An Overview Of The Best 3D Printing Software Tools

Every 3D print begins as a 3D model generated in a modeling program. Years ago, we had to spend lots of money and time to acquire and learn modeling software. Now, there are many easy-to-use modeling software options available, many of which are free. This list includes some of the best options and is sorted by price, with the free ones sorted alphabetically.

The list also indicates whether the software uses solid modeling, a type of 3D modeling that always generates models that are “manifold” or “water tight.” A manifold model is one in which all walls of the model have some thickness, which is necessary for 3D printing. By contrast, software that uses polygon modeling can generate walls that have zero thickness; that’s fine for creating computer graphics for games and movies but not useful when 3D printing the models. Manifold models can be created with polygon modeling software, it just takes more steps and experience. All the software in this list can create 3D printable models, but every model that comes out of solid modeling software is 3D printable.

Additionally, we’ve noted what skill-level of user each software is designed for: beginners, amateurs, advanced users, and professionals. In general, the easiest to use options are near the top and the most powerful options tend to be near the bottom, though there are some outliers found throughout. Most of these software can be tried for free and there are free tutorial videos available for all of them.

Quick jump to:

3D Modeling Software

These tools are all about creating models for 3D printing. Some of them are pretty easy to use while other programs are only suitable for professional users with years of experience.

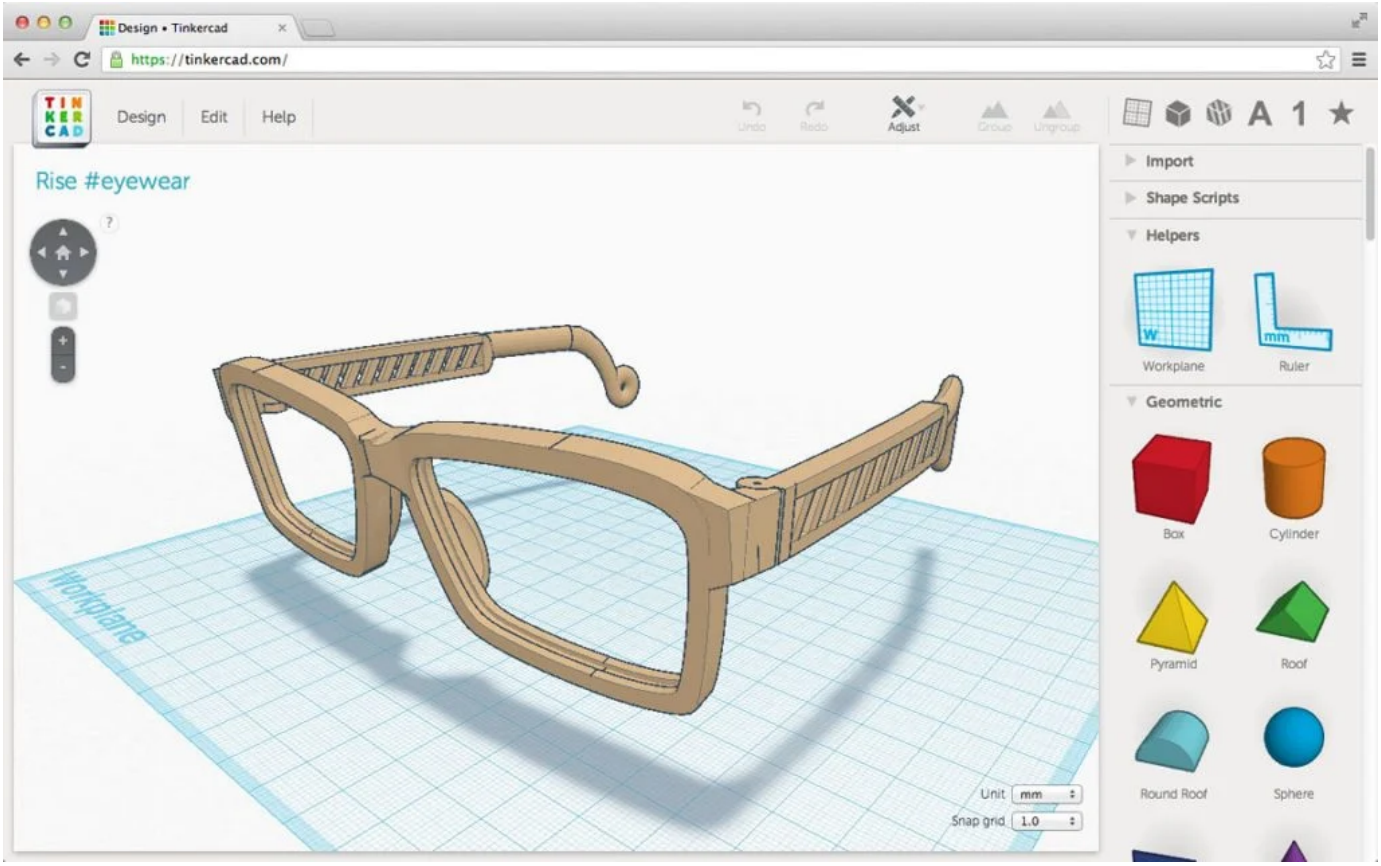
Tinkercad

Price: Free
Solid modeling: Yes
Intended for: Beginners

What makes it special: It's designed to allow anyone to create 3D printable models and serves as an introduction to solid modeling.

This is a browser-based 3D design app geared towards beginners. The software features an intuitive block-building concept, allowing you to develop models from a set of basic shapes. Tinkercad is full of tutorials and guides to aid any aspiring novices get the designs they're looking for. It even allows you to share and export files with ease.

With a library of literally millions of files, users can find shapes that suit them best and manipulate them as they wish. It also has a direct integration with 3rd party printing services, allowing you to print and have your print at your door-step at the press of a button. Even though it can be a bit too simple to the point of limitation, it serves as a great way to learn about 3D modeling.

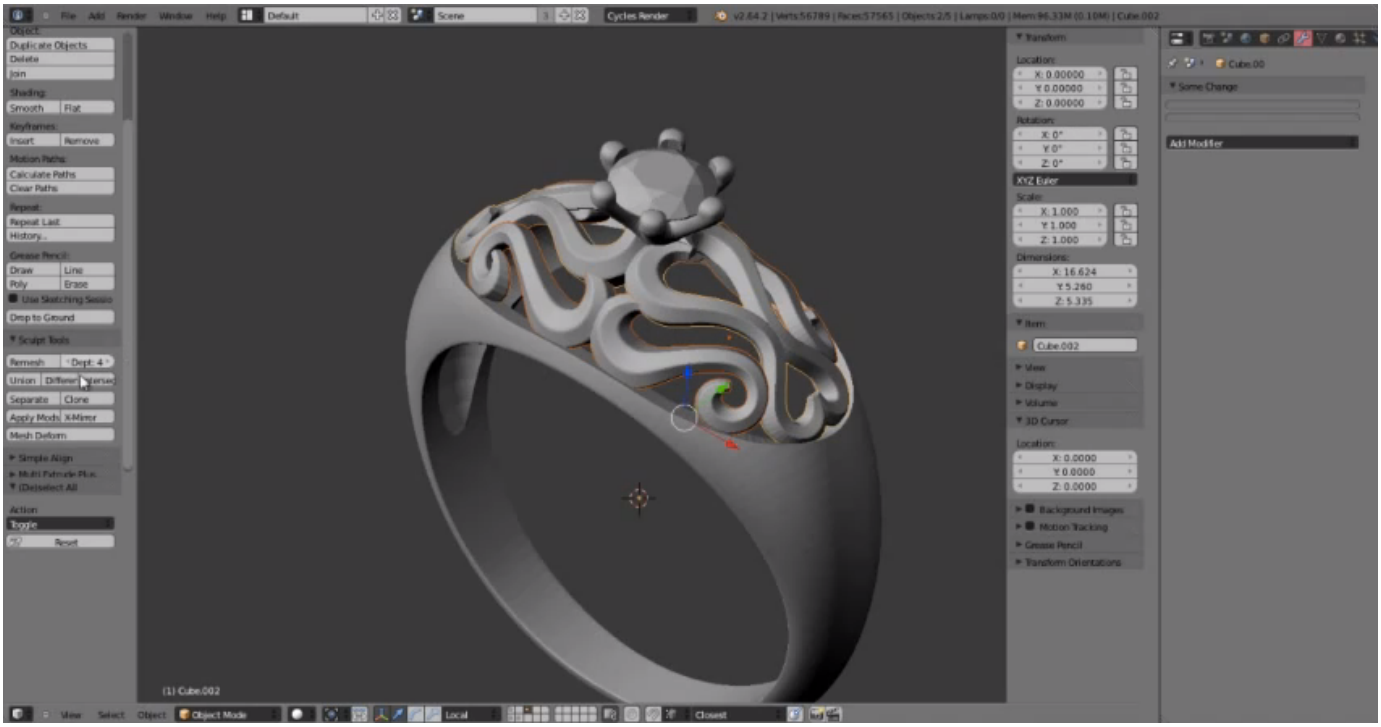


Blender

Price: Free
Solid modeling: No
Intended for: Amateurs and advanced users
What makes it special: It's open source, feature-rich, and includes tools for sculpting, animation, simulation, rendering, motion tracking, and video editing.

In essence, Blender covers many facets of 3D creation, including modeling, animation, and simulation amongst others. This open-source software has a steep learning curve and is ideal for users who feel ready to transition to designing complex 3D models. Check out our Blender tutorials for 3D Printing page.

Blender is actually a free 3D modeling software which was originally for 3D animation and rendering using polygonal modeling techniques. Despite its origins as a software for artists, it is considered quite accessible. One of the software's interesting features is the photorealistic rendering option. This gives the models an air of realism that few free software can achieve.



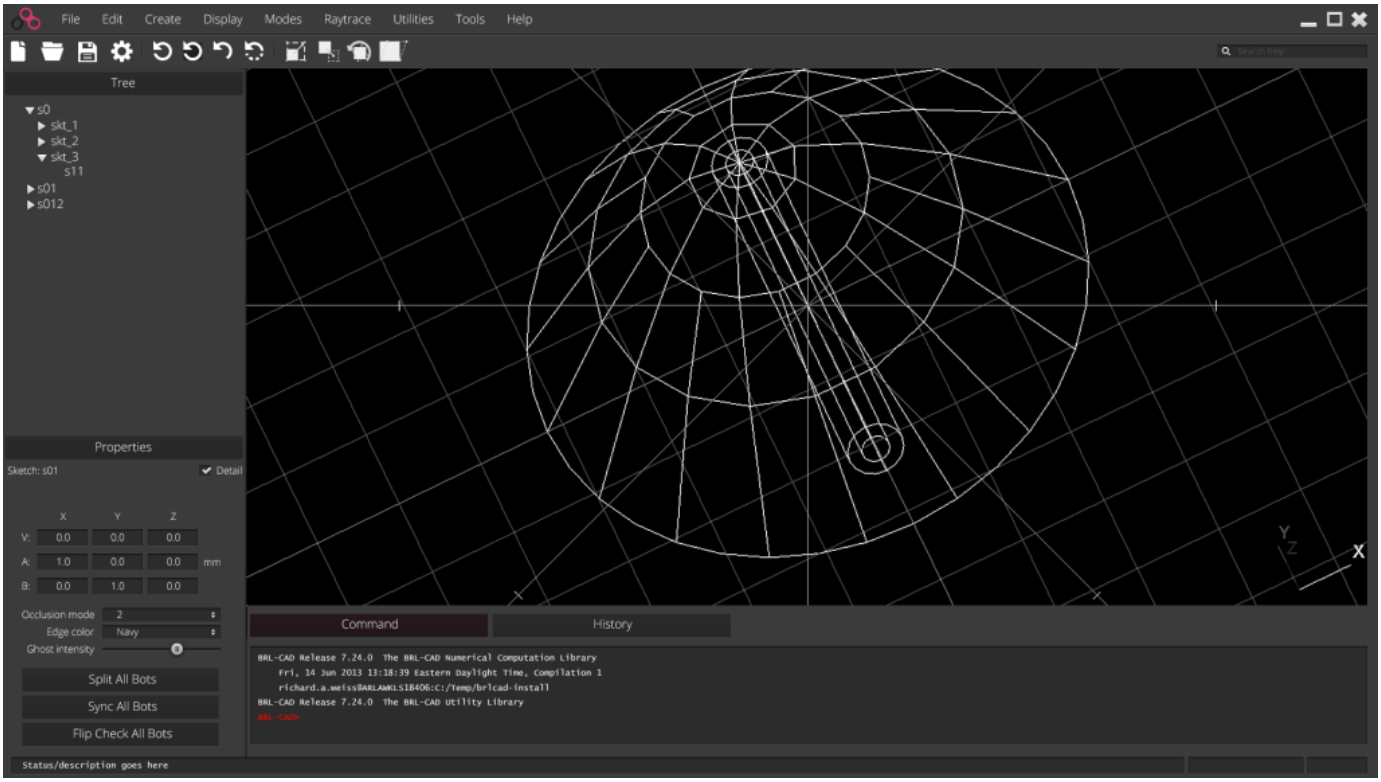
BRL-CAD

Price: Free
Solid modeling: Yes
Intended for: Advanced users
What makes it special: Developed and used by the US Army to support ballistic and electromagnetic analyses. Also includes ray tracing and geometric analysis tools.

