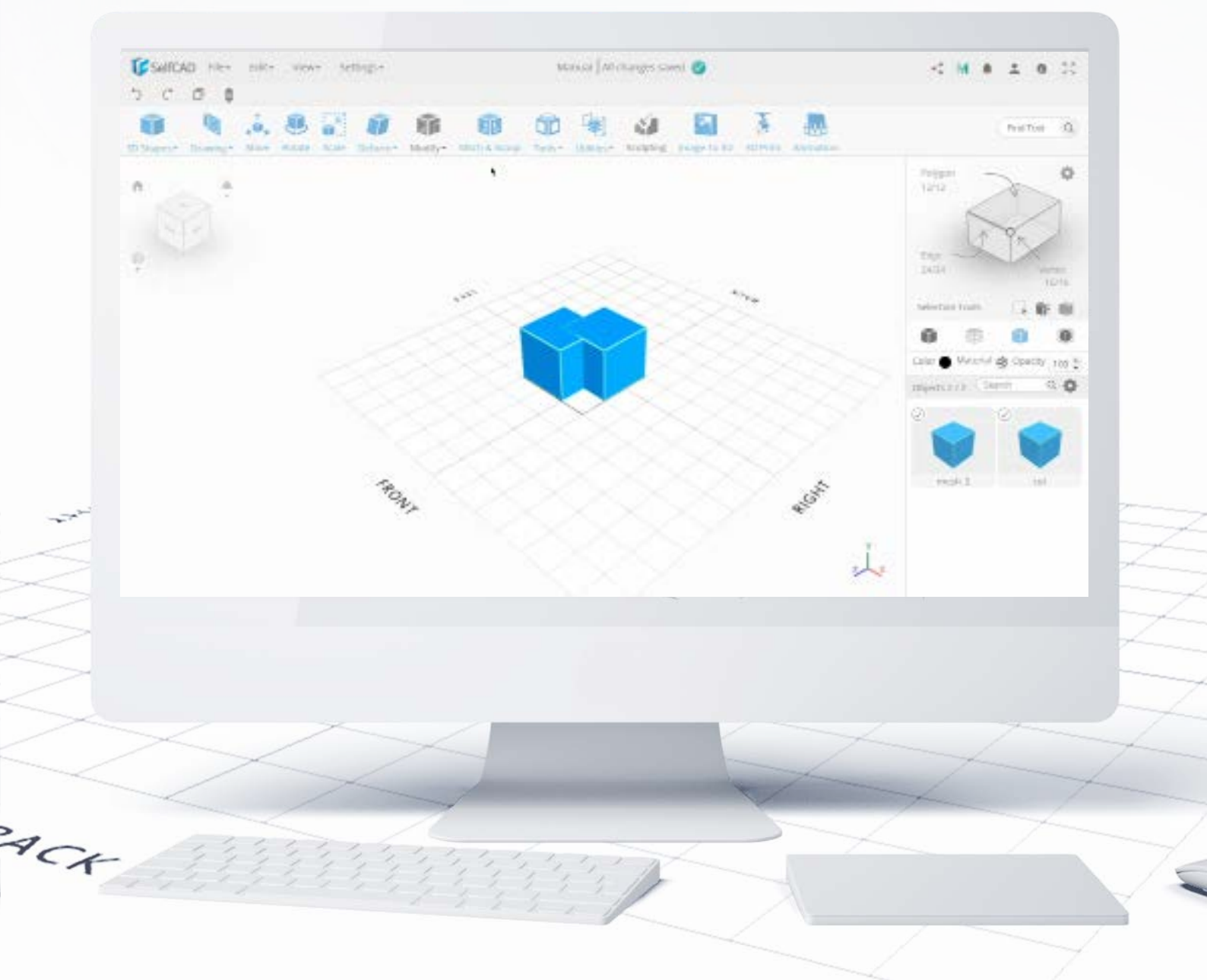

**Difference** allows you to extract the shape of a model from another figure. When you choose this option, the software will ask which figure should be subtracted. And of course, the software supports subtracting multiple shapes at the same time.

# Stitch & Scoop: Exclusion



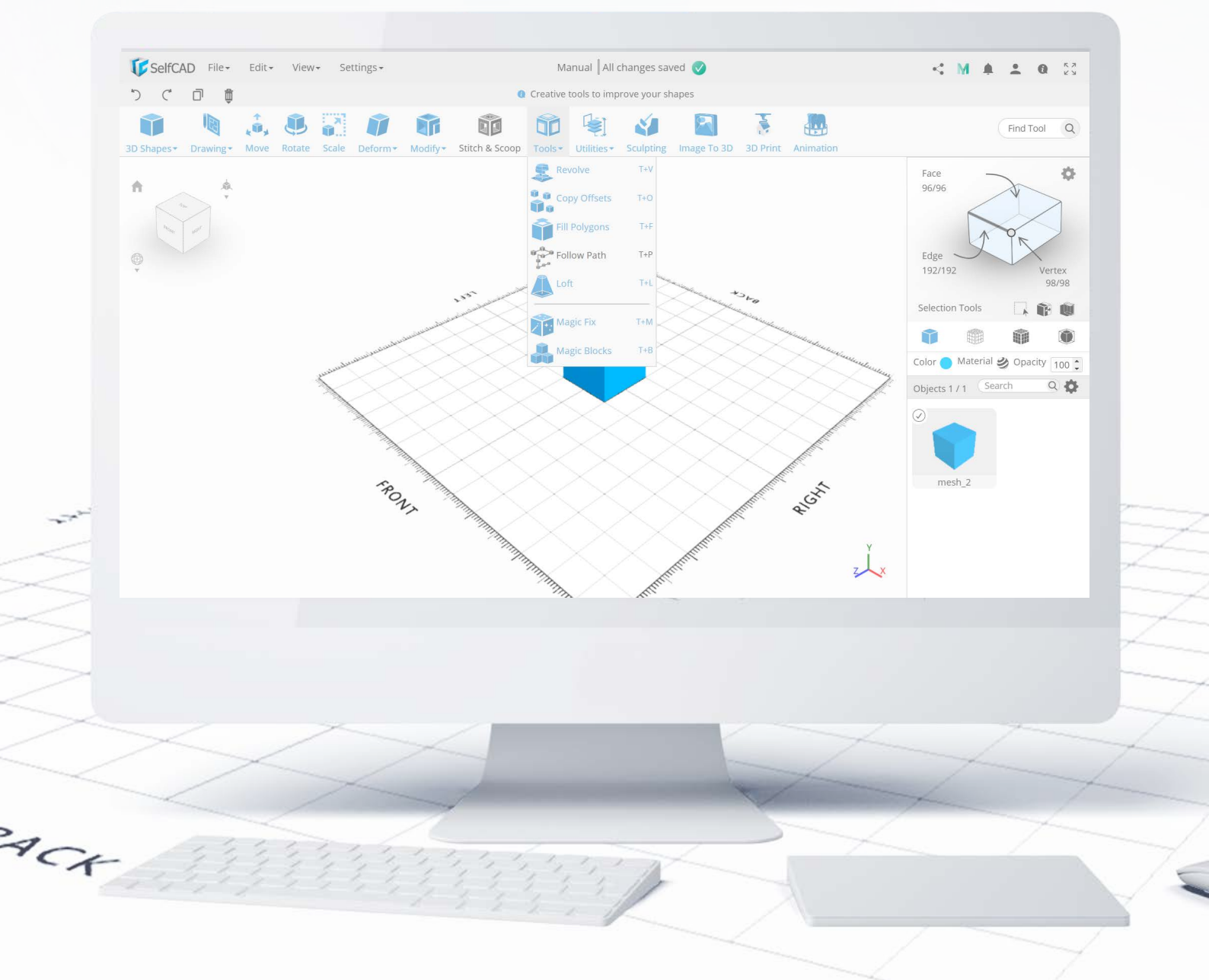

**Exclusion** simply cuts out the part where the figures are intersected.

# Stitch & Scoop: Intersection



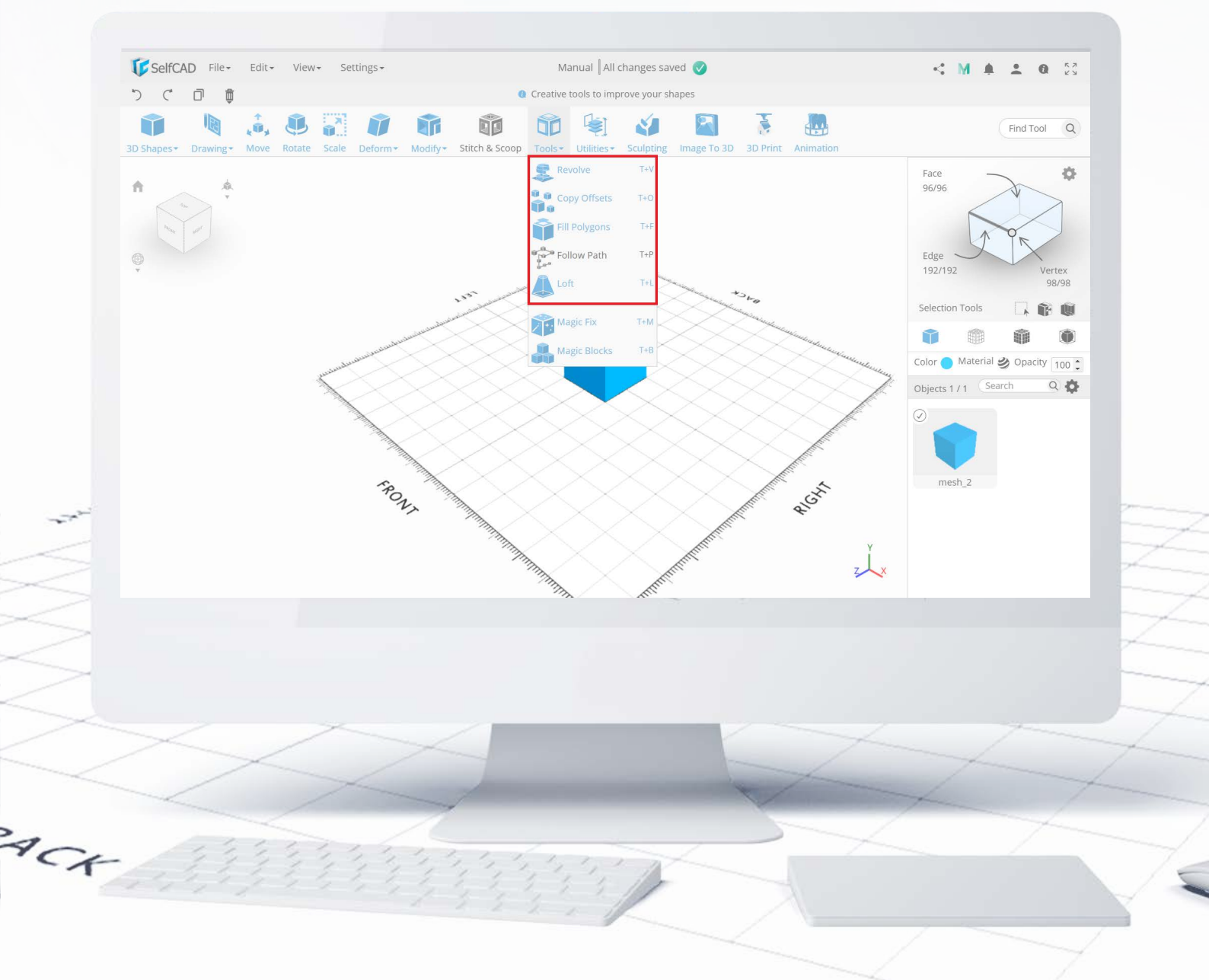

**Intersection** is the opposite of Exclusion - it cuts out everything other than the intersected part of the figures.

# Model: Tools



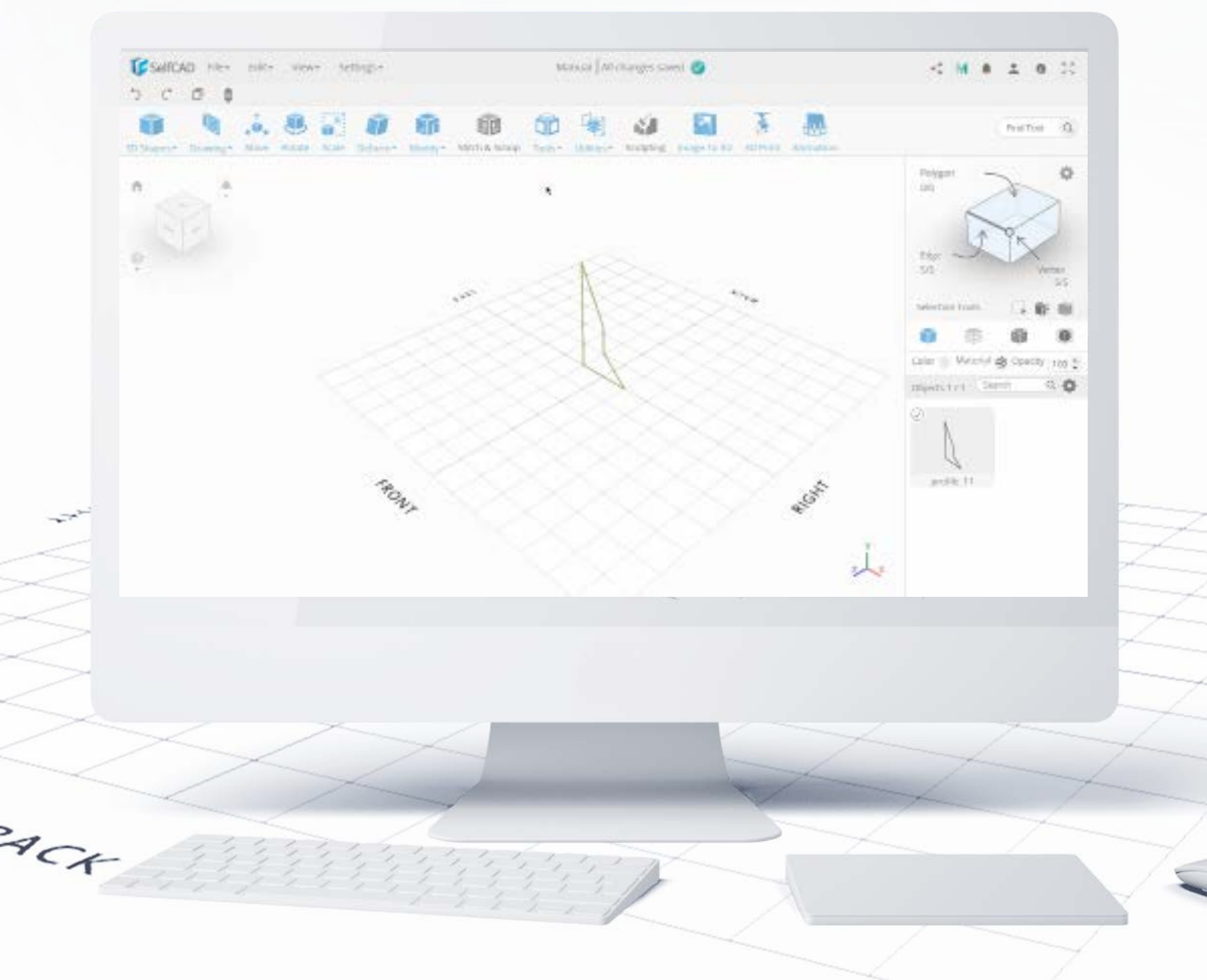

Category **Tools** is dedicated to working on primitives (simple shapes) and sketches and transforming them into much more complicated designs, as well as rebuilding your objects.