This open-source software is an advanced solid modeling system with interactive geometry editing. It is apparently used by the U.S. military to model weapons systems, showing that it is quite dependable but also very advanced. BRL-CAD offers a high level of precision due to its use of specific coordinates to arrange geometric shapes.

It offers a large library of simple and complex shapes users can implement into their own designs. They can take multiple shapes and combine them at their leisure, as well. The software used to be quite costly, however it was converted to open source a few years ago. It includes over 400 tools in

its arsenal. It also runs at great speeds, especially considering how dense its features are.

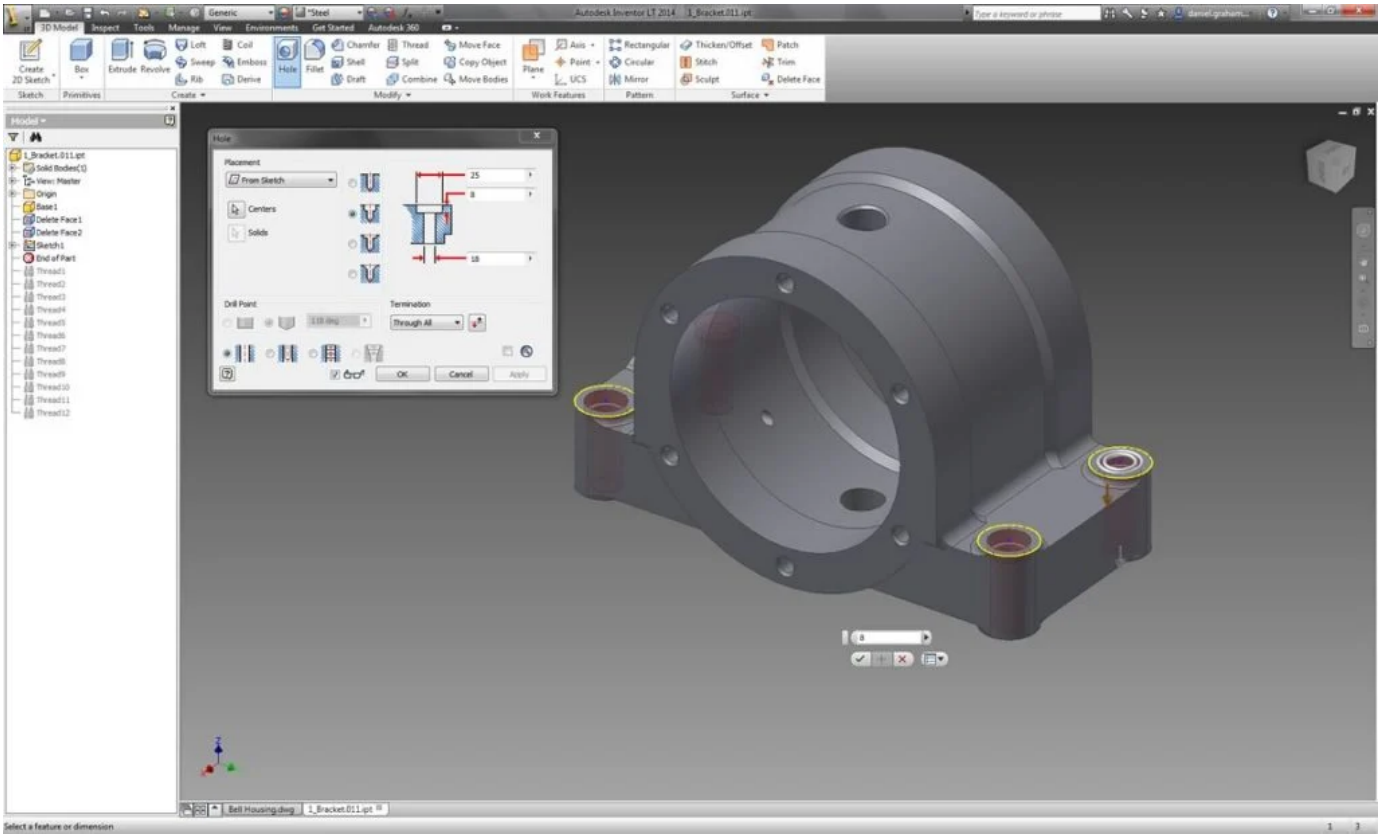


DesignSpark Mechanical

Price: Free
Solid modeling: Yes
Intended for: Amateurs and advanced users
What makes it special: A library of 3D models from industrial suppliers and the ability to generate a bill-of-materials for designs. Electrical and PCB CAD tools are also available.

This nifty and free CAD software is ideal for professionals and advanced hobbyists alike. The user interface is relatively straightforward and the software runs quickly, meaning efficient designing. You also have the capability to generate a bill-of-materials that calculates the cost of printing potential 3D design projects.

DesignSpark Mechanical allows users to utilise an in-built library to mix with own drawings. Another feature that new users might find useful is the pull feature that allows users to create 3D models from only a surface. It is feature-rich for a free software and quite beginner-friendly.

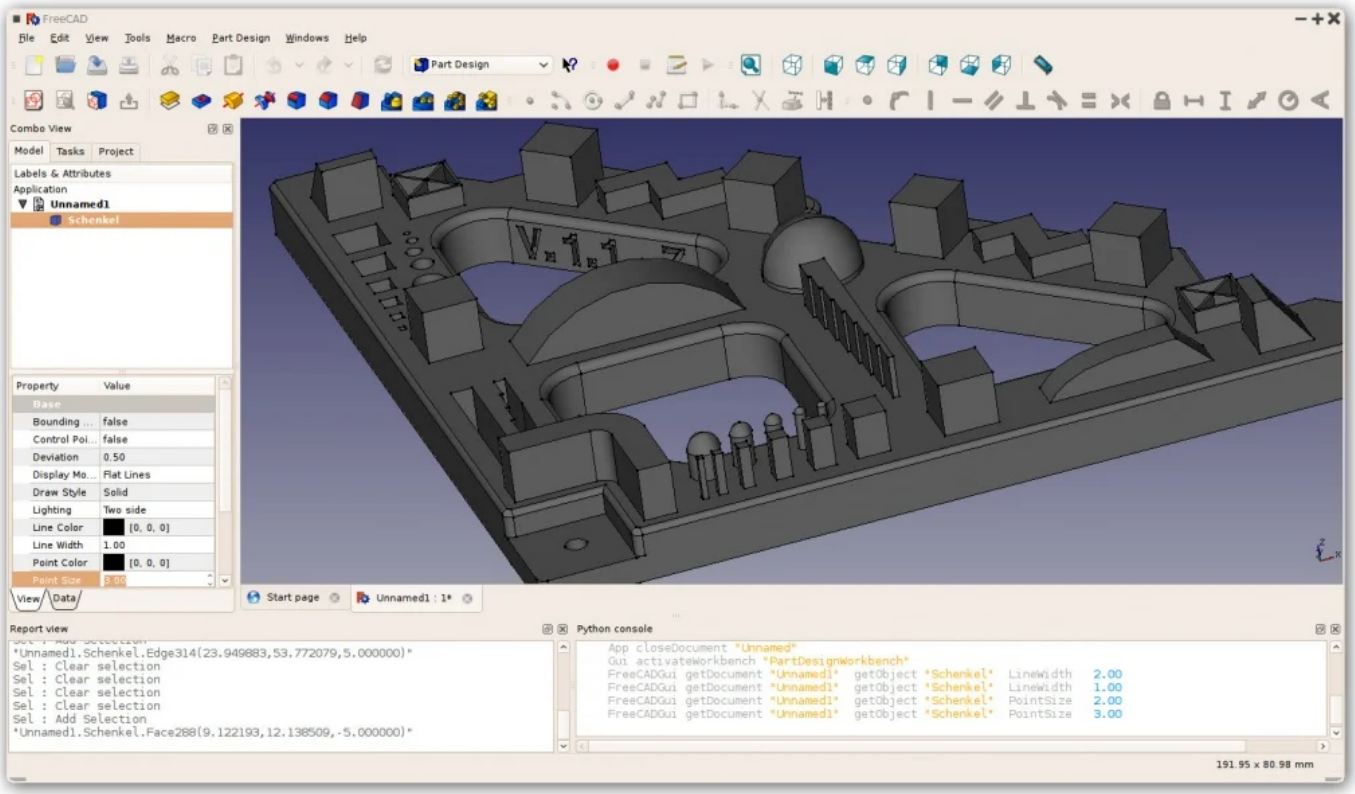


FreeCAD

Price: Free
Solid modeling: Yes
Intended for: Amateurs and advanced users
What makes it special: Models are fully parametric and recalculated on demand with an undo/redo stack. Other features include robotic simulation, architectural tools, and a path module for CAM (Computer Aided Manufacturing).

A parametric 3D modeling tool that is open-source and enables you to design real-life objects of any size. The parametric component makes editing your design a piece of cake. Simply go to your model history and change the parameters, and you'll have a different model. As the name suggest, it is in fact totally free. The upside of this is that none of the tools are blocked behind a pay wall, so you can tweak your models to your heart's desire.

It's not the best for professional purposes, but it's a great training tool. Despite it's basic options and design elements it's worth a try if you're new and don't want to have to invest in something before you dip your toe in the water.