# Tools: The First Section



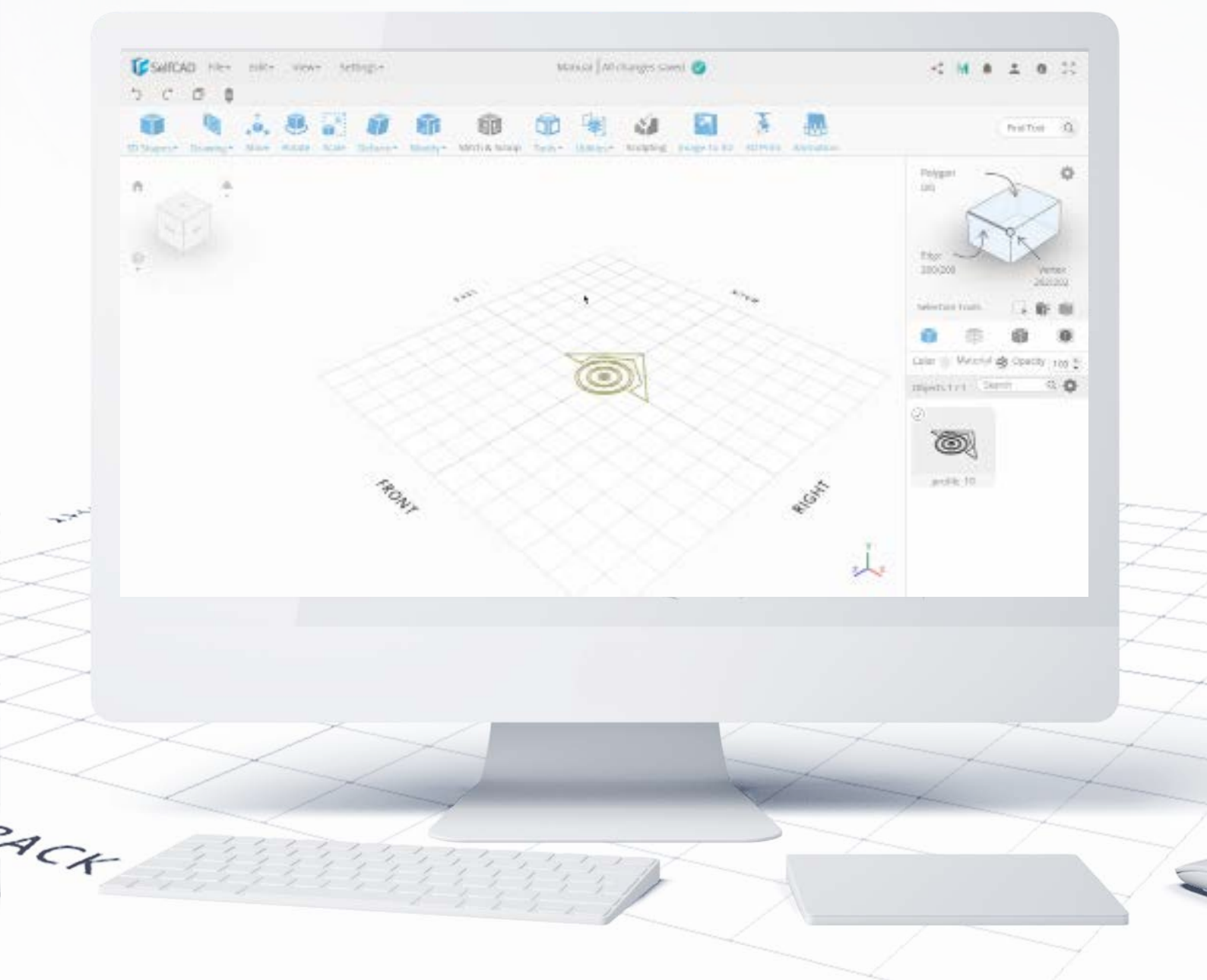

Tools above the divider are dedicated to working on, and improving primitives, drawings, and sketches, and turning them into more complex 3D models. They focus mostly on connecting profiles, filling empty spaces in polygons and arranging them in specific patterns.

# Tools: Revolve



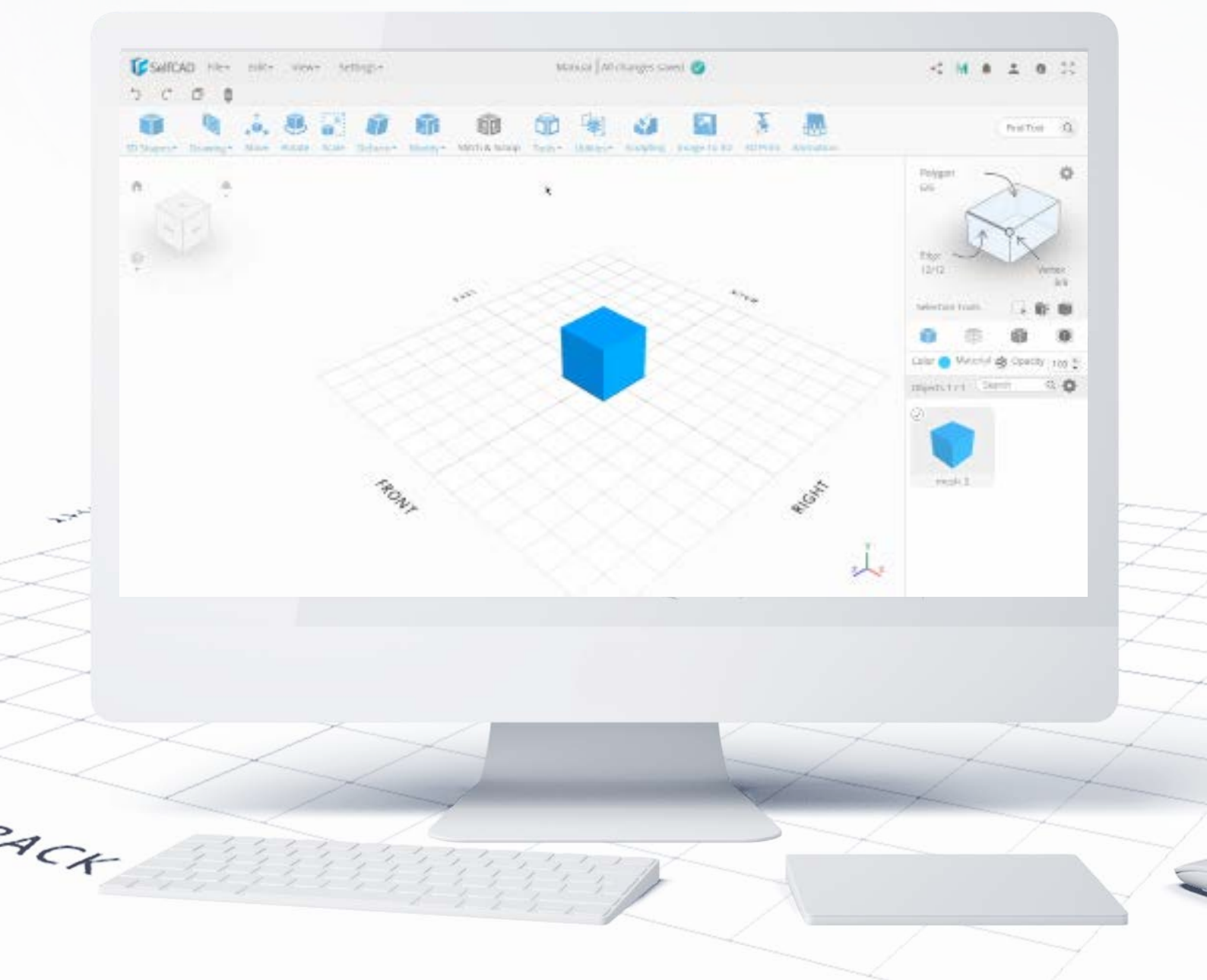

This tool uses a shape or a profile as a base and revolves it, creating a solid 3D model. Of course, there are options to customize it: starting from changing the angle of the revolved figure to its number of segments, but the most important feature is **Revolve Around Edge**, which allows you to select an edge around which the object will be revolved. As you can imagine, choosing different edges will drastically change the shape of the revolved model.

# Revolve: Revolve with holes



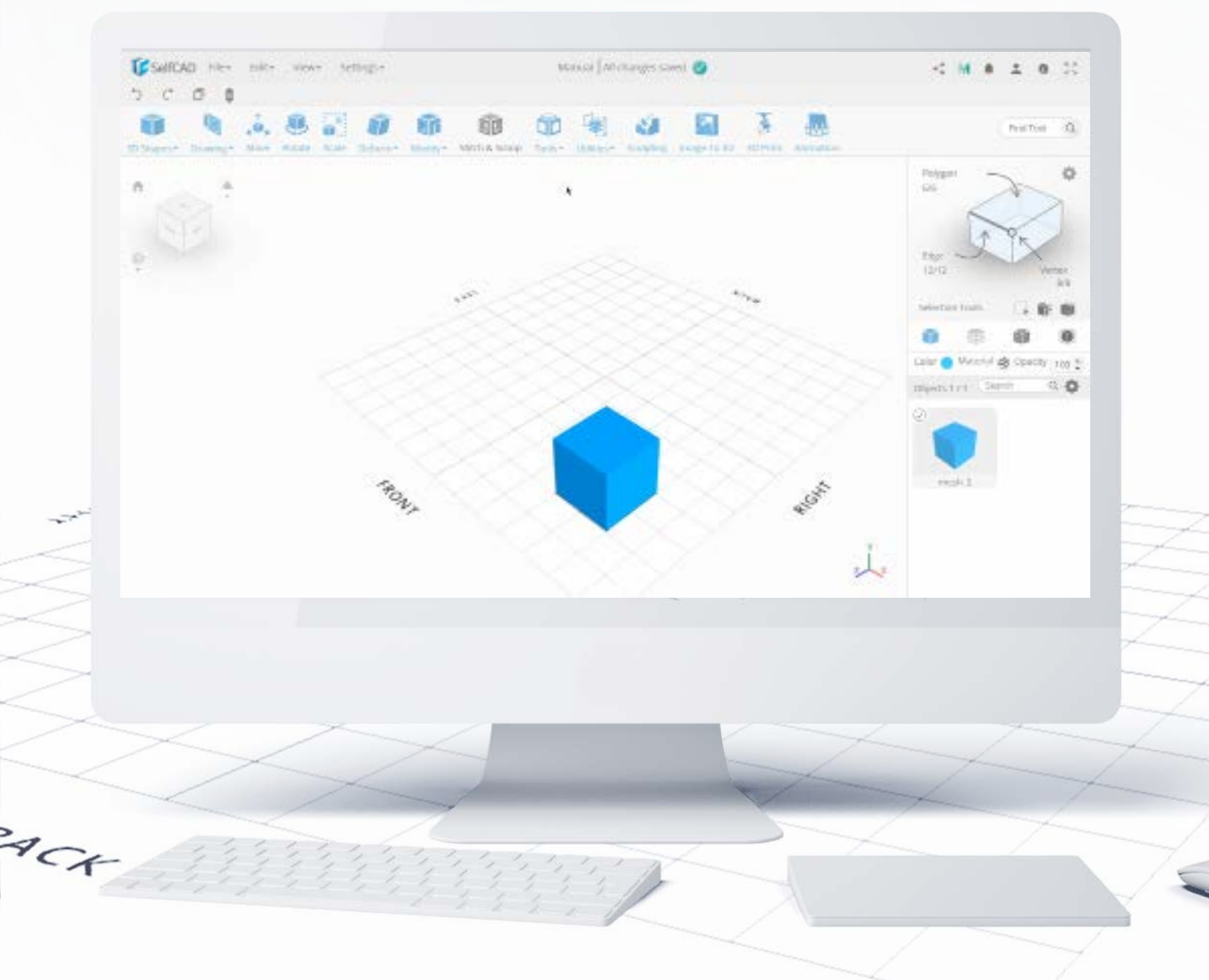

You can use the Revolve tool to create more complicated designs as well.

# Tools: Copy Offset



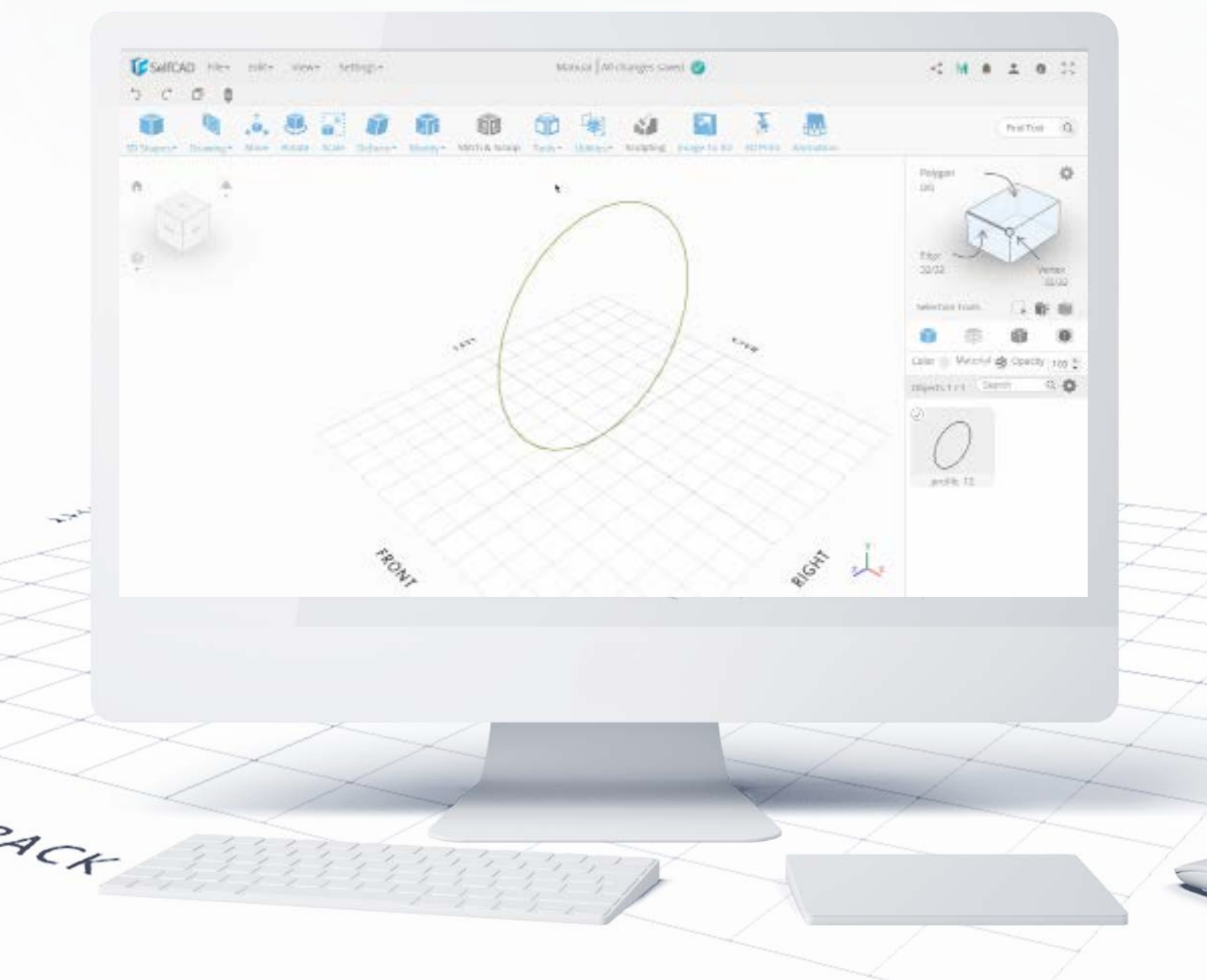

This tool creates a copy of an object with the possibility of setting up a precise distance between the copy and the original. There is an option to set the number of copies that the software will create, in which case the copies will be distributed evenly between the original, and the copy with an offset. Each of the added copies becomes a separate object, you naturally you'll be able to model each of them individually.

# Copy Offset: Add Option



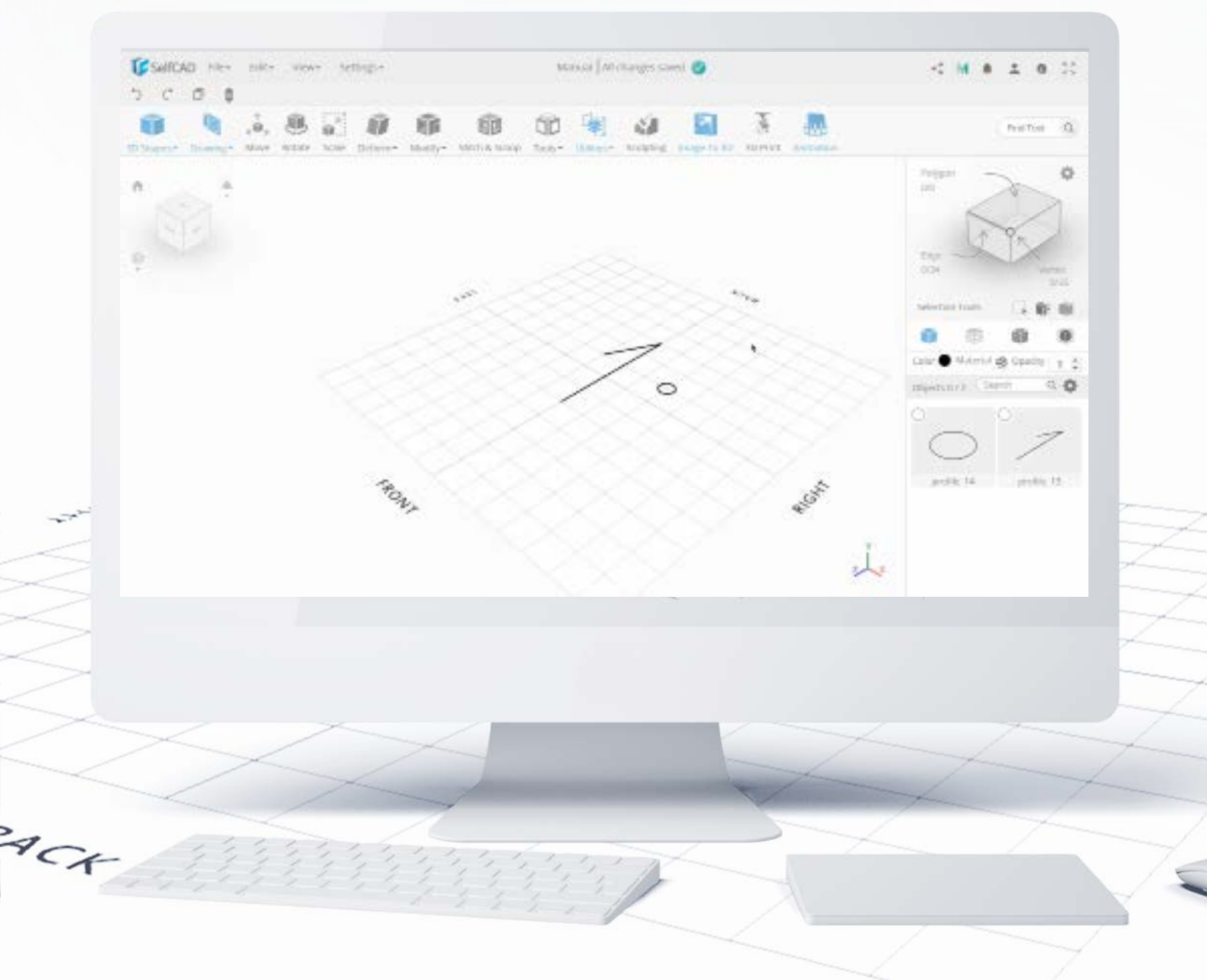

You can also use the **Add Option** feature to add more effects to the copied figures. As you can see, most of the available options have already been explained in the Transform section or in the Deform category. The option that has not yet been explained, however, is the Pivot option, which creates a selected amount of copies around the center of the grid.

# Tools: Fill Polygons



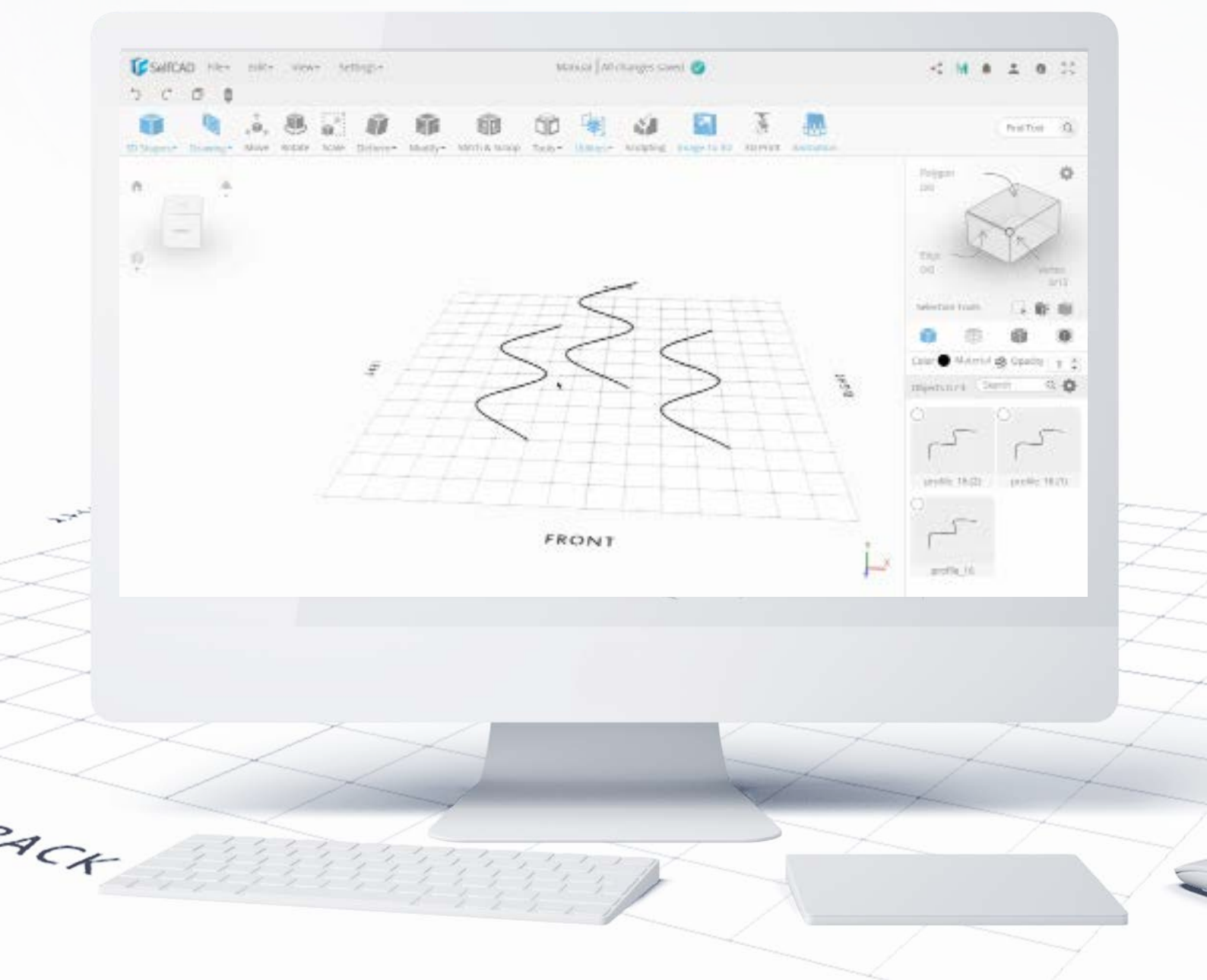

**Fill** tool works exactly how you would expect it to - it fills up profiles, and patches up all the hollow spaces in polygons.

# Tools: Follow Path



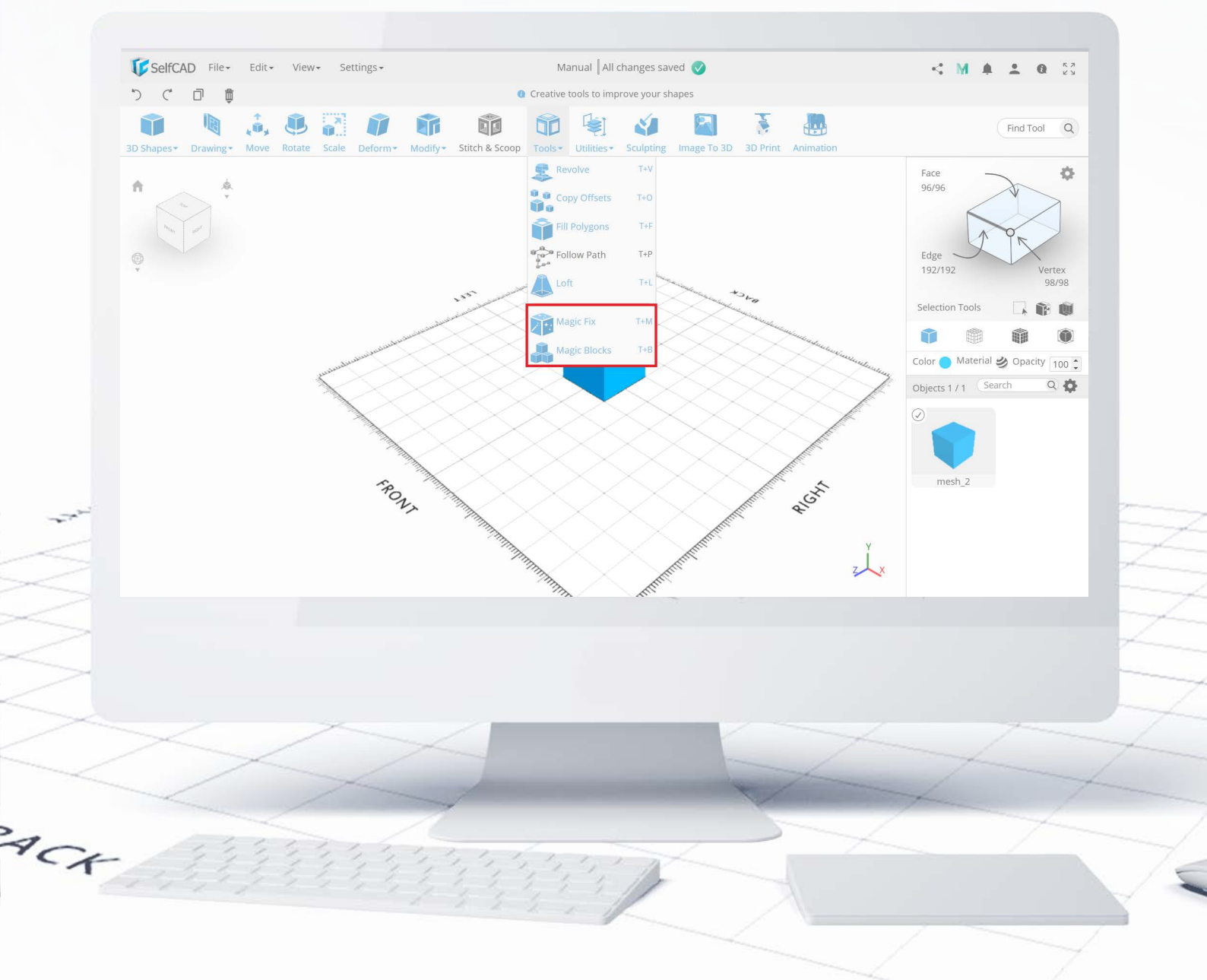

**Follow Path** turns Sketches into 3D Models. There are two steps to use this tool: At first you need to draw the outline of the shape for your figure (in the animation it's the shape resembling number '1'), and then you need to draw another shape that will serve as a profile for the model (I used a small circle). Now it's time to convert those two simple sketches into a 3D model - select the sketch that will serve as a profile first, and then select the sketch that will serve as the shape. Now you can safely use the tool.

# Tools: Loft



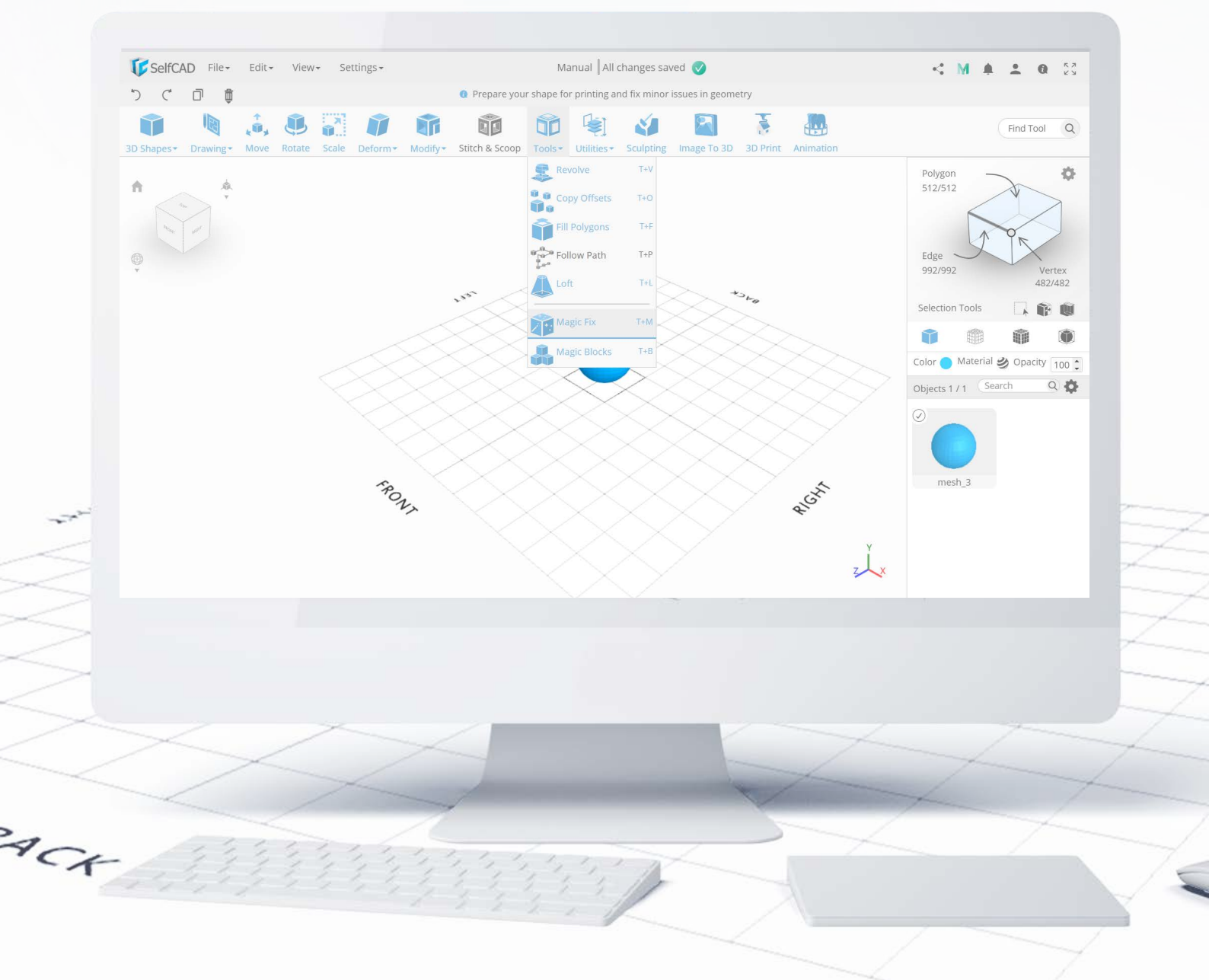

The **Loft** tool creates connections between shapes and profiles - it connects their outlines to create a solid shape. Previously, I said that Sketches serve as a foundation, then you can think that Loft pours the concrete over the foundations. There are a few options to slightly customize the Loft with Fill and Bevel Settings, with which - at this point - you should already be familiar with.