OpenSCAD

Price: Free

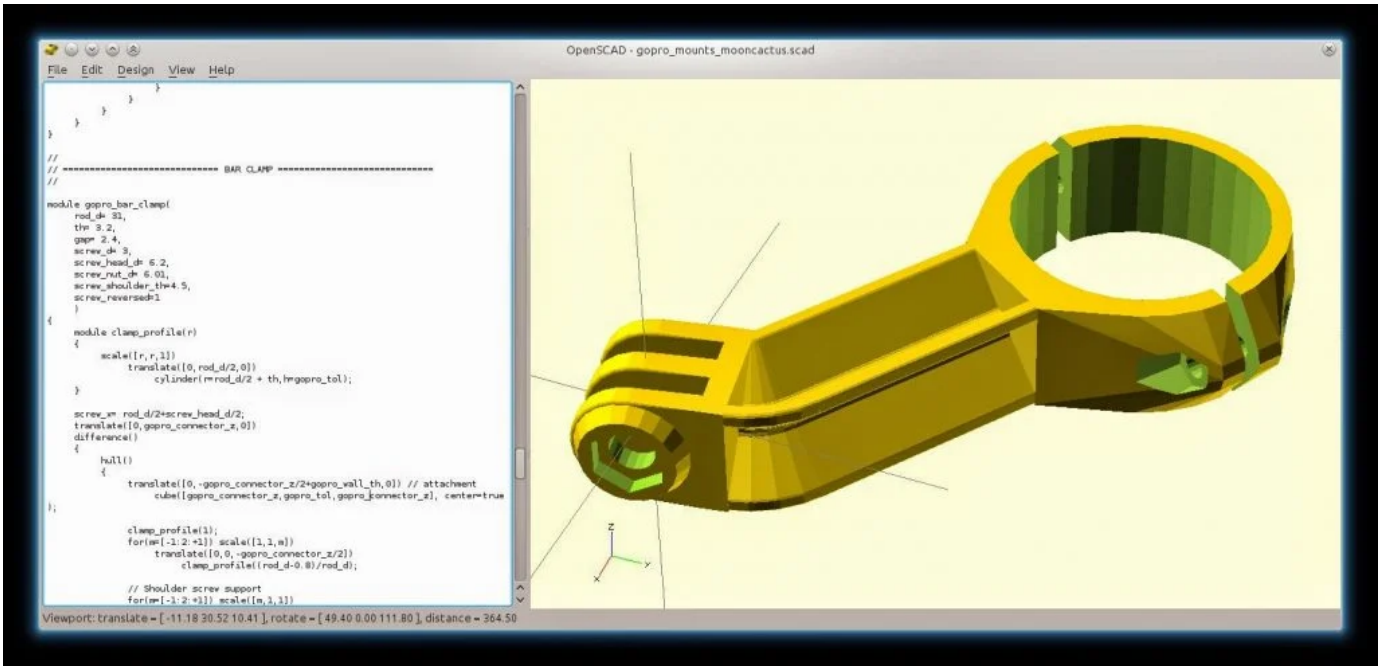
Solid modeling: Yes

Intended for: Amateurs and advanced users

What makes it special: Designed for programmers, models are generated through typing scripts.

OpenSCAD is a free software with a ton of features and a unique way of creating models. This software takes a programming approach to 3D modeling, making it a unique addition to this list of 3d printing software tools. Instead of the traditional interactive modeling interface, users write code in a script file that describes the parameters of the 3D object. Once you've entered your code, you can view the shapes you've created by clicking a "compile" button.

Another great feature that OpenSCAD has is the ability to import 2D drawings and extrude them as 3-dimensional. It uses a part profile from drawings made in a standard sketching software and use the SXF file to do this. With its stronger focus on programming, OpenSCAD may appeal to some while alienating others. Regardless, it is still a powerful tool.



Wings3D

Price: Free

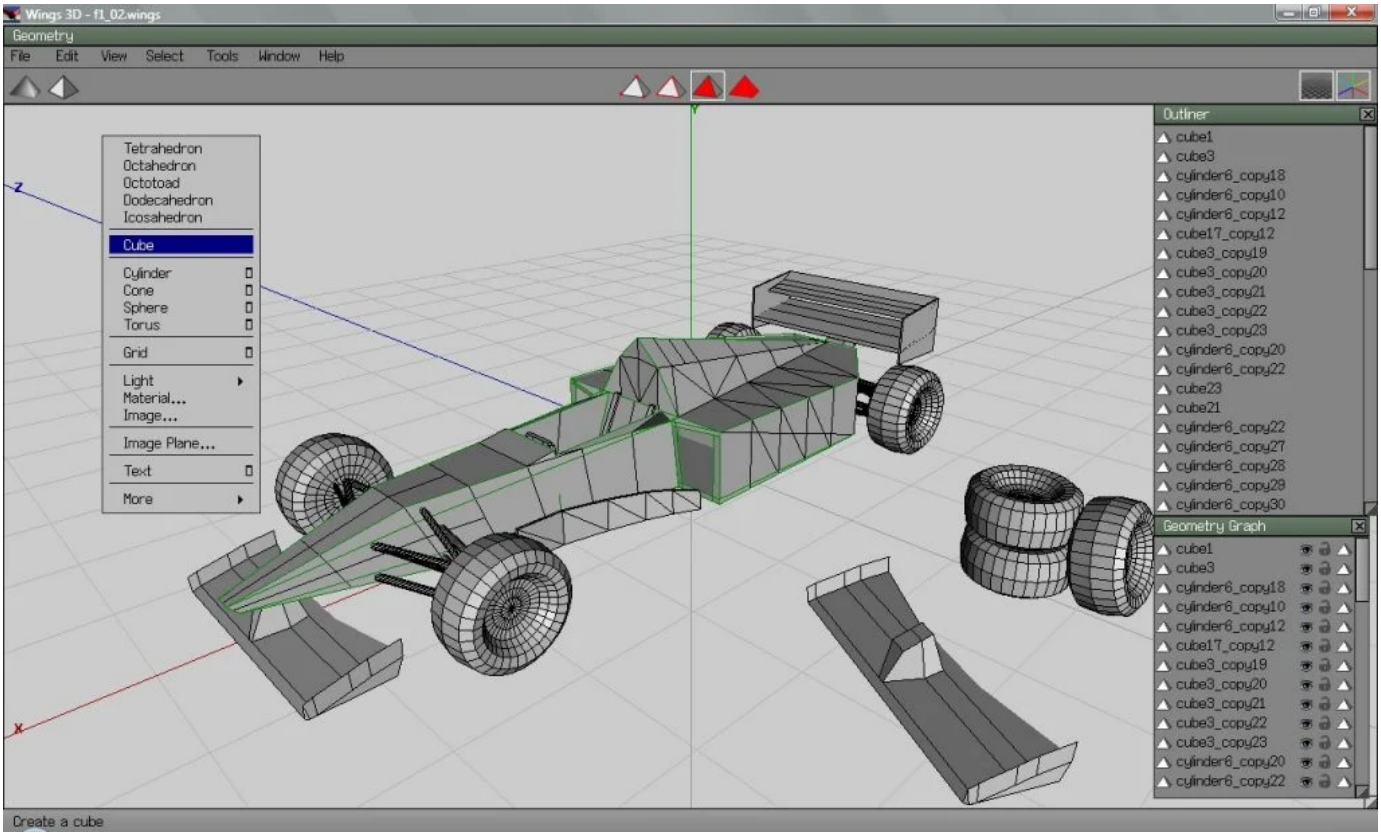
Solid modeling: No

Intended for: Amateurs and advanced users

What makes it special: Polygon modeling enables the creation of more organic shapes. Standard tools can be accessed through a right-click menu.

Wings3D is another open-source polygon model tool. Despite being freeware, it comes with a wide range of mesh and selection tools. Tools like mirror make symmetrical modeling a breeze. Seeing as it is a program for beginners, it is very user-friendly and the learning curve is quite steady. Features like the customisable hotkeys and easy to use interface are indicative of its status as an ideal tool for starters.

Despite the ease of use, it has no shortage of useful features such as plane cut, intersect, inset, bend, sweep, circularize, and sheer, making it capable of some very impressive models. It also supports a very wide range of file formats for both import and export. Despite its simple and plain looks, it is definitely worth checking out if you’re just starting out.

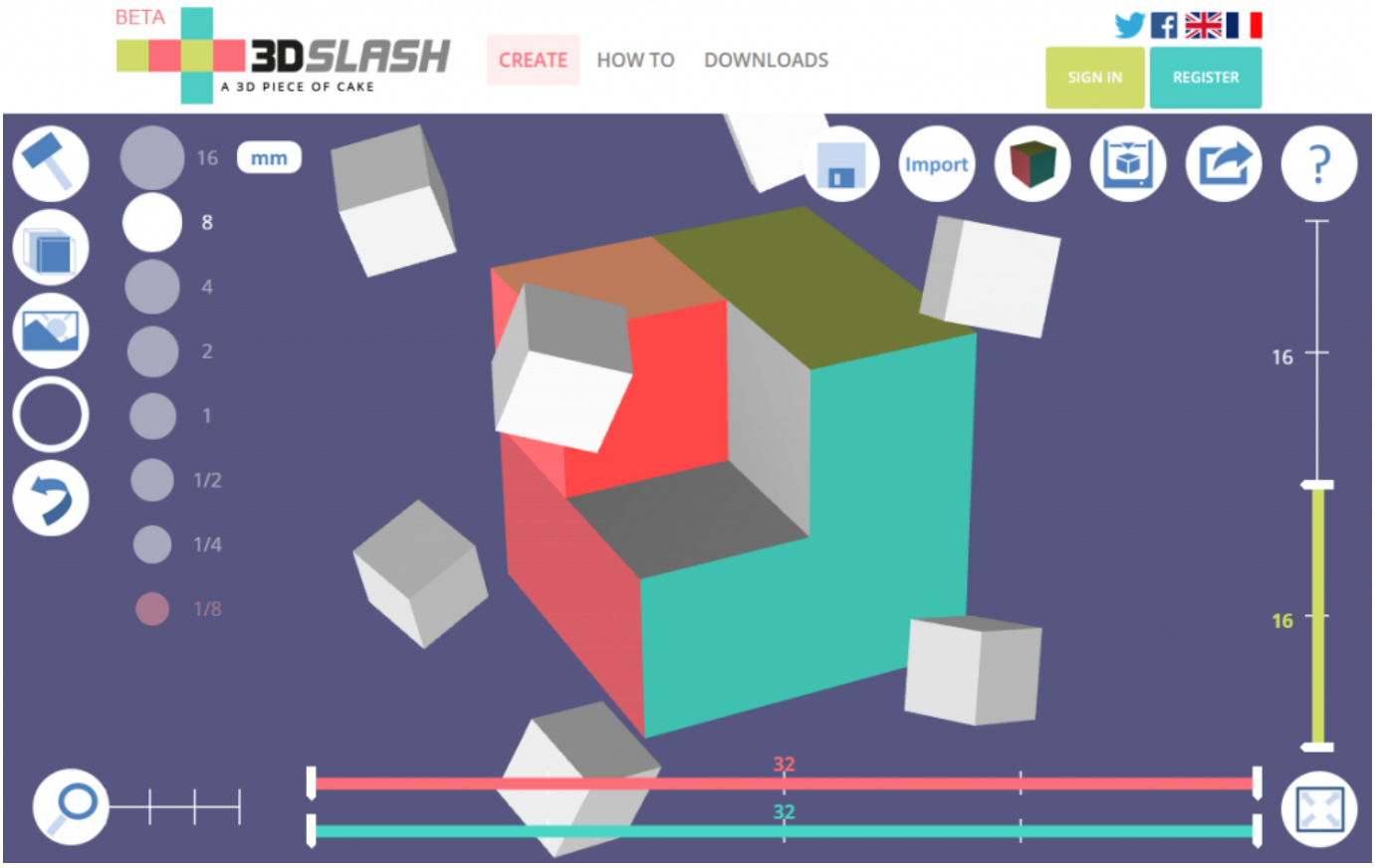


3D Slash

Price: Free web version; Premium license is $24/year and a Commercial license is $240/year
Solid modeling: Yes
Intended for: Beginners and amateurs
What makes it special: Models are created through “slashing” 3D blocks away to shape them as desired.

3D Slash focuses on providing design software with a uniquely fun user interface and enough advanced features to work with a high level of precision. You can also make logos and 3D text with this software. 3D Slash is free to use and ideal for beginners, however there a range of price packages that add in features for cooperative use or commercial use depending on the needs of the consumer. Additionally, the free versions has limitations in terms of functions, higher resolutions and colours you can apply. It’s intuitive interface with a block cutting style to create shapes makes it simple enough for anyone to use.

Even if you can’t find the creative spark to start a design from scratch, there are a multitude of files available for download that you can import and then cut apart into something new. Novel features like the cursor mode that makes interior designing much easier are great additions. Aside from its ability to run on standard mode, it an can also be used with VR head sets. While the blockish style can be limiting in terms of range of shapes one can make and less pleasing to the eyes, it is nonetheless efficient and practical. There are few software that are as quick from concept to finish as 3D slash.