# Tools: The Second Section



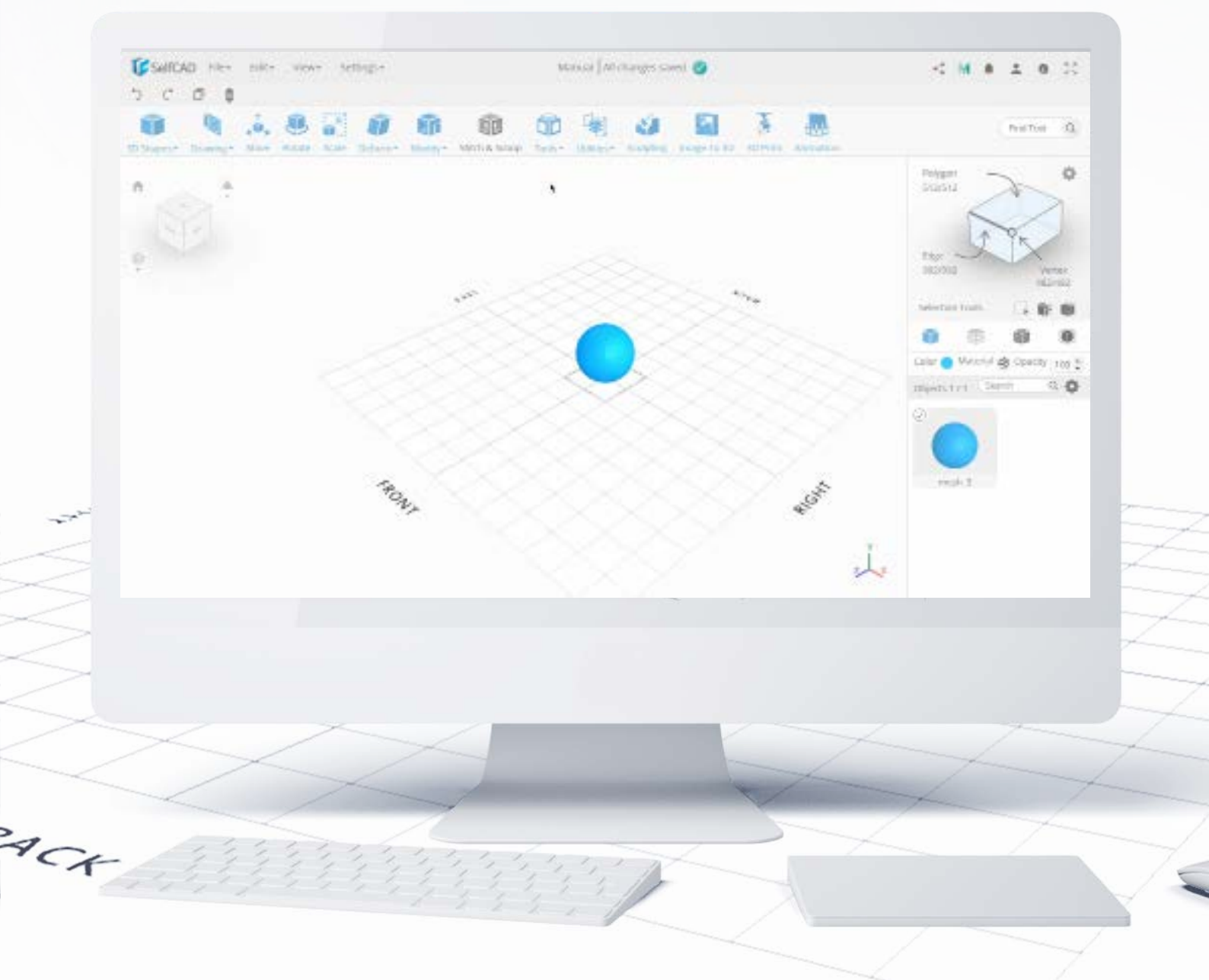

Below the divider, you'll find the tools dedicated to rebuilding models.

# Tools: Magic Fix



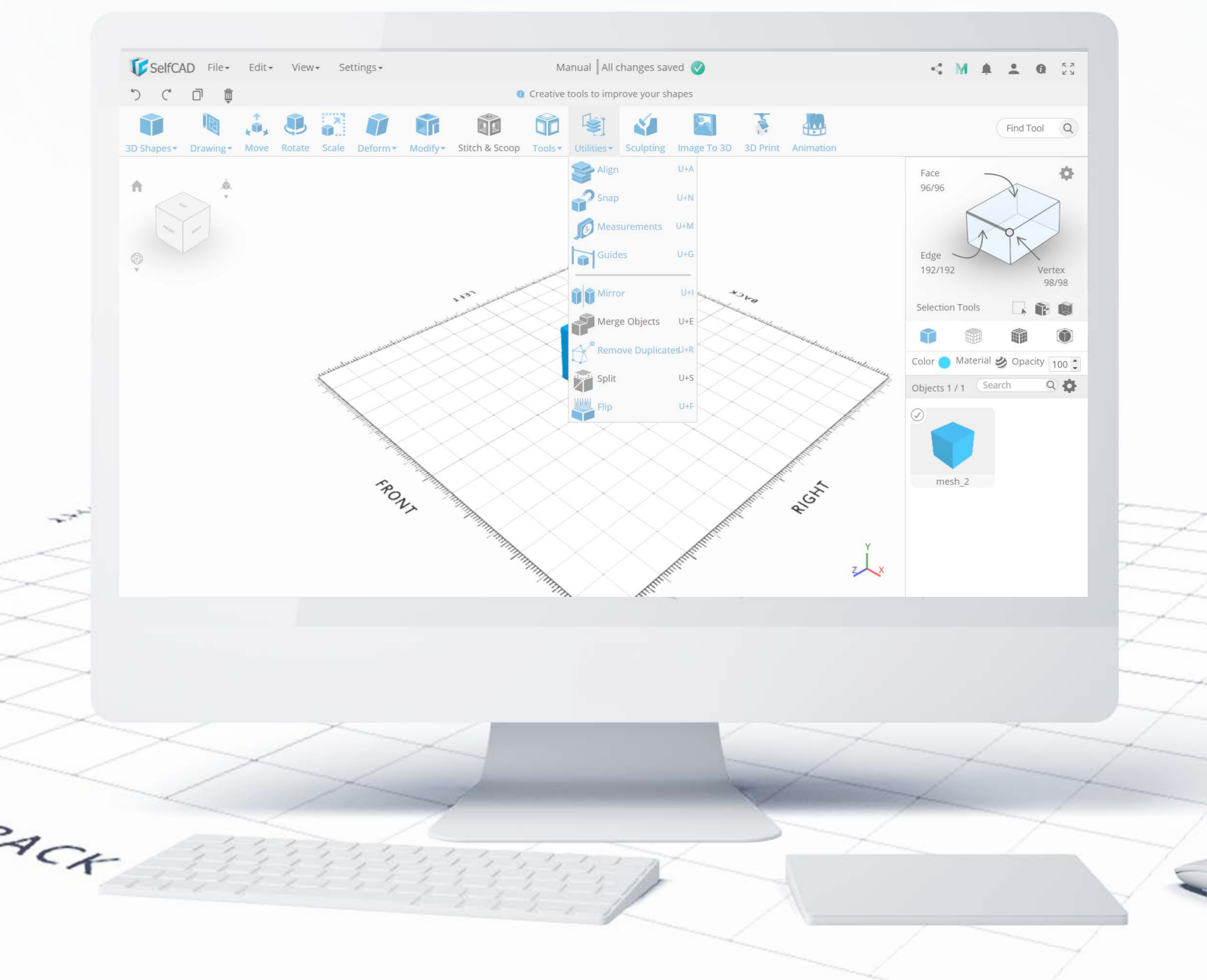

**Magic Fix** is a tool that rebuilds your objects by removing small, unprintable details. It's a good practice to use this tool before printing - this way you'll always be sure that there are no problems with the geometry of your project.

# Tools: Magic Blocks



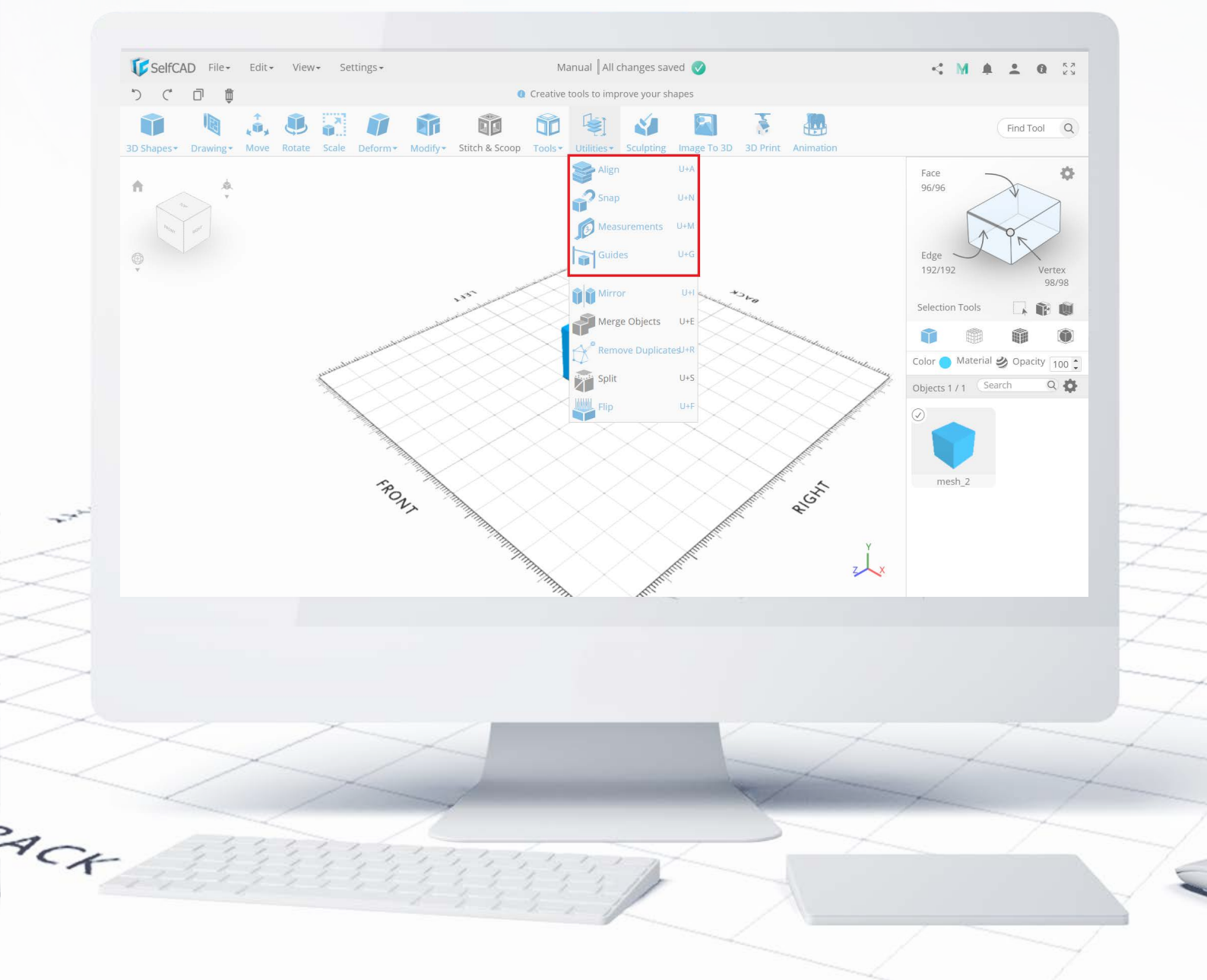

**Magic Blocks** rebuild your objects by replacing all flat surfaces with cubes. By manipulating the Block Density you're able to choose into how many cubes each Face will be split into - the bigger the density, the smaller the individual blocks and more detailed the overall shape.

# Model: Utilities



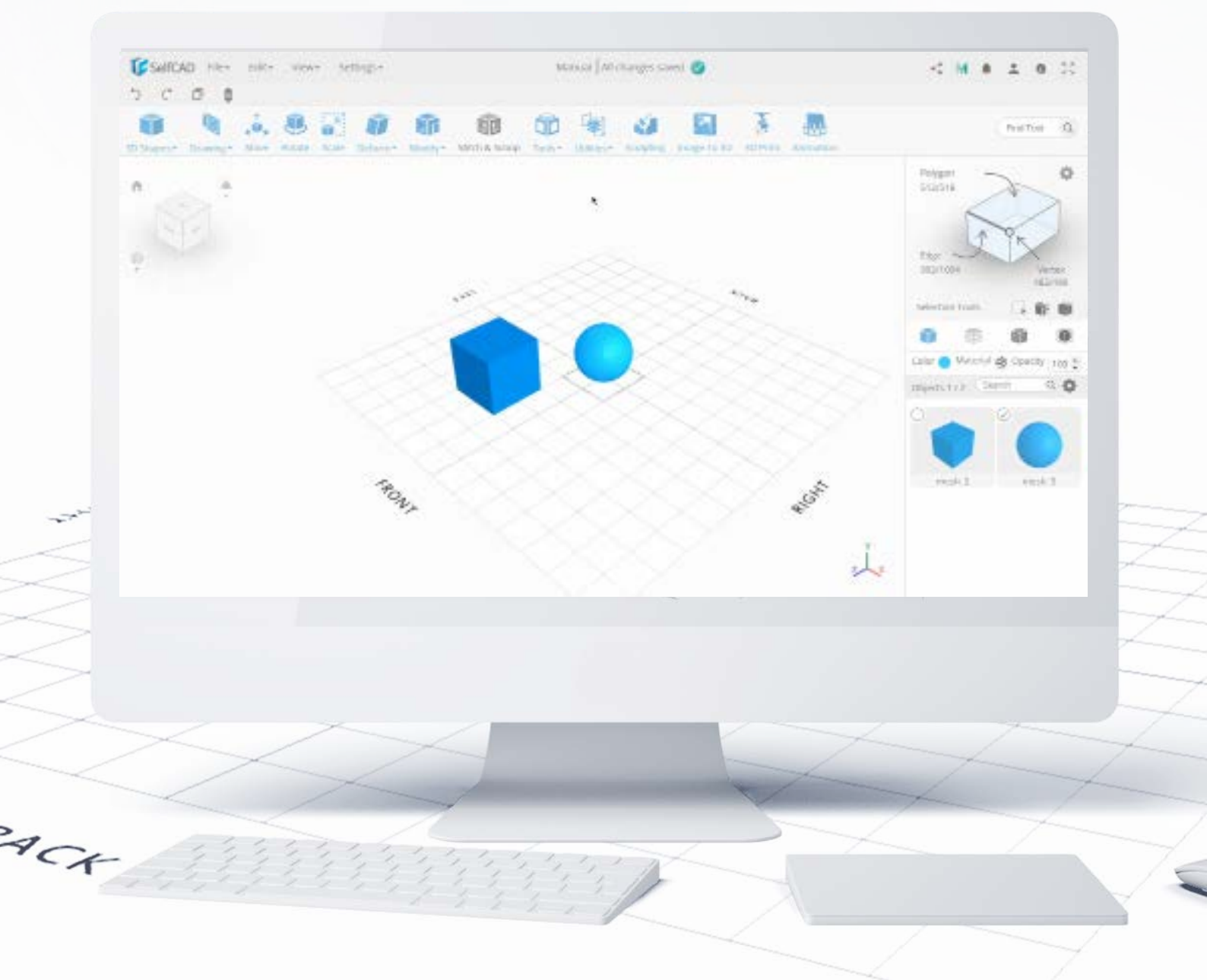

The **Utilities** category is also called a 3D modeling First Aid Kit - you'll find here all the shortcuts and helpers which job is to simply assists you in modeling and make certain actions more convenient, rather than adding special effects to models themselves.

# Utilities: The First Section



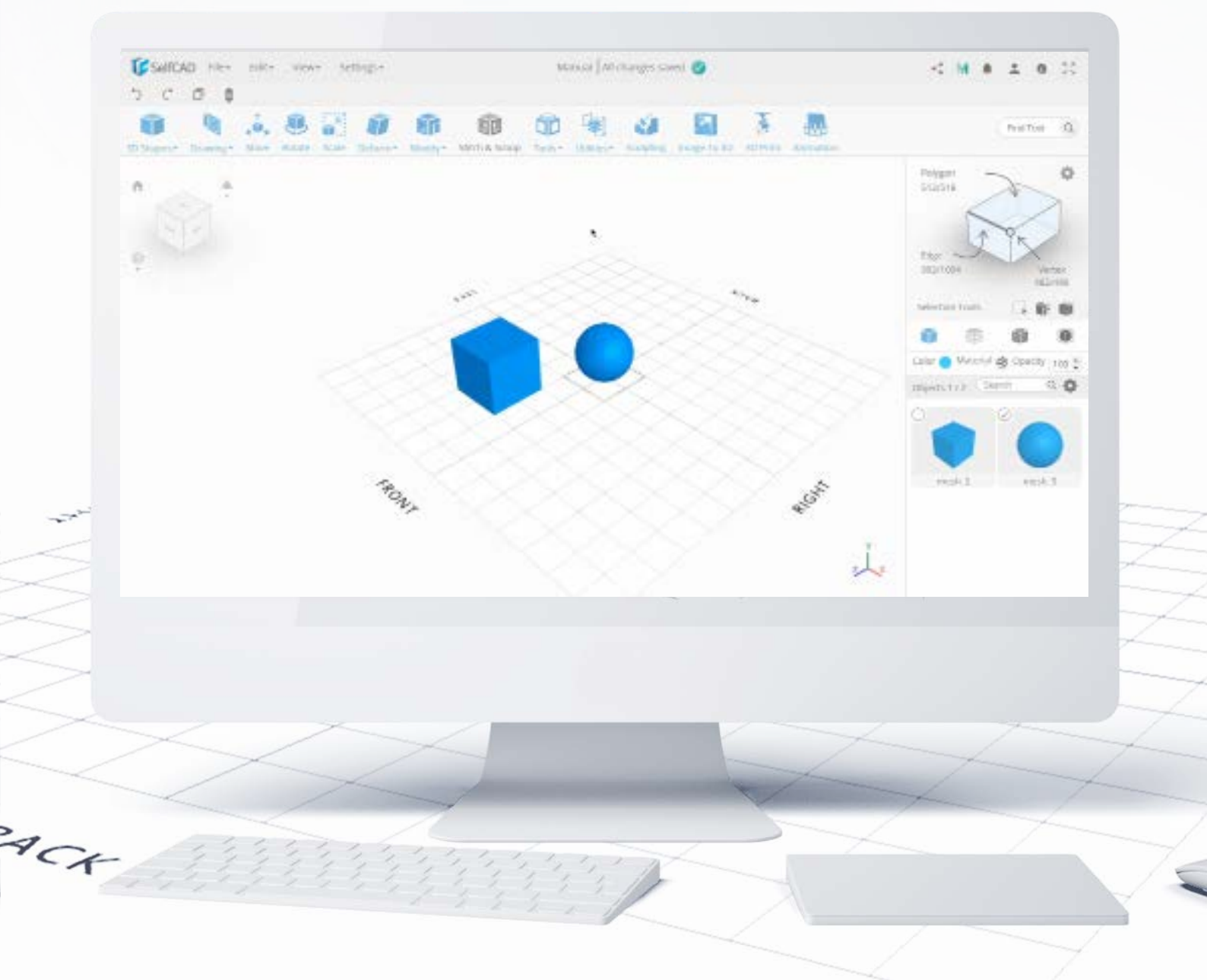

In the first section of the Utilities, you'll find options related to positioning and measuring.