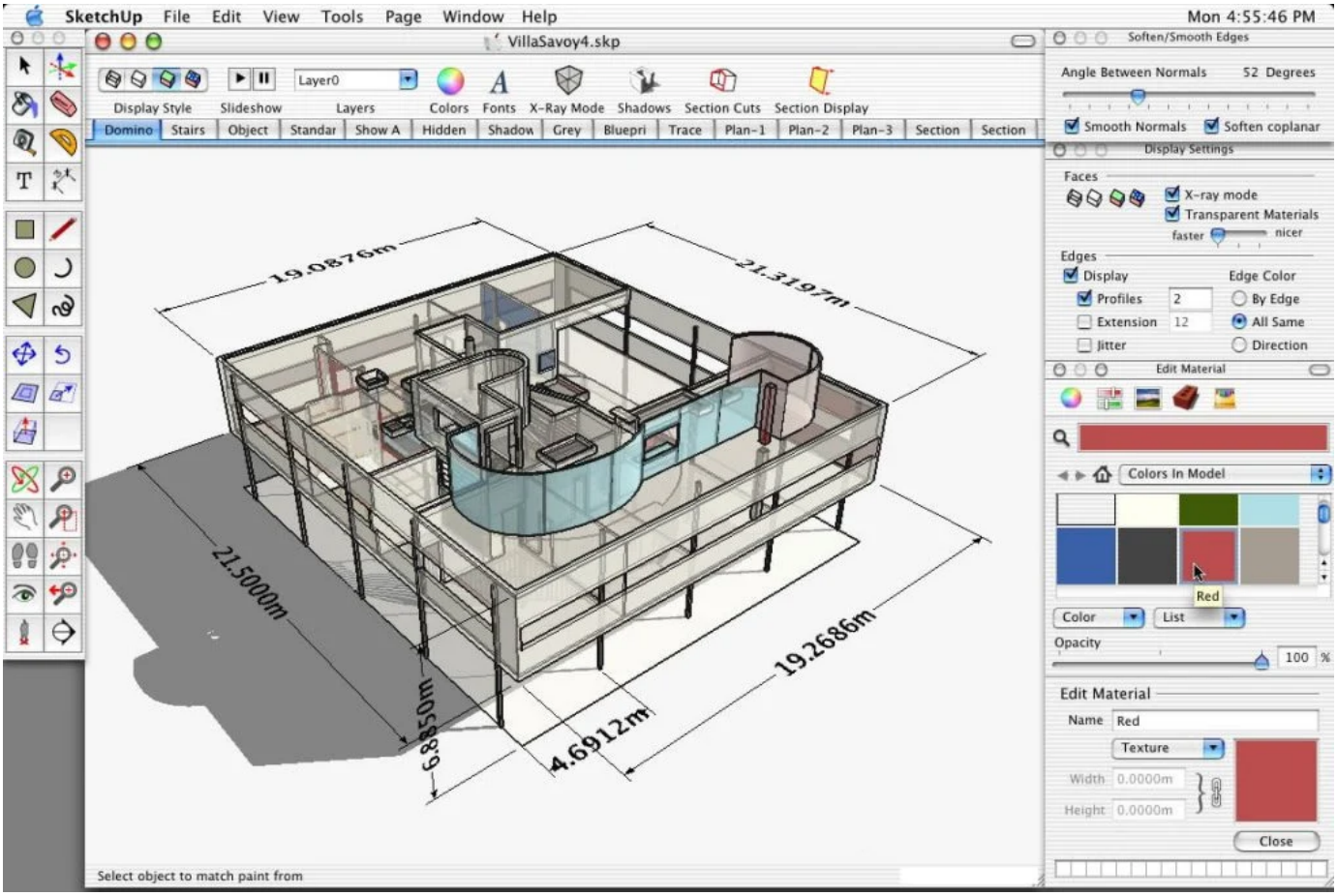


SketchUp

Price: Free web version; Pro version is $299/year
Solid modeling: No
Intended for: Beginners to advanced users
What makes it special: Intuitive and powerful, with a library of user-generated and manufacturer-produced models.

SketchUp is another good modeling software because it maintains that balance between usability and functionality, making it ideal for most skill levels. The software has an easy learning curve and there are advanced features available for professionals at an extra cost. It is especially good for designing interior and exterior architectural projects but also has tools for a diverse range of other purposes.

Anything complex can take quite a while, but simpler designs aren't too time-consuming. A freeware version, SketchUp Make, and a paid version with additional functionality, SketchUp Pro, are also available.

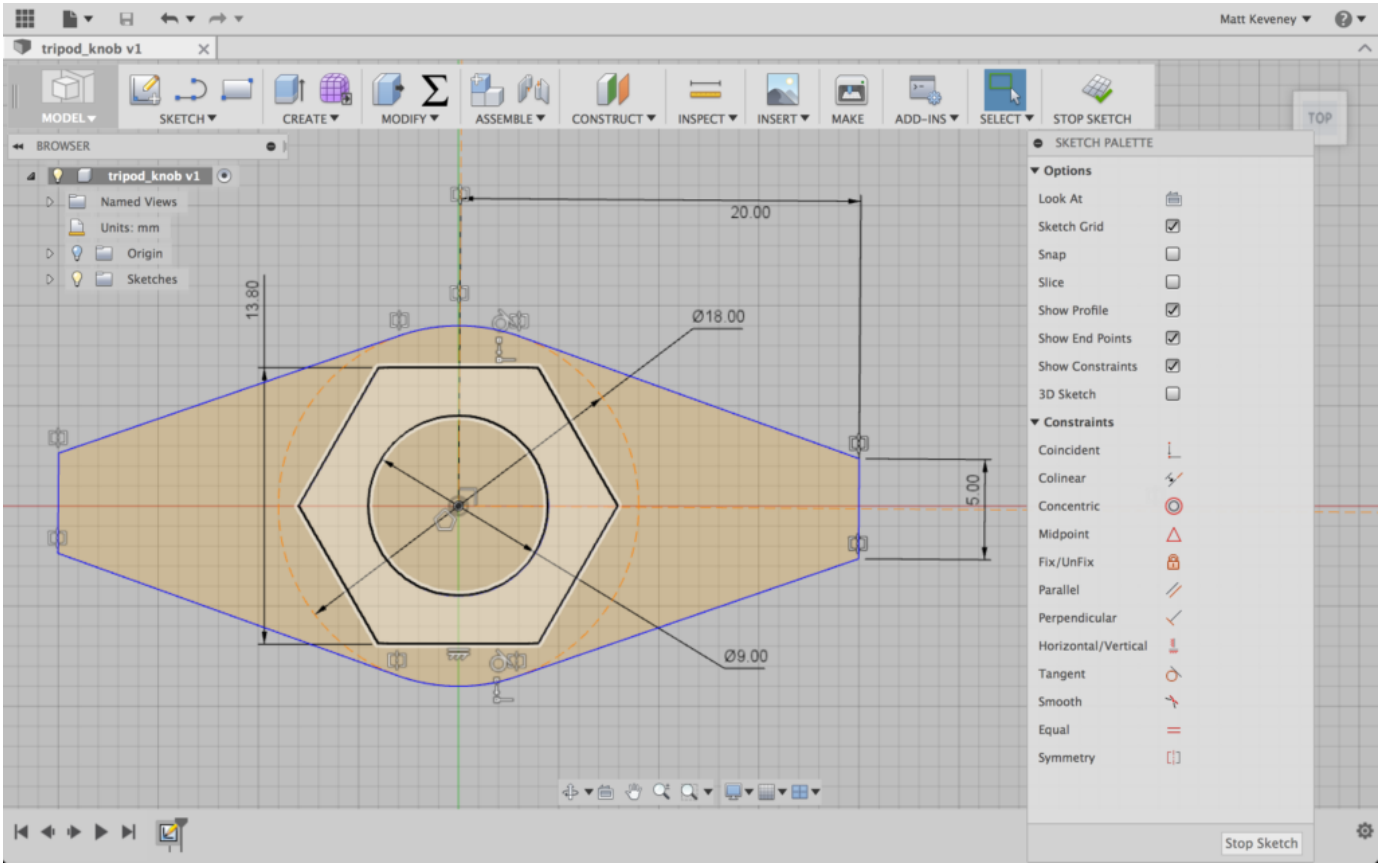


Fusion 360

Price: Free for personal use and startups, $595/year for commercial license
Solid modeling: Yes
Intended for: Amateurs to professionals
What makes it special: Lots of features, such as tools modeling and sculpting, generative design, simulation, assemblies, collaboration, 3D printing, and CAM.

This is a unique addition to the list of 3d printing software tools. Fusion 360 is a cloud-based 3D CAD program that utilizes the power of the cloud to bring design teams together and collaborate on complex projects. Another advantage of the cloud platform is that Fusion stores the entire history of the model including the changes to it. Numerous design options are available, including freeform, solid, and mesh modeling.

Fusion 360 operates on a monthly payment subscription basis. The developers also regularly update the features, making it better as new instalments come along. It runs on multiple platforms and allows users to access their information wherever they want.



MoI 3D

Price: $295

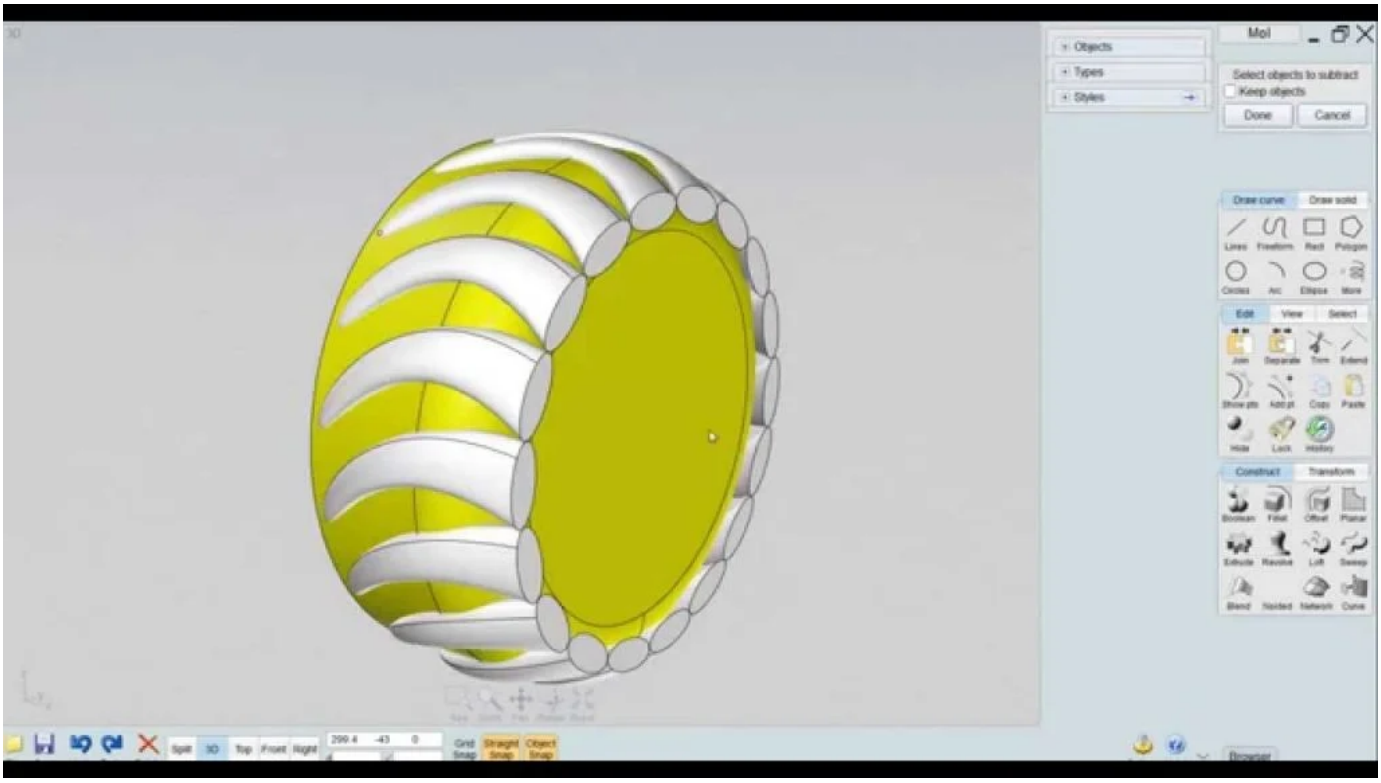
Solid modeling: Yes

Intended for: Amateurs to advanced users

What makes it special: Can create smooth meshes from CAD models and is pen-tablet friendly.