# Utilities: Align



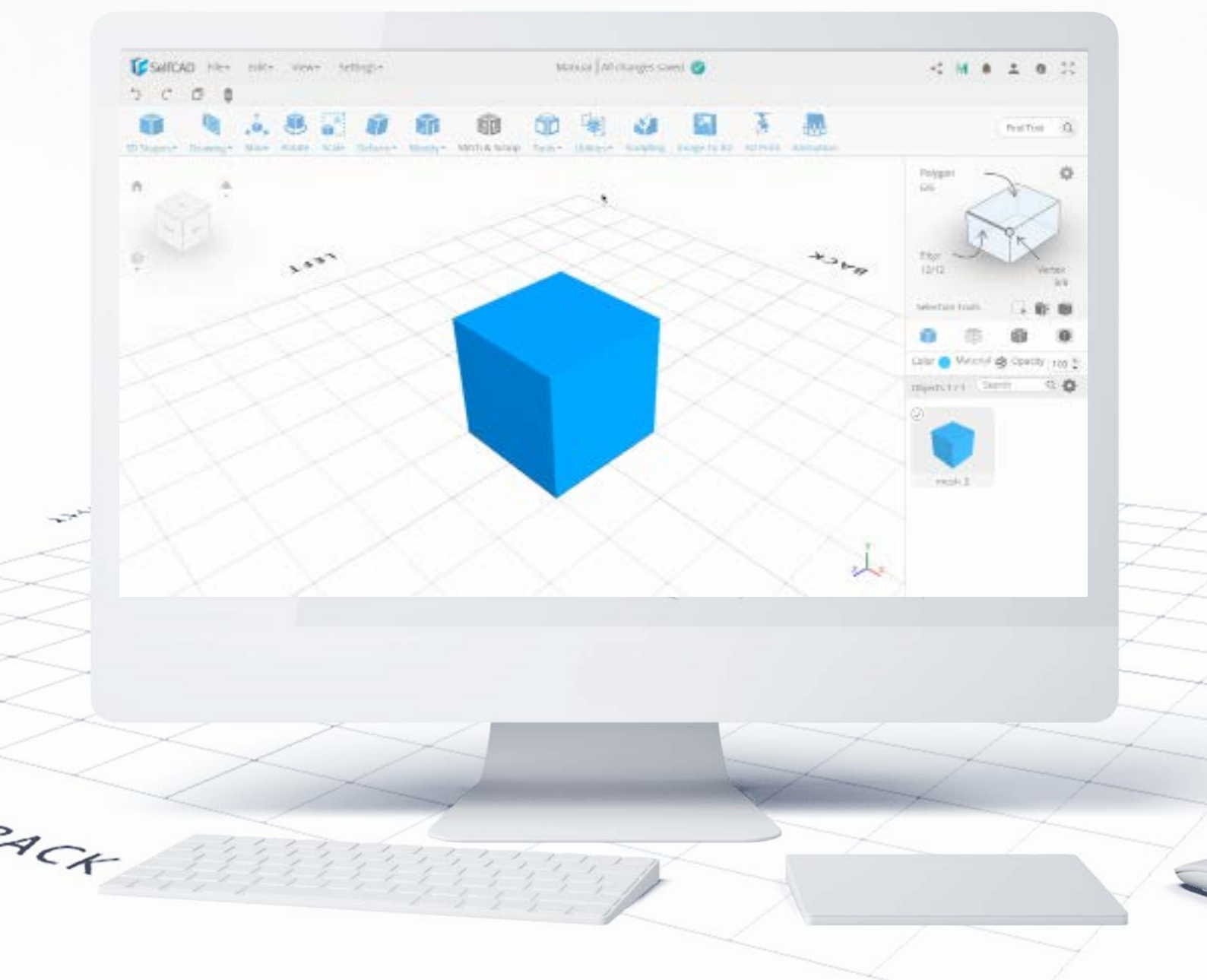

As its name suggests, you can use this tool to align one object to another. There are options to choose to what exactly do you want to align your figure - you can align 3D models to other figures in the grid, or the grid itself, select which part of the figure should be aligned and even set precise offset (distance) between the aligned objects.

# Utilities: Snap



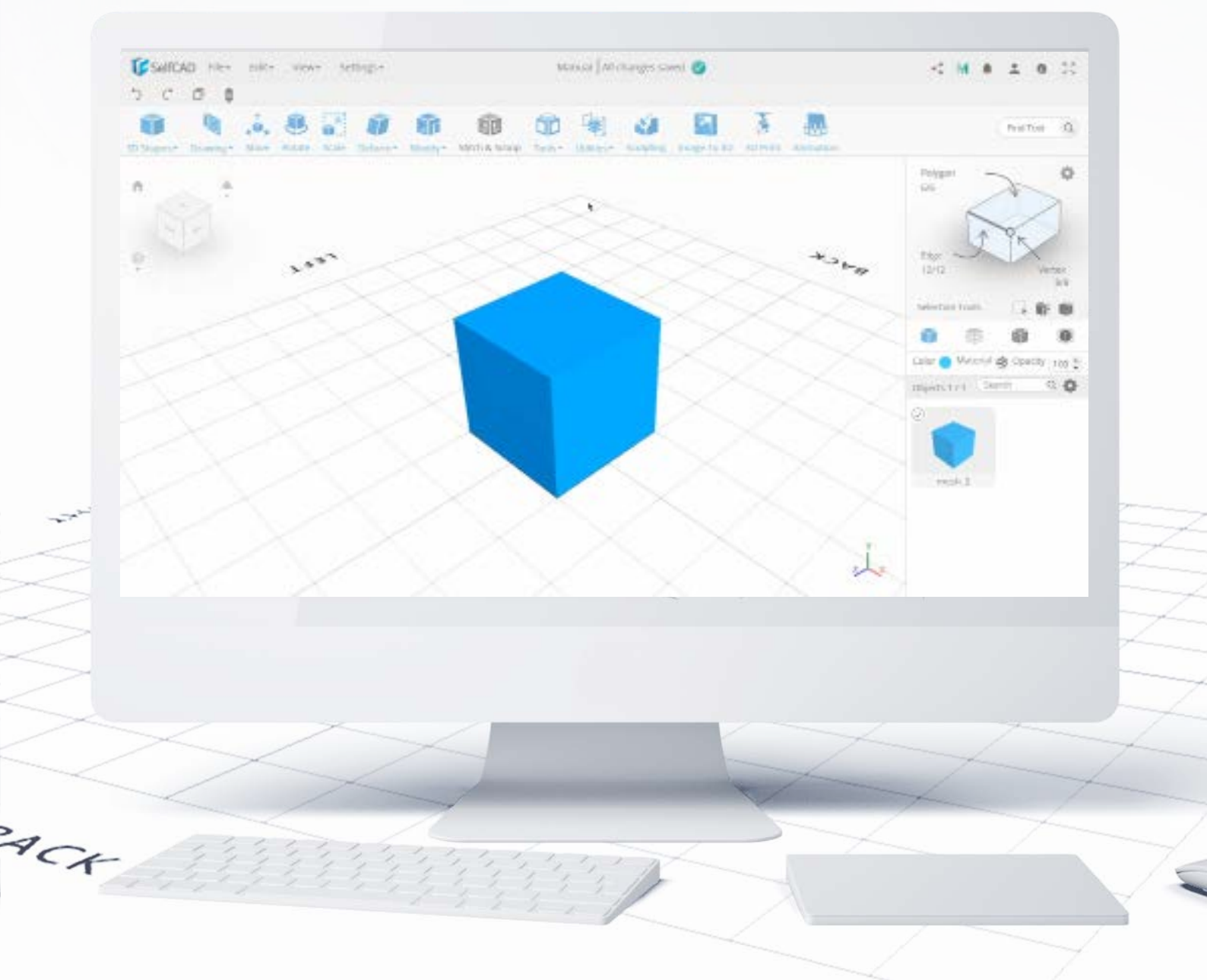

**Snap** allows you to immediately move selected shape to any place on the grid or onto any model. There is also an option to set the offset between the model and the point you want to snap it to.

# Utilities: Measurements



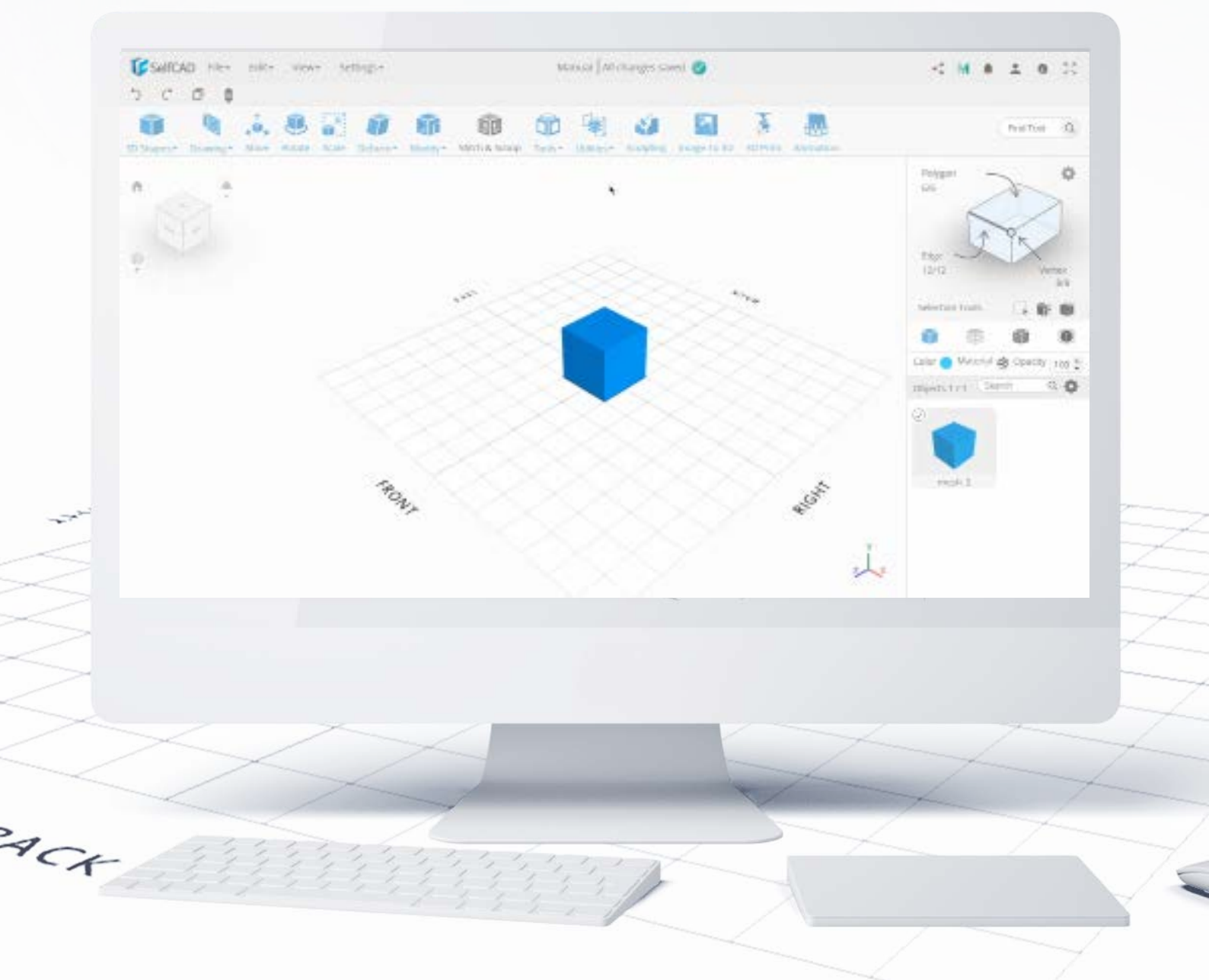
Measurements serve as a simple measuring tool - you can use it to measure lengths, distances, and angles

# Measurements: Resize



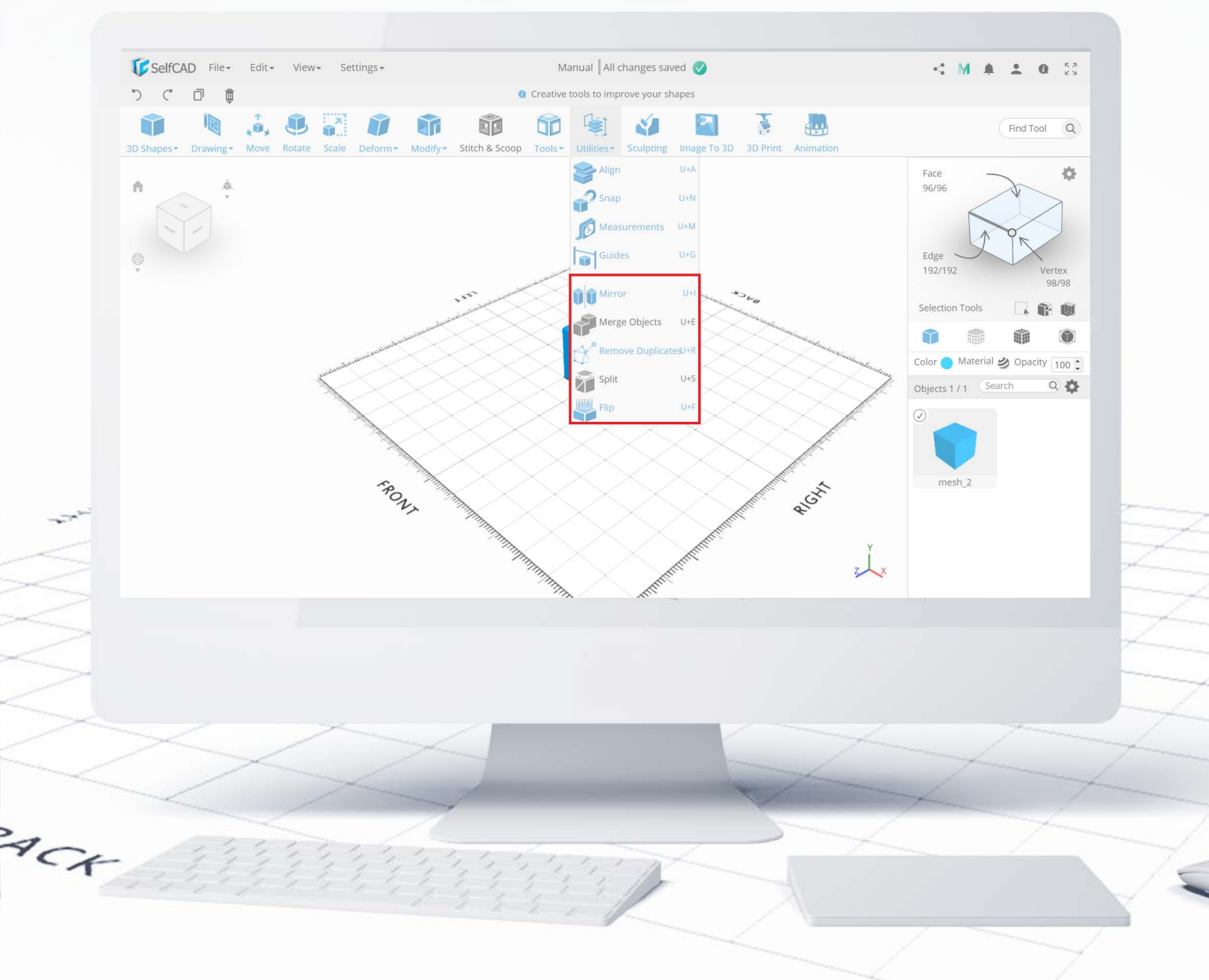
You can also use to resize them, by selecting a specific length or an angle and changing its value in the bottom-left part of the screen.