Short for Moment of Inspiration, MoI offers a sleek UI and powerful range of CAD tools for users specializing in polygonal modeling. The program comes with advanced boolean functions that enable quick design of “hard surface” models. It is a user-friendly software that uses the NURBS modeling system.

While it isn’t free, it is cheaper than some of its competitors. It has a good amount of functions in it, yet avoids being too cluttered with pointless features. The system which uses curves and booleans makes workflow quicker as well.

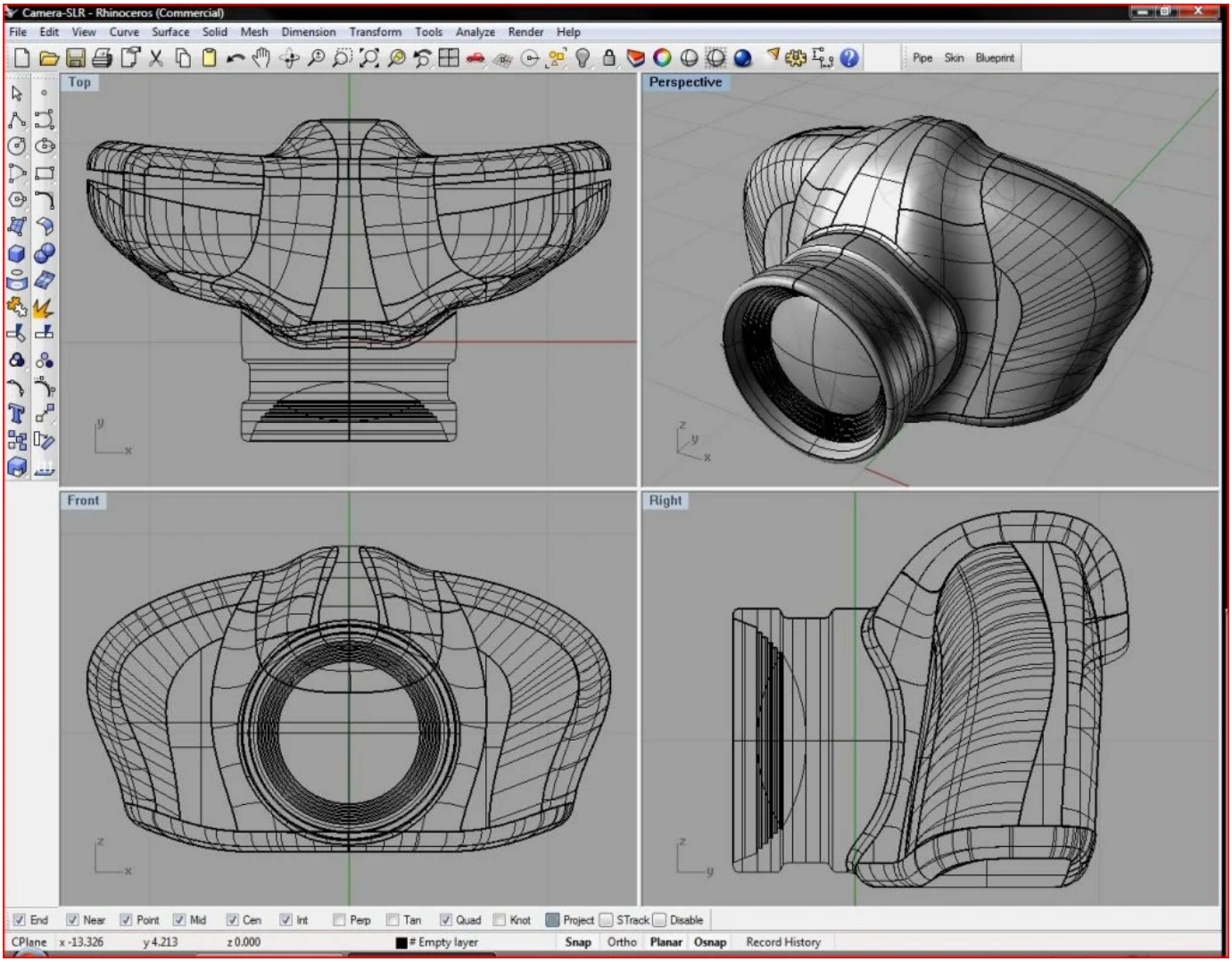


Rhino3D

Price: $995
Solid modeling: No
Intended for: Advanced users and professionals
What makes it special: Very powerful and full of features for modeling, analysis, rendering, 3D capture, CAM, and 3D printing.

The company behind this software markets it as the world's most versatile 3D-modeler. The software is available for download in a variety of bundles on their website at various prices. The program uses a precise and mathematical model known as NURB, allowing you to manipulate points, curves, meshes, surfaces, solids, and more in all sorts of ways. Ultimately, given the range of design features available with Rhino3D, it's hard to argue against its claims about unrivaled versatility in creating complex 3D models.

Users have commented on how the software can be very difficult to learn. This is a natural trade-off between capabilities and user friendly many designers have to make when creating a detailed software. While it is not the most accurate software at capturing user intent, it is one of the best on the market.



Modo

Price: $599/year or $1,799 for Perpetual license

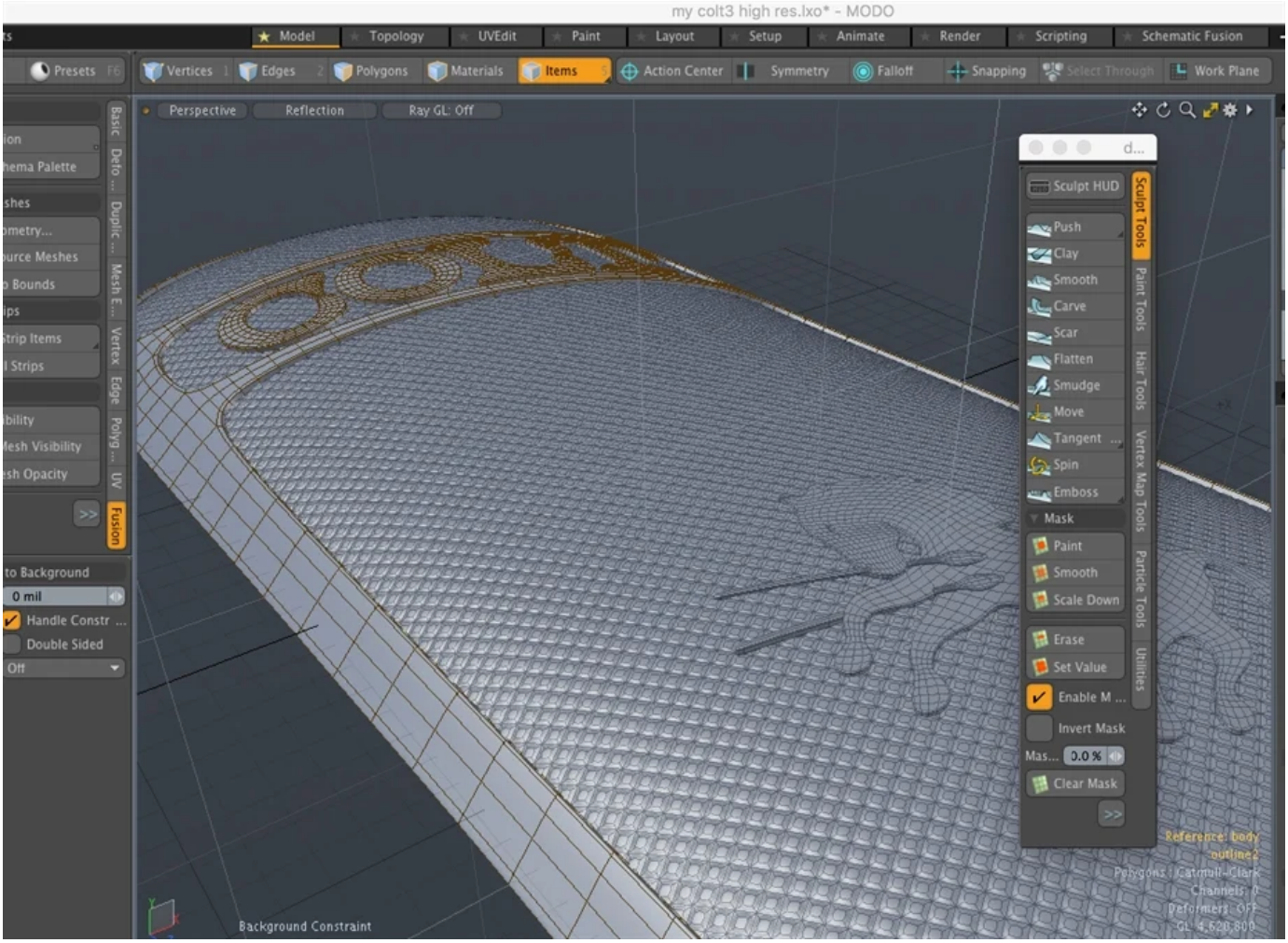
Solid modeling: No

Intended for: Amateurs to professionals

What makes it special: Procedural modeling and artist-friendly tools for modeling, animation, texturing, and rendering.

Modo provides creative 3D polygon and subdivision surface modeling tools with a lot of flexibility, allowing you to create both freeform organic models and precision meshes using the same software. This is a professional-grade program with a range of features designed for advanced 3D designers, and the price reflects this.

Even though it isn't the most user-friendly software, it hosts a large set of features while running smoothly. The speed of the software is particularly evident in terms of baking textures. It also works with partner software and extensions as additional customisations.