# Utilities: Guides



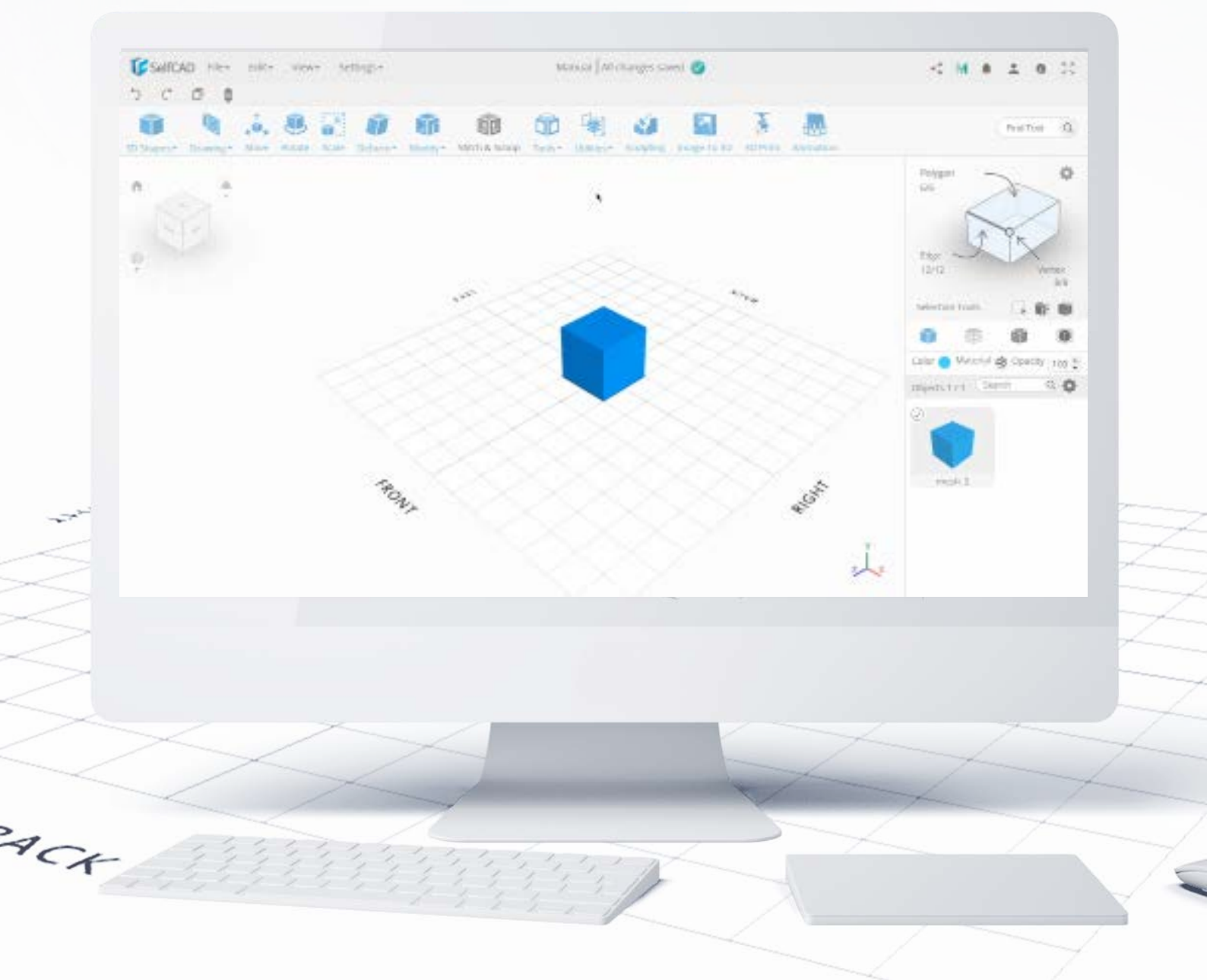

The tool **Guides** can be used to add physical measurements to the grid. You can create them based on length, angle, and even create arcs. What stands out about this tool, is the fact that you can use the generated guides as points of reference to which you can snap objects to.

# Utilities: The Second Section



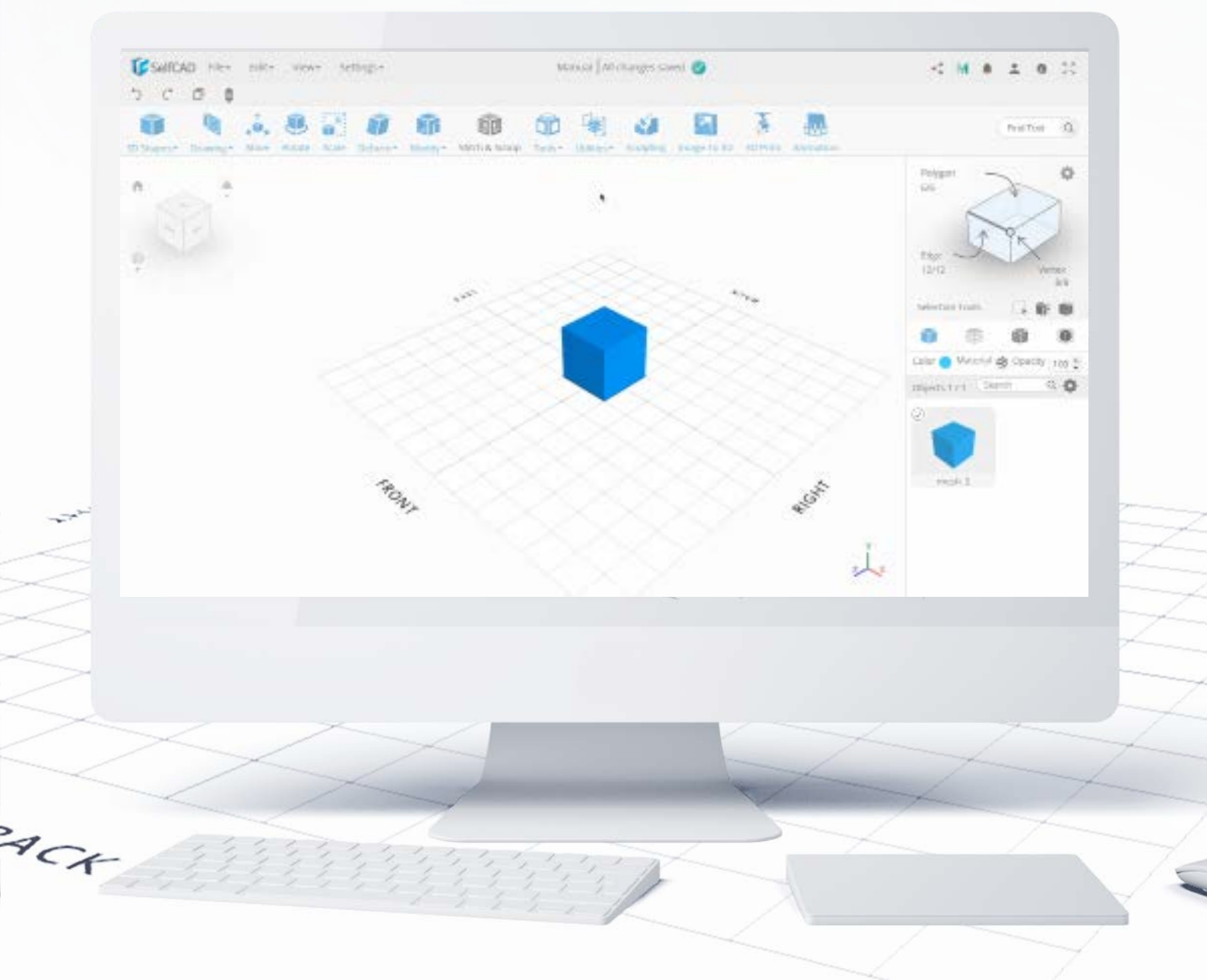

The second part of the Utilities category consists mostly of shortcuts and helpers.

# Utilities: Mirror



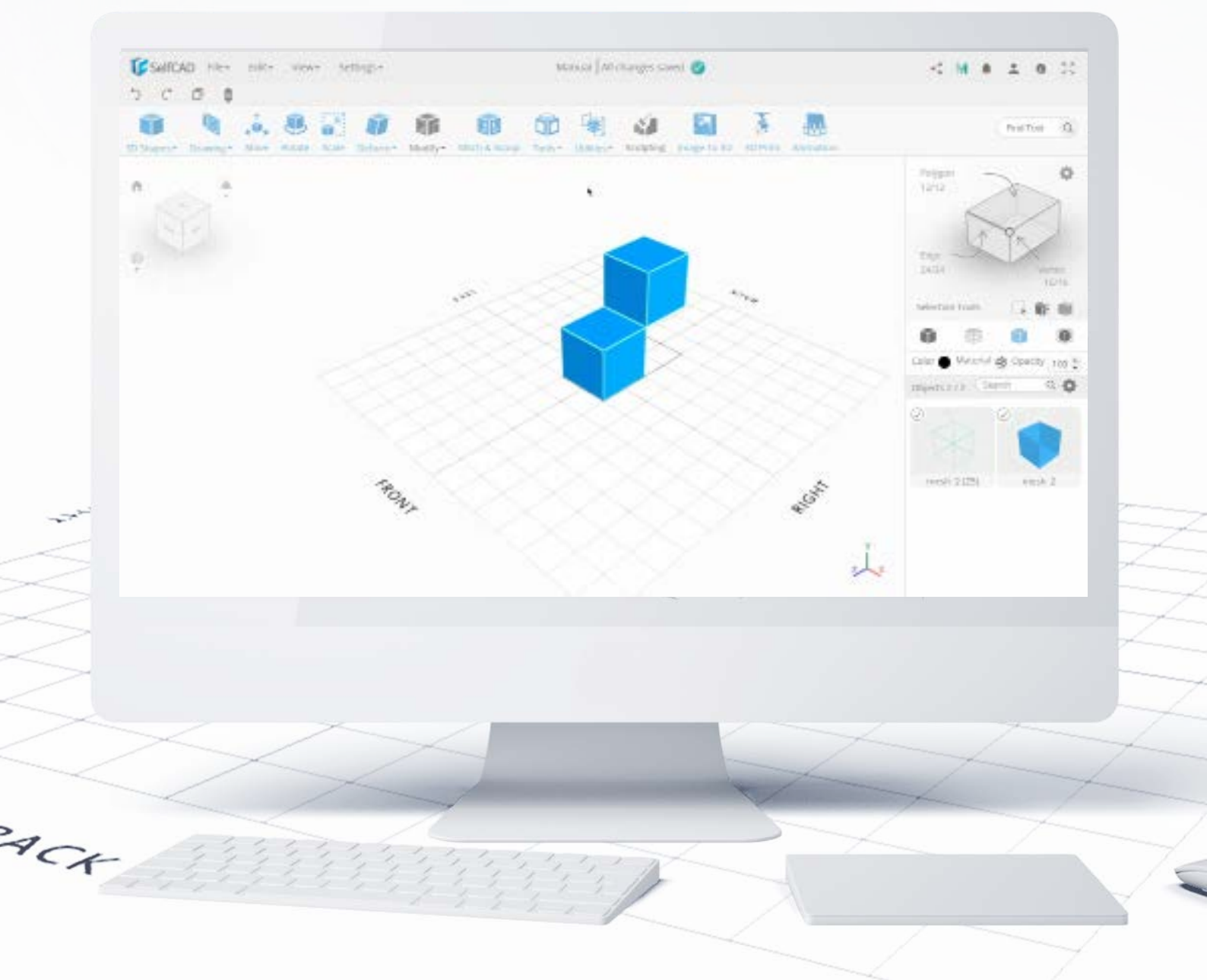

It creates a mirrored copy of a figure. In the drop-down, you can select at which side the mirrored copy will appear.

# Mirror: Mirror Around Edge



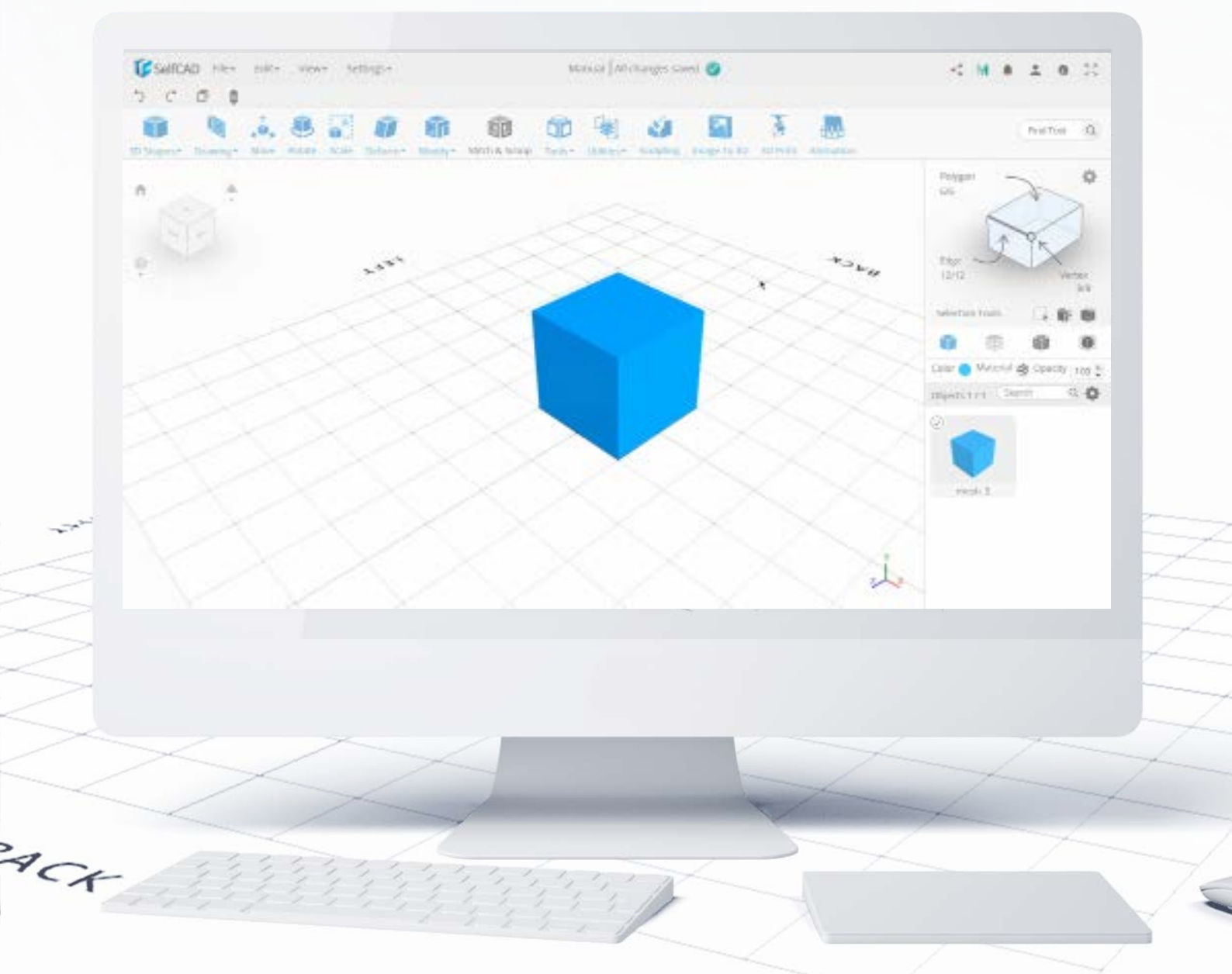

**Mirror Around Edge** allows you to choose the exact edge to Mirror an object.

# Utilities: Merge Objects



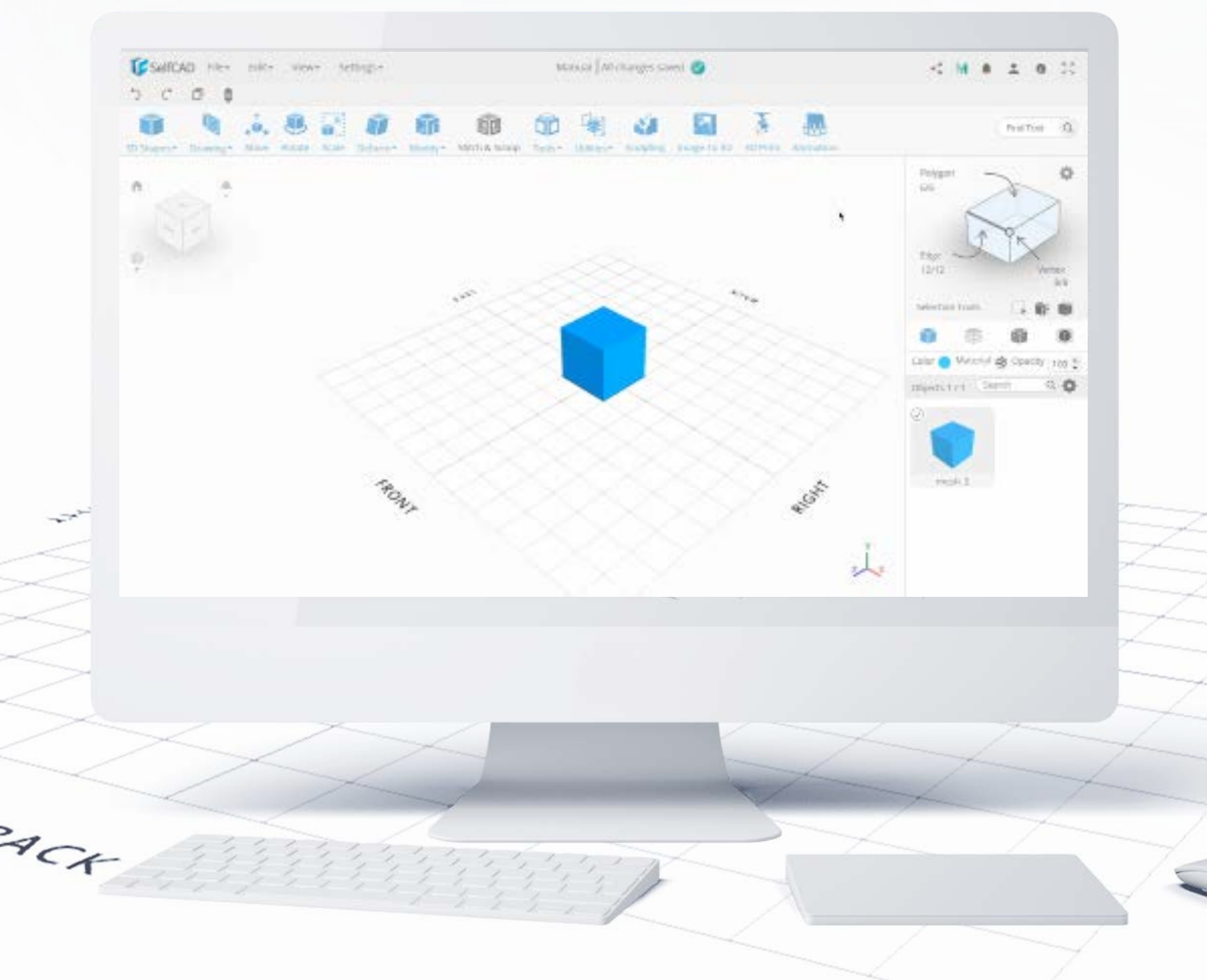

**Merge Objects** allows you to connect objects without changing their geometry. It works correctly when the shapes you want to merge do not overlap each other - otherwise it will create an unwanted problems during printing.

# Utilities: Remove Duplicates



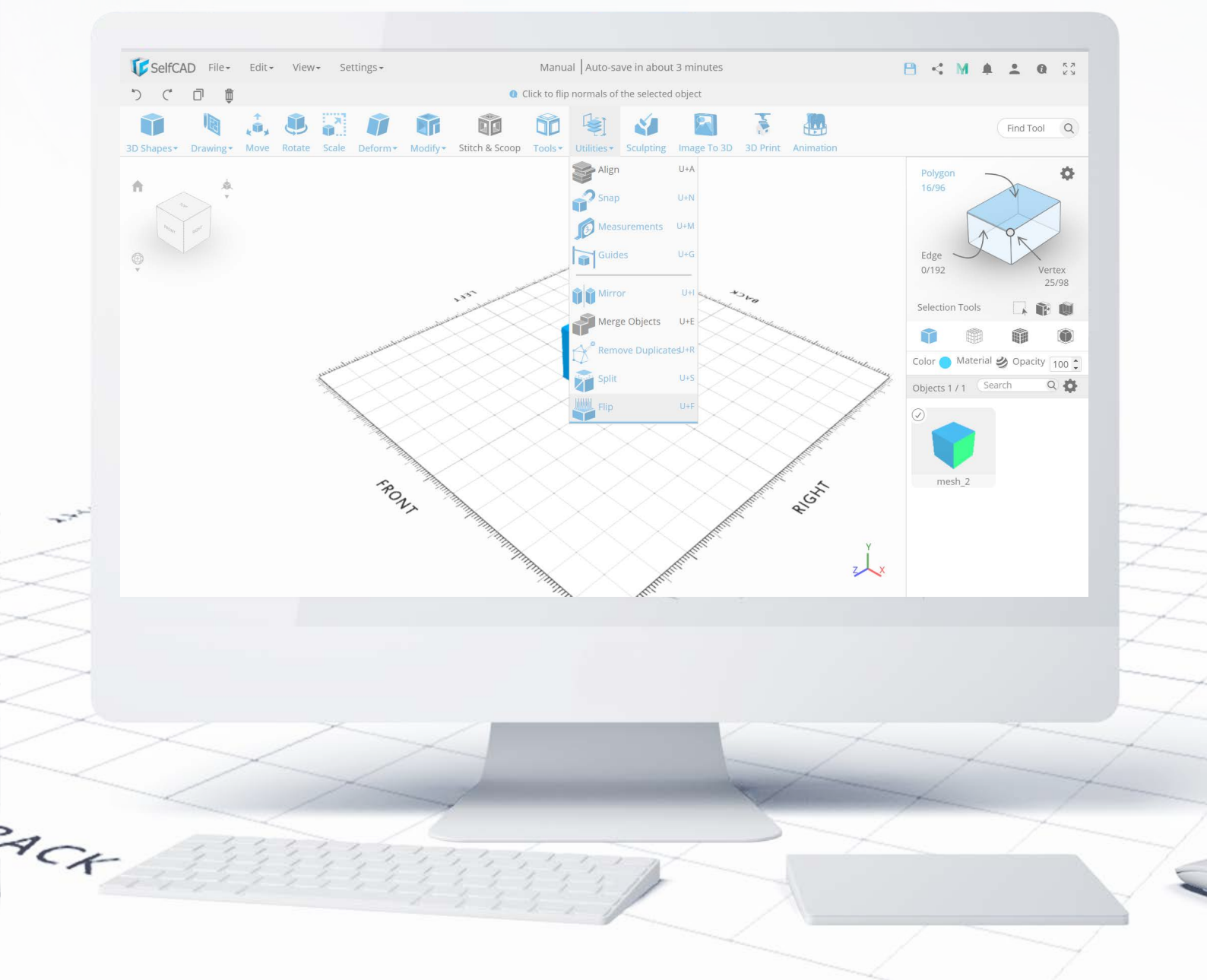
**Remove Duplicates** refers to overlapped Edges and Vertices. Sometimes during modeling, some Edges and Vertices may overlap with each other which unnecessarily inflates their number - this tool removes those overlapped parts.

# Utilities: Split



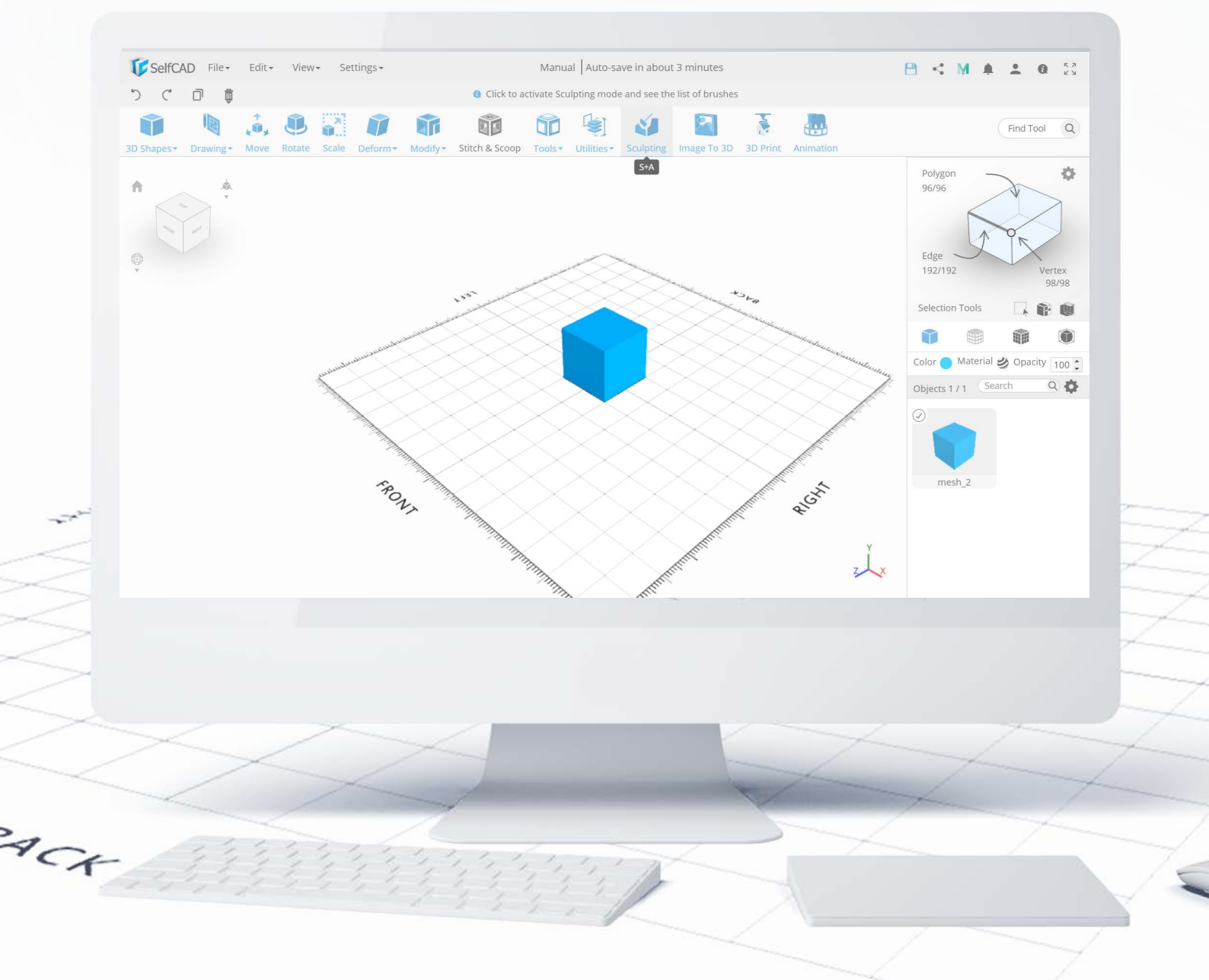

This option allows you to split selected parts of the model and create a separate shape out of them. You won't see the change in the mesh itself, but then you look at the scene panel you'll see that the split part became a separate object, which you can now model independently.

# Utilities: Flip



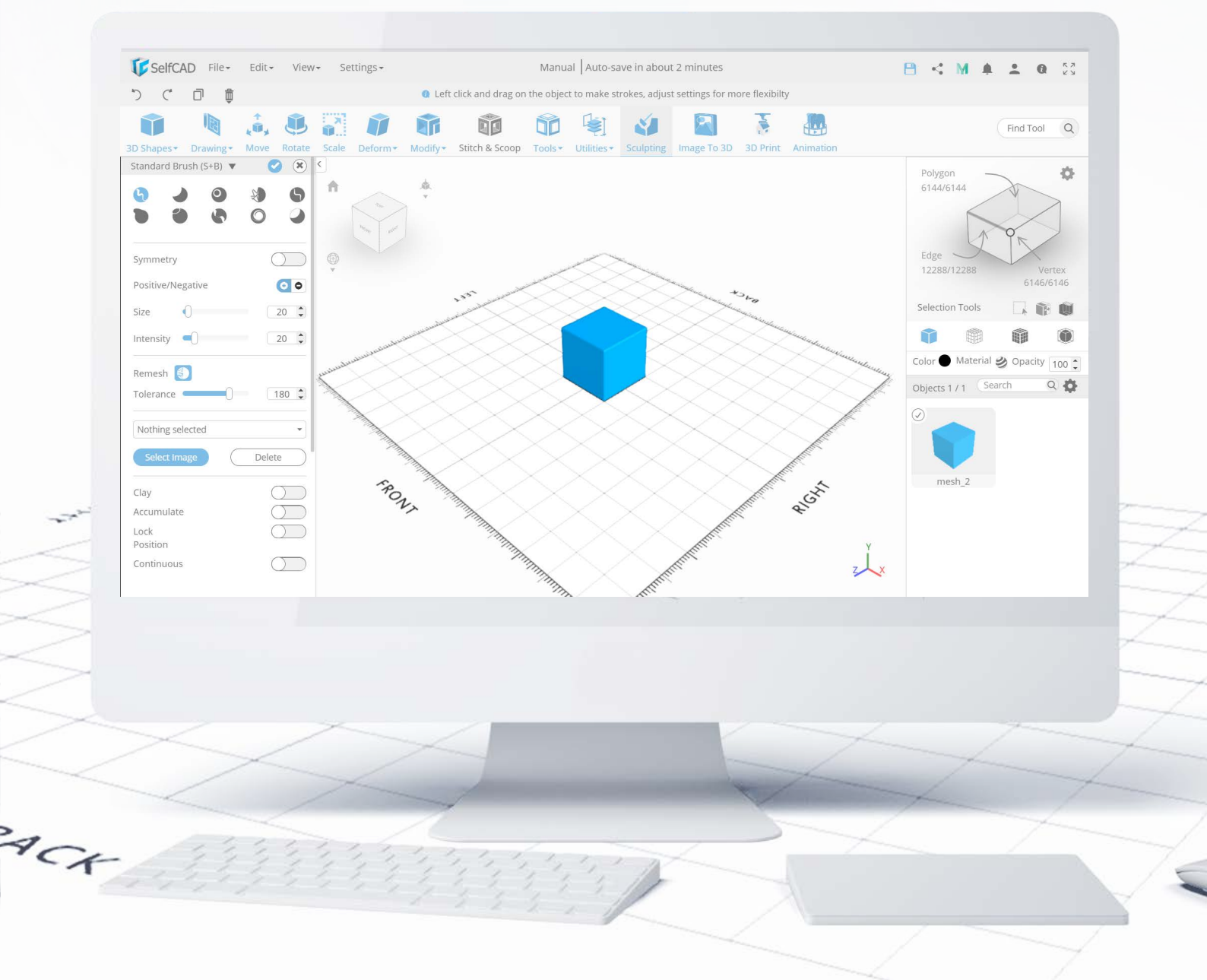

**Flip** allows you to simply turn a selected face or polygon inside-out.

# Model: Sculpting




Next in line is **Sculpting** - out of all of the tools available for modeling, this one can be the most precise of them. You can use it to add the most minute details and finishing touches to your designs. Sculpting works in a completely different way from other tools - here you don't manipulate the object directly by changing the settings of the tool, but by using different brushes directly onto the object itself to invoke a change.

# Sculpting: Brushes




Unlike most CAD software, SelfCAD doesn't have hundreds of brushes, whose only job is to confuse and intimidate you - instead, we added only the most commonly used ones alongside options to customize them. This way, you won't get overwhelmed by the number of possible choices.