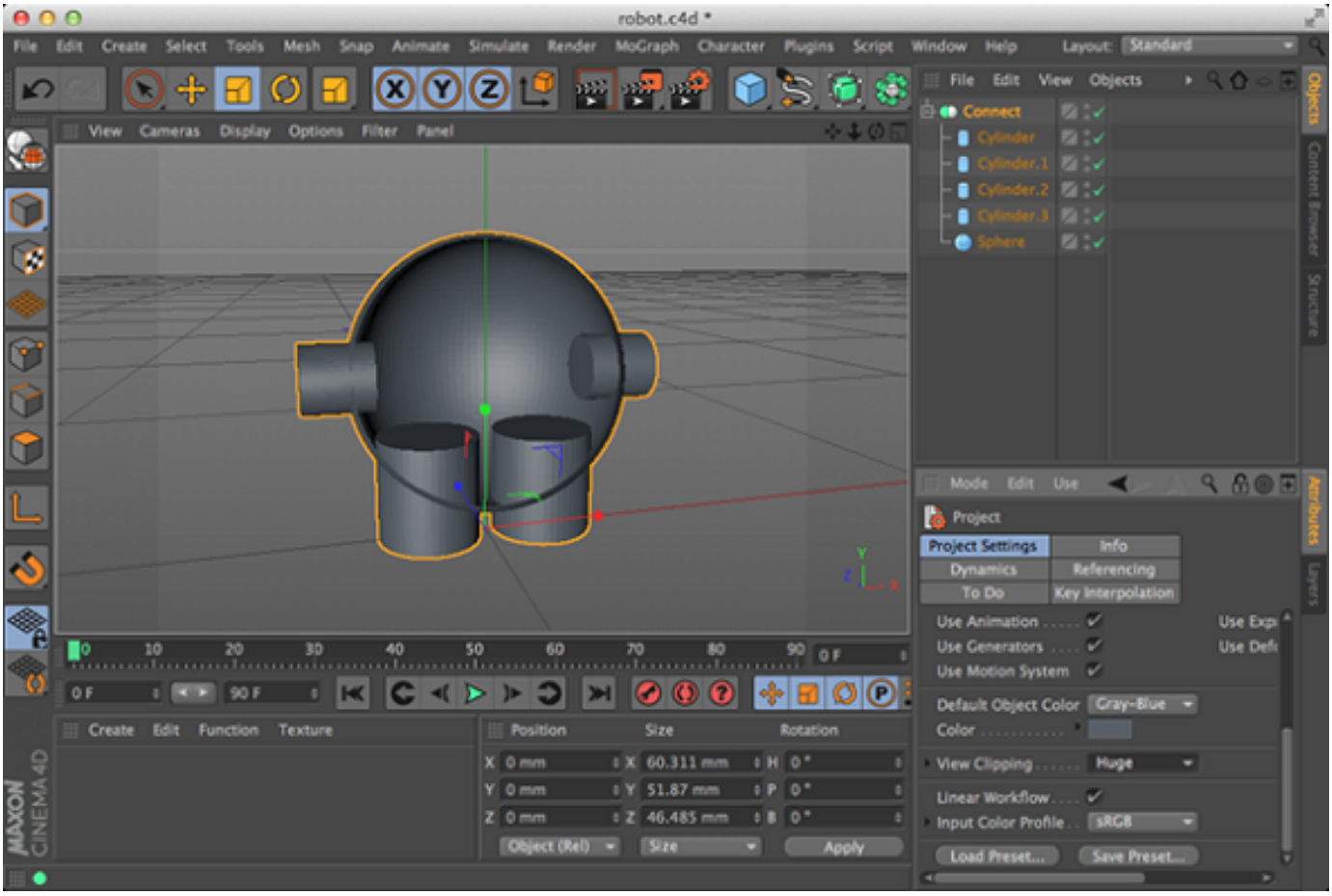


Cinema 4D

Price: $720/year or $3,945 for Perpetual license
Solid modeling: No
Intended for: Amateurs to professionals
What makes it special: An intuitive interface, parametric modeling, and procedural workflow.

This is an extremely powerful 3D modeling tool that lets you create complex 3D designs. Cinema 4D's quite flat learning curve makes it approachable for beginners intimidated by software with advanced features. The program is regularly updated with free service packs, which help to optimize how it runs on various operating systems.

The user friendly options present the prints in very accessible ways. Scaling and shading options make modeling far easier. It's sculpting tool is a great example of why this software is ideal for editing models and pre-existing files.

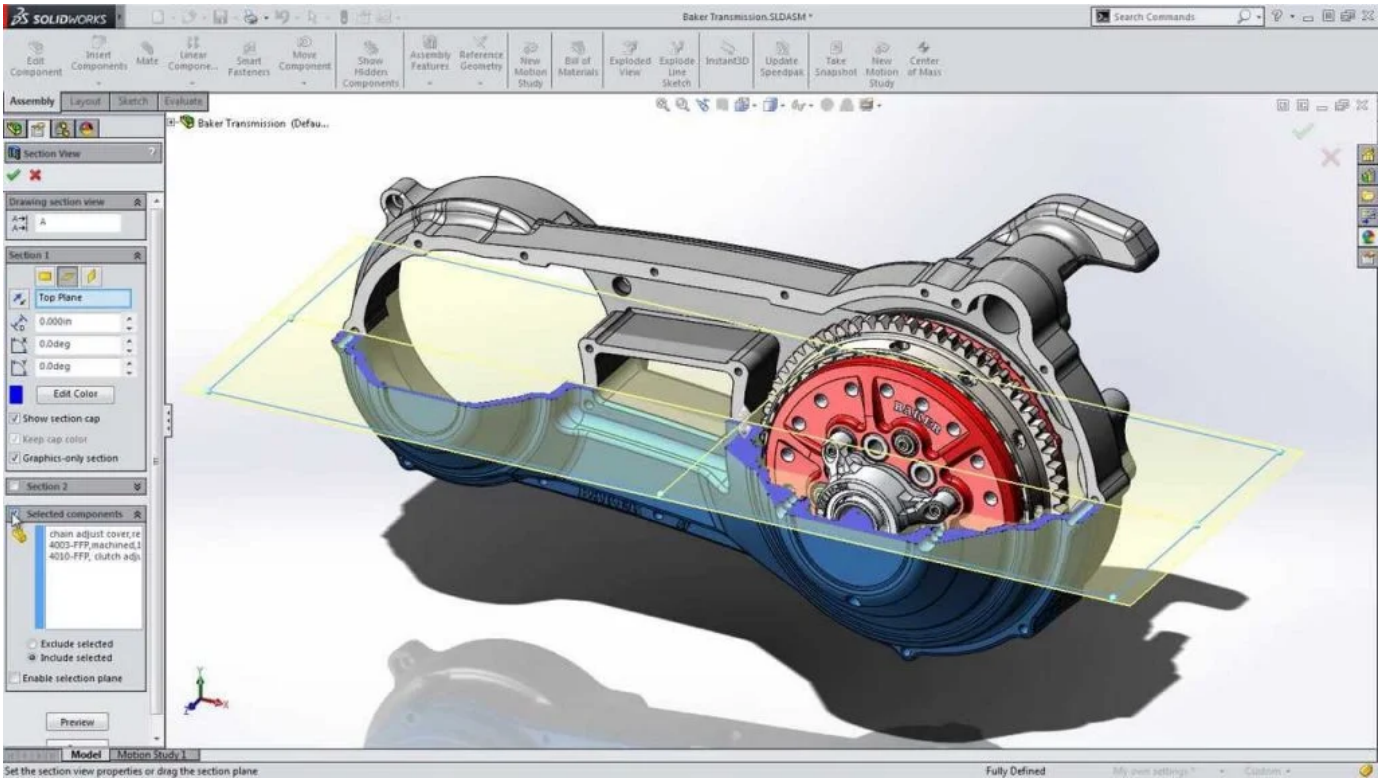


SolidWorks

Price: $1,295/year or $3,995 for Perpetual license
Solid modeling: Yes
Intended for: Amateurs to professionals
What makes it special: Powerful editing tree and tools for manufacturing, assemblies, simulation, cost estimates, CAM, and 3D printing.

Now we move on to SolidWorks. This is a CAD program often used by professional 3D designers. There are a plethora of advanced features included, such as design validation tools and reverse engineering. Solidworks comes in three distinct packages, depending on the exact features you need.

Solidworks tends towards the industrial side of things. It is practical and detailed. While most software, mimic curves through gently inclining flat structures, Solidworks uses a system of nurbs that create averages of the edges to produce fantastically detailed curvatures. It only does away with polygonal modeling, opting instead for dimensional sketching. As a result, resizing becomes far less of a hassle.

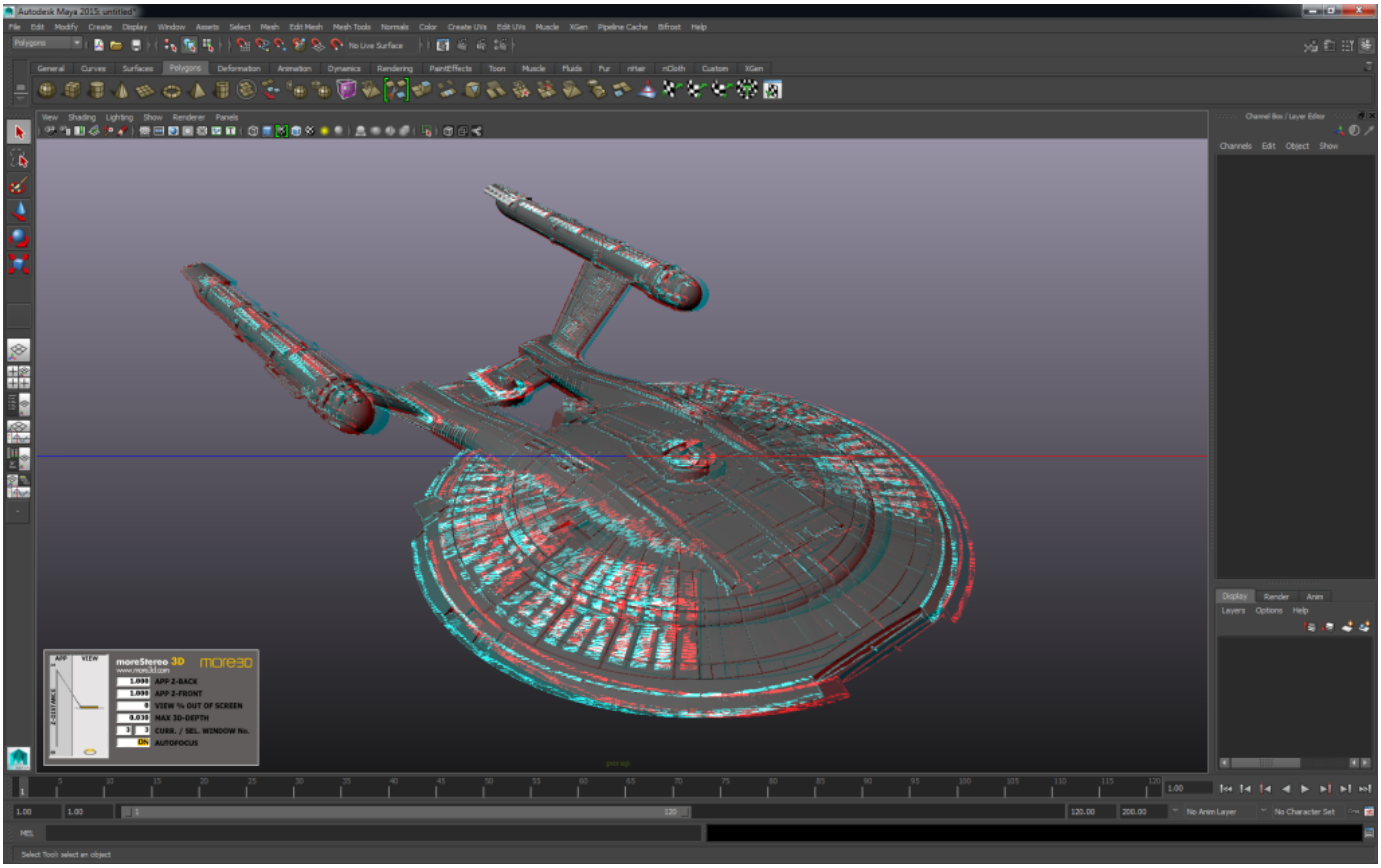


Maya

Price: $1,545/year
Solid modeling: No
Intended for: Advanced users and professionals
What makes it special: Procedural effects and powerful world and character creation tools.

Primarily marketed at animation professionals, Maya is useful for many aspects of 3D modeling, especially in terms of mathematically smooth surfaces and shapes. Maya was originally slated as a 3D animation software, but is very useful in 3D printing as well. Thus, a lot of the interface options are more reminiscent of sculpting and animation.

Maya is more applicable to artistic printing requirements. It has a fast rendering engine and is best for highly detailed models with many intricacies. The downside is that it is very expensive (it is, after all, the same software used for high-budget movie CGI|). Nonetheless, it allows for realistic representations of reflection and colour on a software with smooth operation.