# Model: Image to 3D

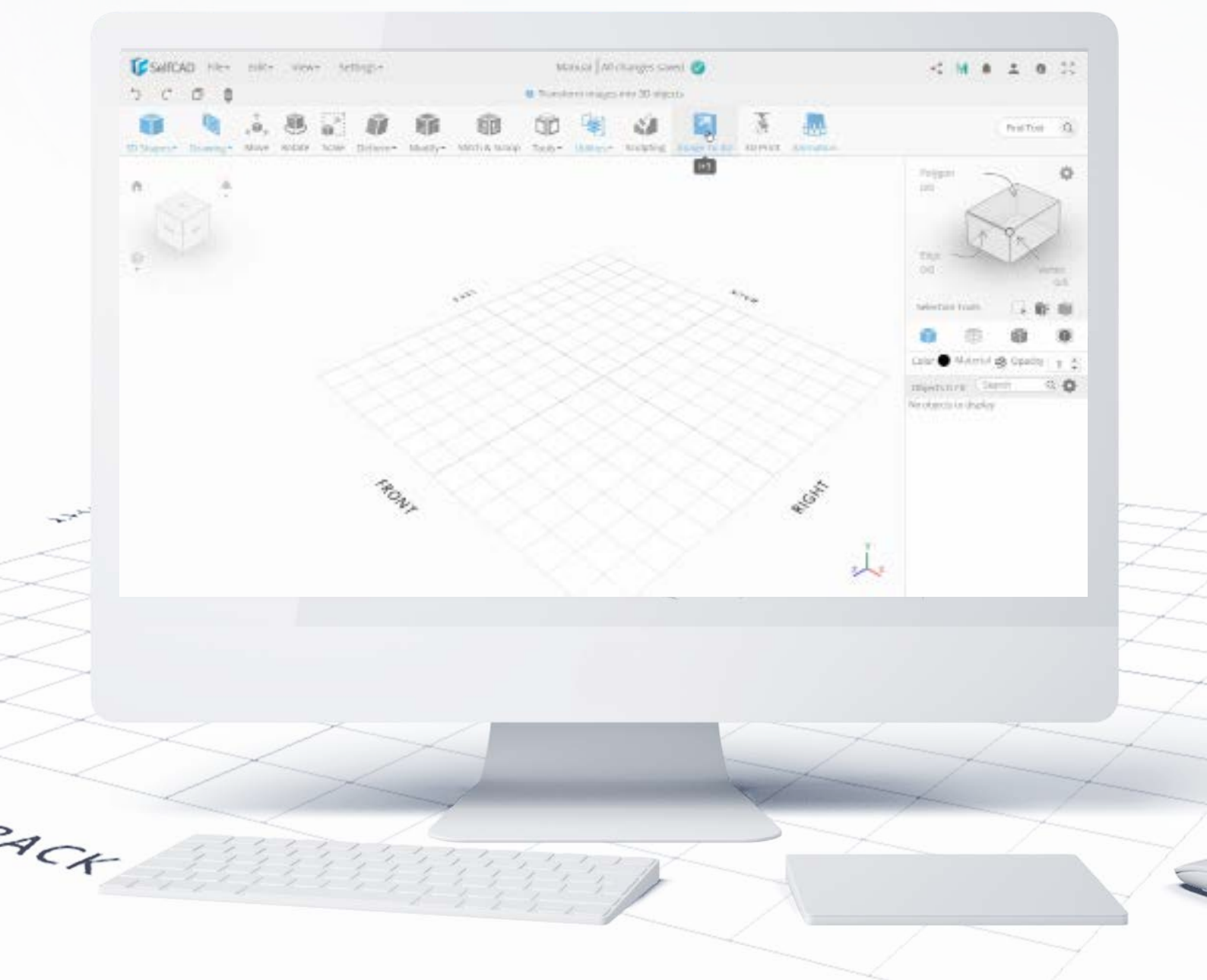
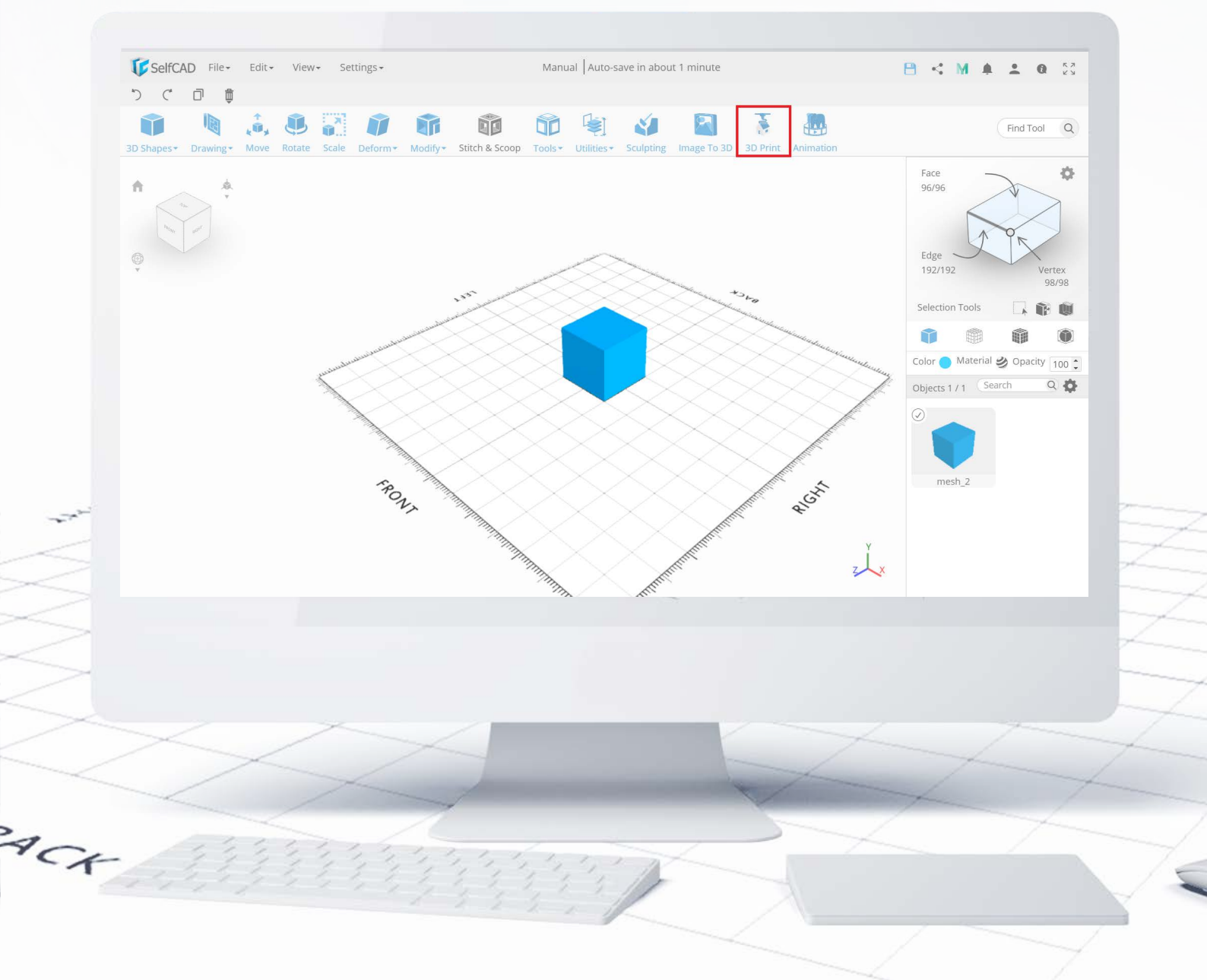


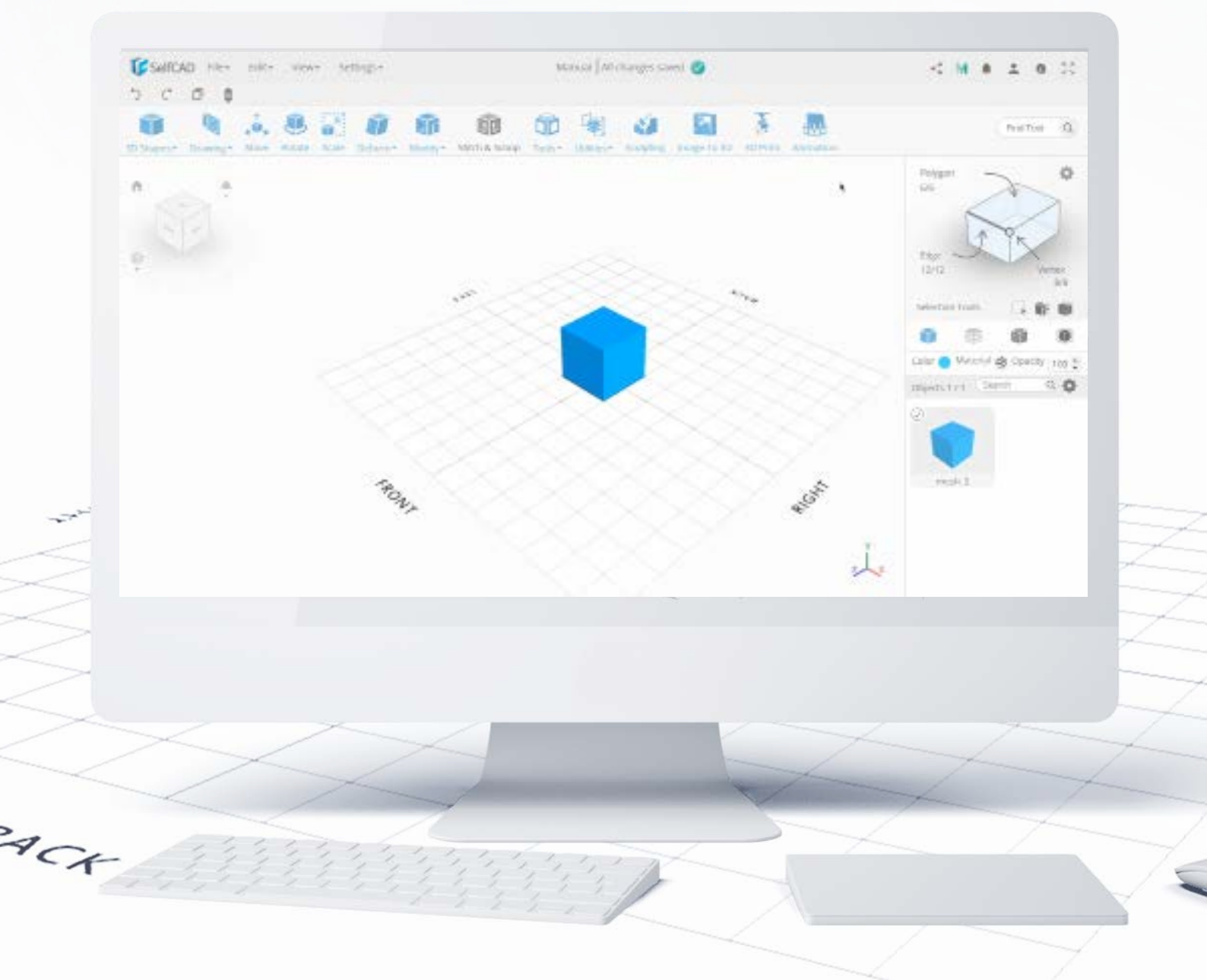

**Image to 3D** allows you to convert any picture into a 3D model. It's a powerful, yet easy to use tool - the only thing you need to really do is to choose the picture you wish to convert to a 3D image and customize its available options by using sliders.

# The Main Toolbar: 3D Print



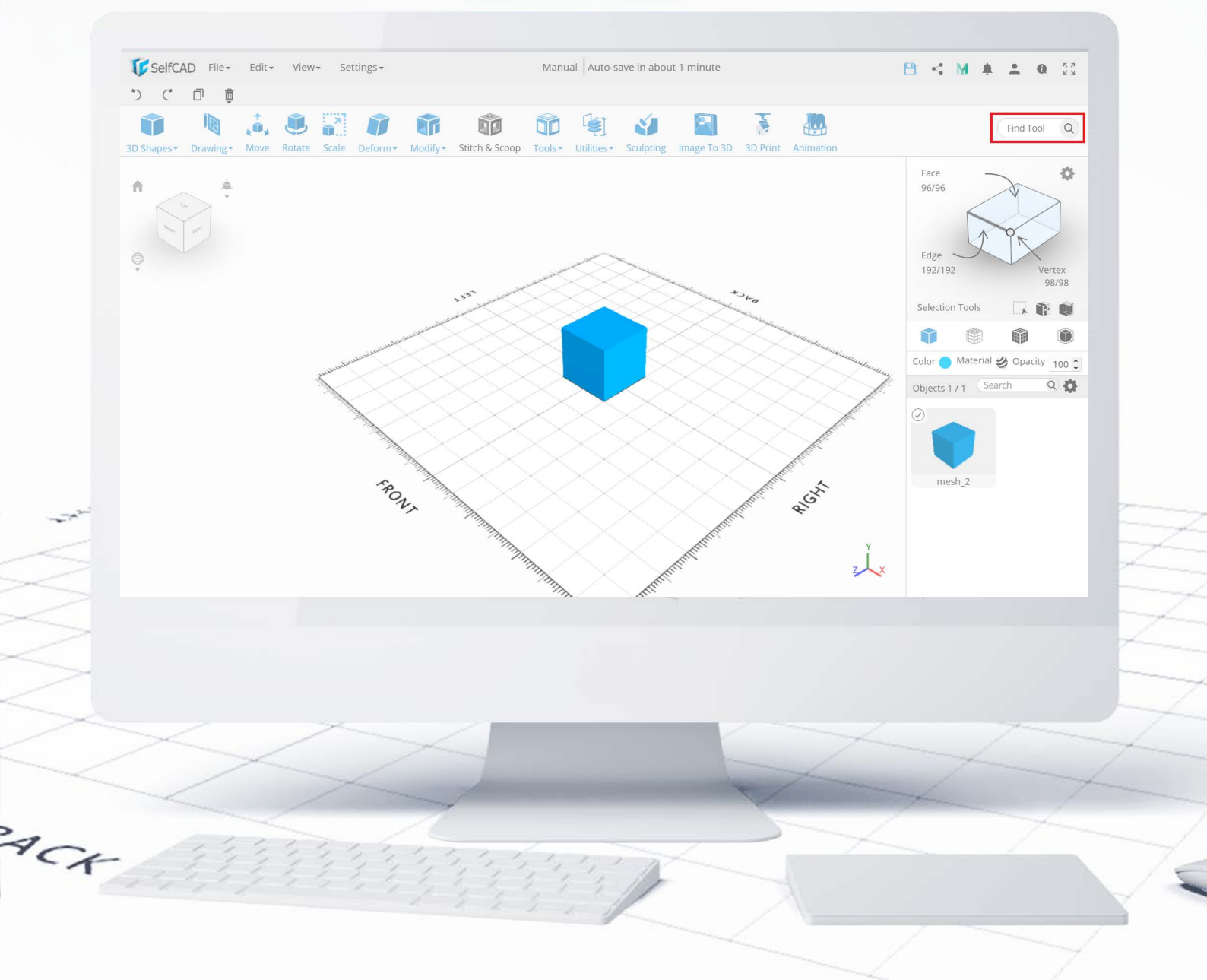

Almost at the end, you'll find the option to **3D Print** your design. This tool will slice the object, and generate a GCode in preparation for 3D printing. It might sound complicated, but you don't have to worry - all of that is being done automatically by the software for you.

# The Main Toolbar: Animation




And the latest addition to the software - the **Animation** tool. In short, it allows you to record everything you do in the software. Each action becomes a separate slider on the timeline, so you can later overlap and stack them together, to make it look like multiple changes were added to a model at the same time. When all is set, you can download the animation in the GIF format.

# The Main Toolbar: Search Tool




At the end of the panel, you'll find a **Search Tool** feature - with it, you can simply type in the name of the tool to get quick access to it. Also, because the tools in SelfCAD have names that reflect their function, you can simply type in what you want to do with an object, and the software will provide you the tool for that purpose.

And you've come to the end of the manual. Now, you should possess the knowledge about SelfCAD's capabilities, the layout of the interface as well as how to move around the software, where to find its respective tools and how they work.

If you have any questions, please check the F.A.Q. section on our website - it is being updated all the time so it's possible that you'll find the answer to your question there.

If not, then feel free to contact us directly - all the contact information can be found on our website - we await any comments and recommendations you may have for us.

You'll find links to the F.A.Q., YouTube and other social media on our website, so check it out at www.selfcad.com