3DS Max

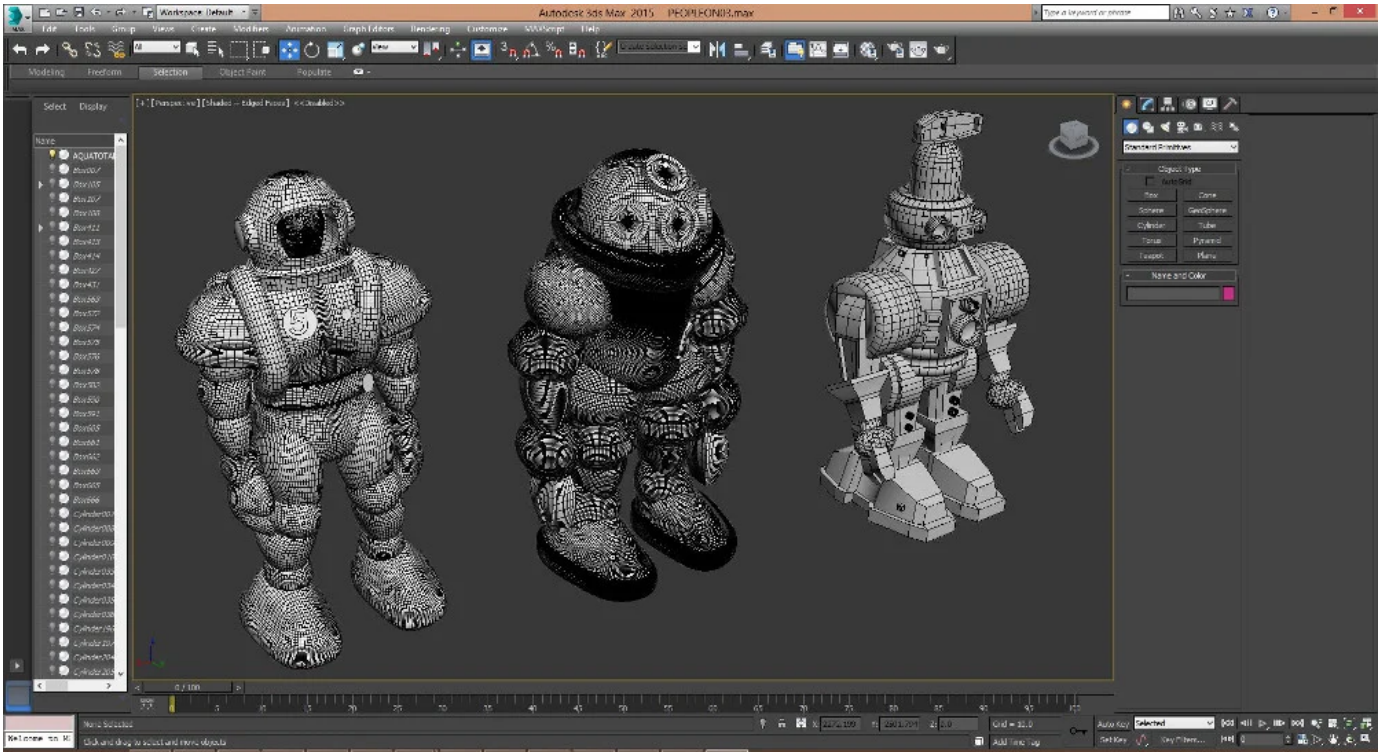
Price: $1,545/year

Solid modeling: No

Intended for: Advanced users and professionals

What makes it special: Advanced users and professionals

Another program that focuses on animation, 3DS Max offers some great 3D modeling features such as shading tools, parametric mesh modeling, and polygon modeling. This Windows only software is a favourite among video game developers, many TV commercial studios and architectural visualization studios.

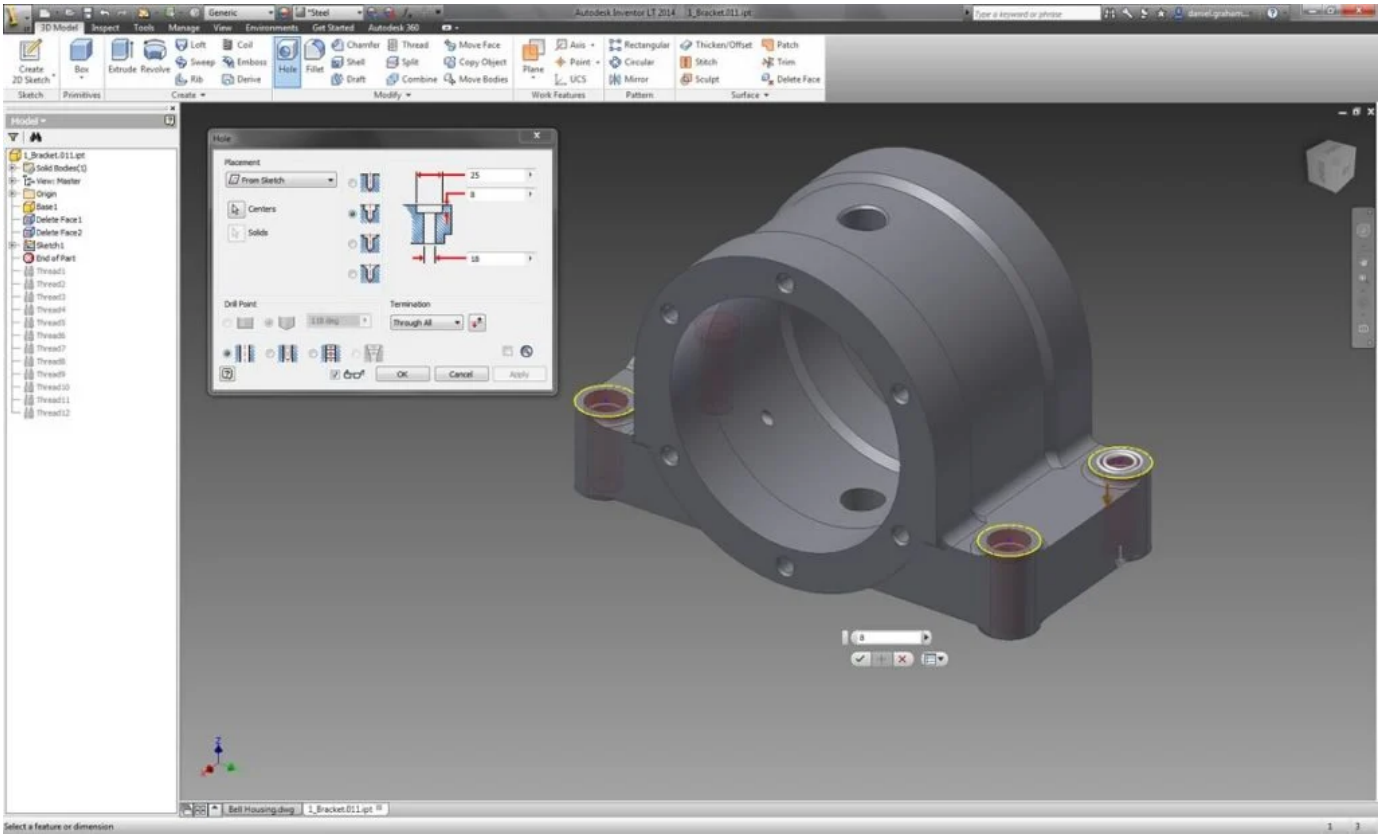


Inventor

Price: $1985/year
Solid modeling: Yes
Intended for: Advanced users and professionals
What makes it special: Tailored specifically for product design and engineering applications and loaded with tools for simulation and manufacturing.

Inventor 3D CAD software offers professional-level 3D mechanical design. The program comes with freeform, direct, and parametric modeling choices. Furthermore, you also get automation and simulation tools.

Developed by Autodesk, Inventor comes in different packages depending on level of proficiency (student, professional etc.). One of the great things about Inventor is how they improve the software with user feedback. New versions include improvements to visual data representation and the ability to easily reference 3rd party designs without the need to convert file formats.

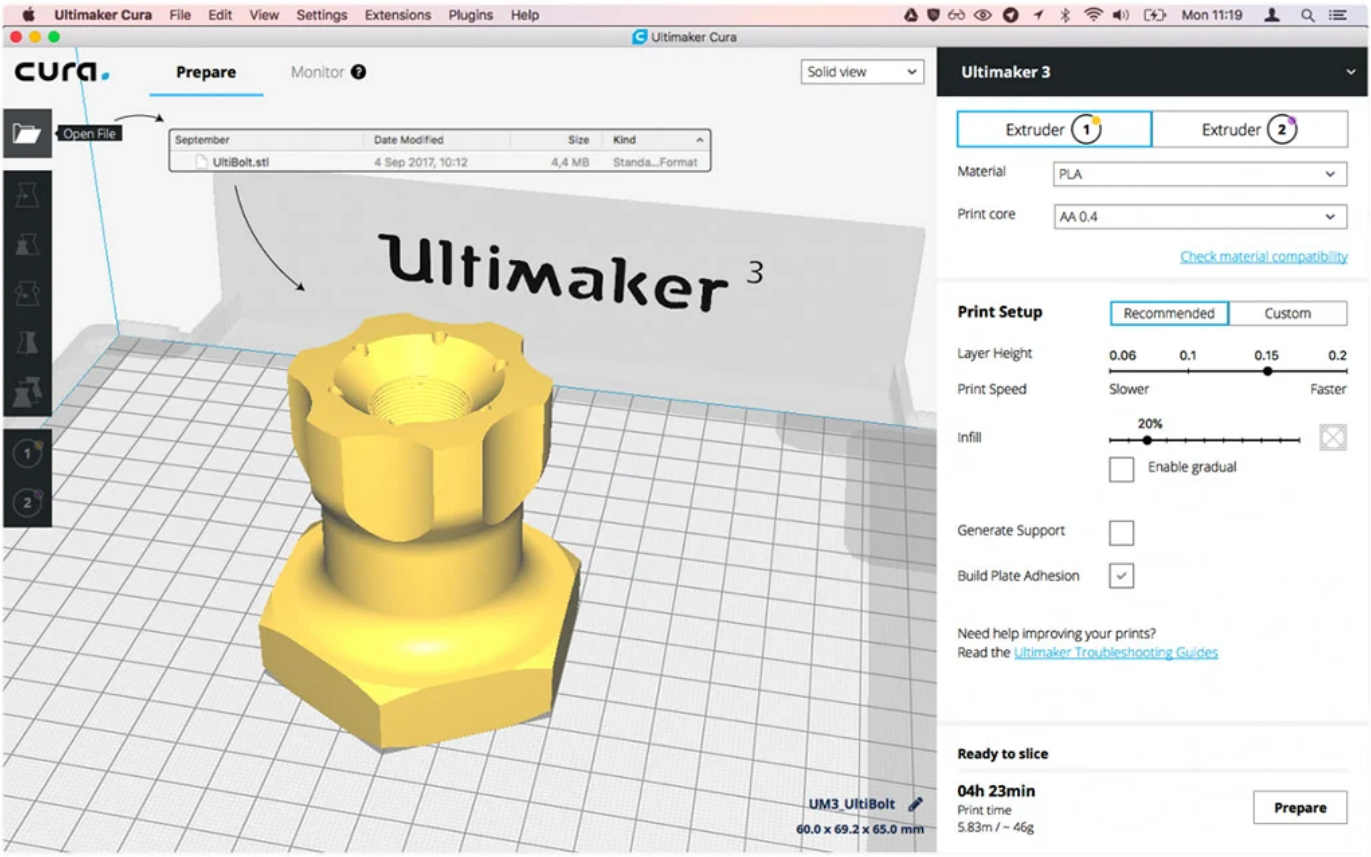


Slicers & 3D Printer Hosts

The second section of this list of the best 3D printing software tools focuses on programs that help you to execute a 3D print. Slicers are the easiest way to go from a 3D model to a printed part because they take a CAD model, slice it into layers and turn the model into G-code. The slicer software also includes 3D printer settings like temperature, layer height, print speed, etc. to the G-code. The 3D printer can read this G-code and make the model layer by layer following the instructions set in the G-code.

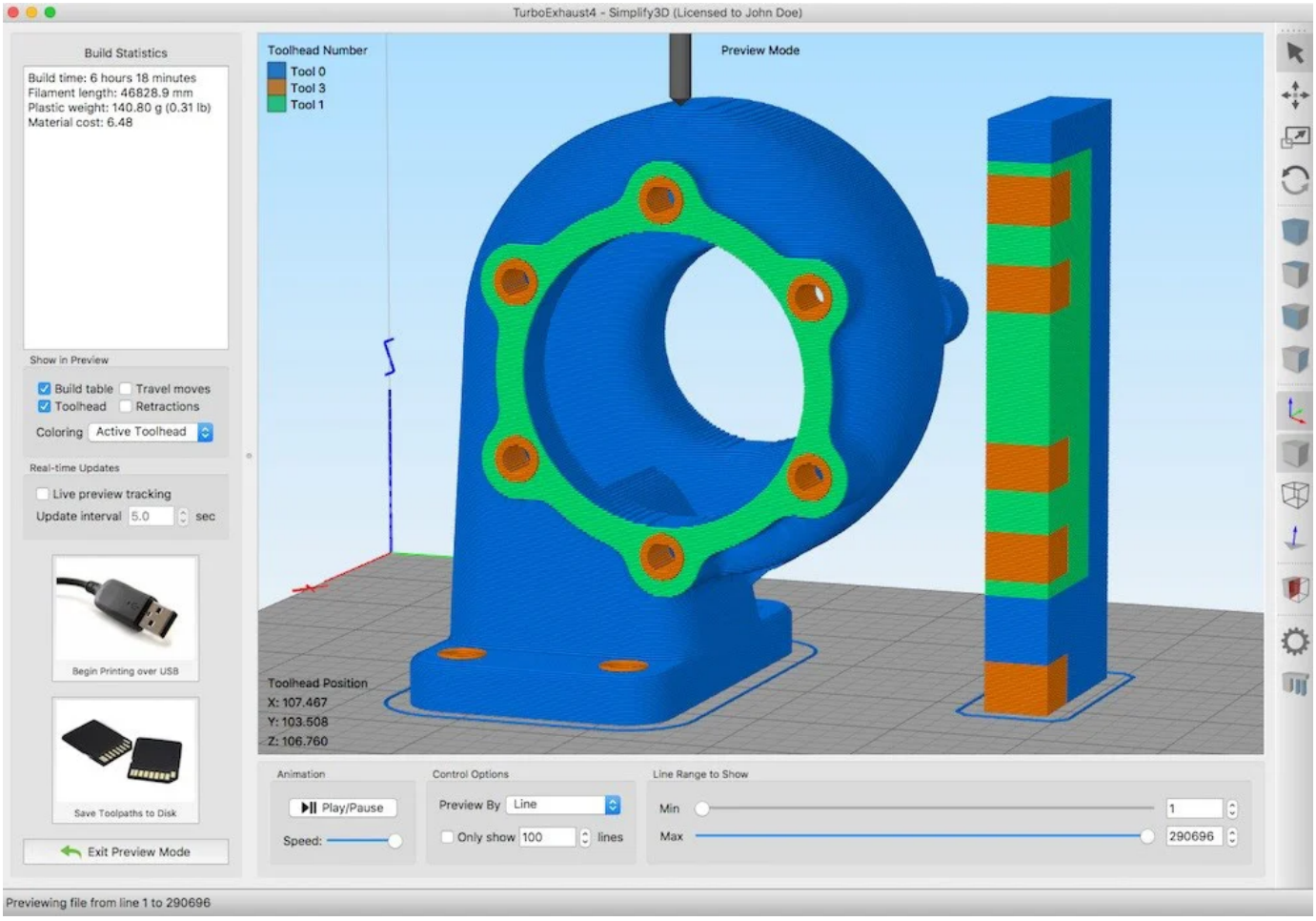
Ultimaker Cura

Despite its name, Cura can be used with almost any 3D printer because it is an open-source slicer. The program is ideal for beginners because it is intuitive and fast. Most of all, it’s easy to use. More advanced users can access a further 200 settings to refine their prints.



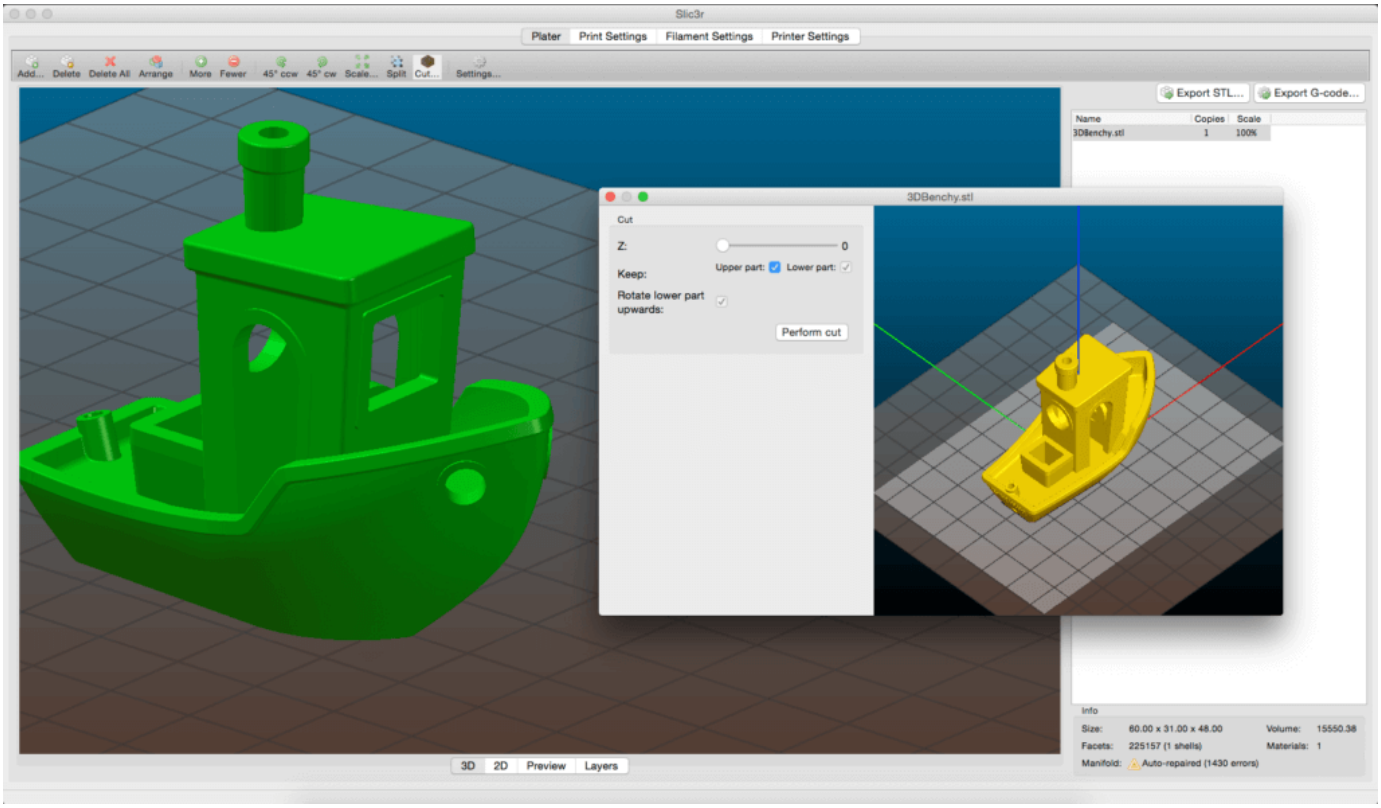
Simplify3D

Simplify3D is an extremely powerful premium slicing tool that helps you drastically improve the quality of 3D prints. Not only does Simplify3D slice your CAD into layers, it also corrects any problems with your models and allows you to preview the end result, helping to further identify any other issues. Advanced users will need to decide if the premium features are worth paying for compared to open-source slicers.



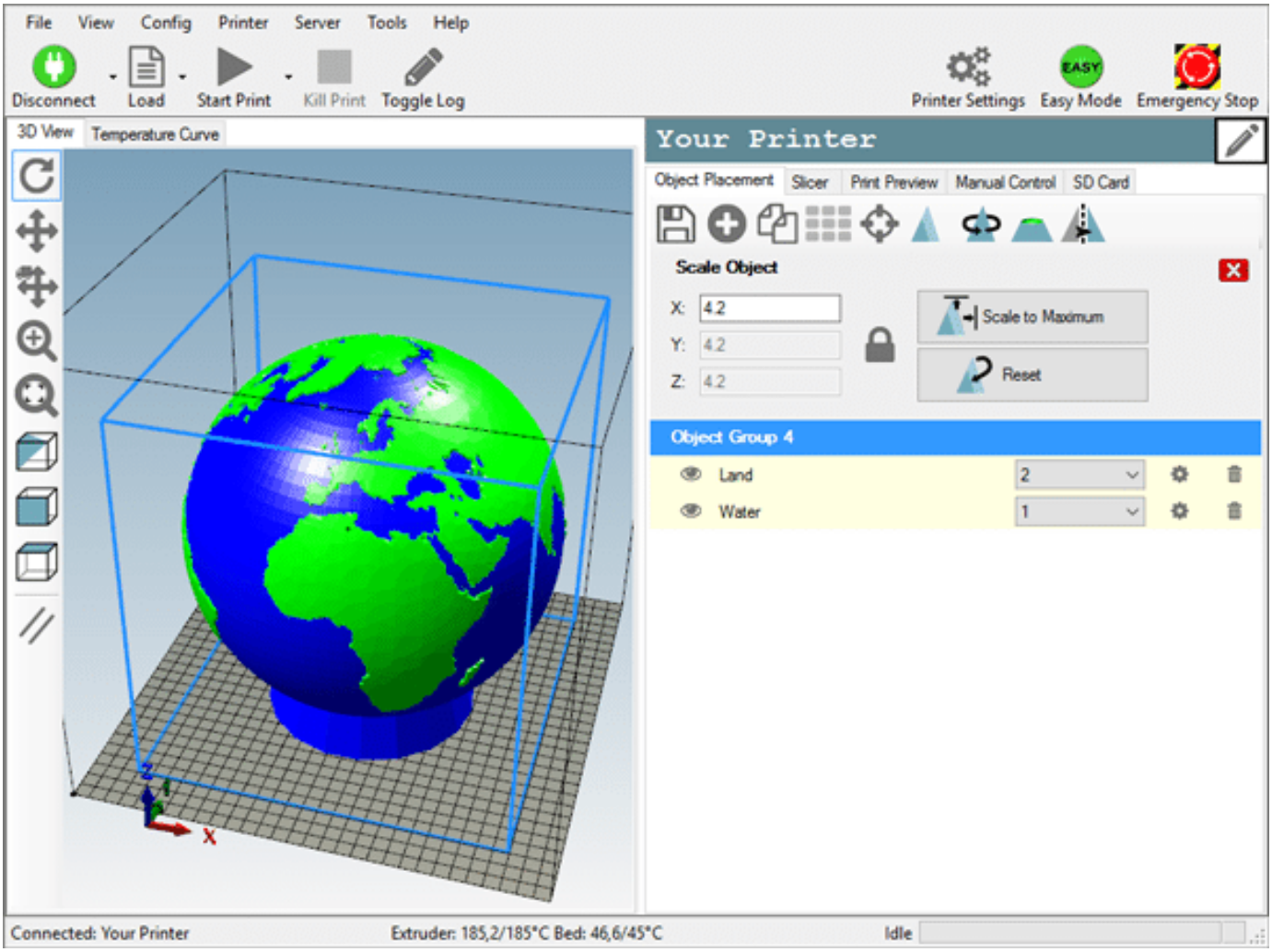
Slic3r

This open-source software includes real-time incremental slicing, 3D preview, and more. It is one of the most widely used 3D printing software tools. The incremental real-time slicing ensures that when you change a setting, the slicing doesn't need to start from scratch. Only the G-code for affected parts is recalculated. The end result is a fast, flexible, and precise slicing program.



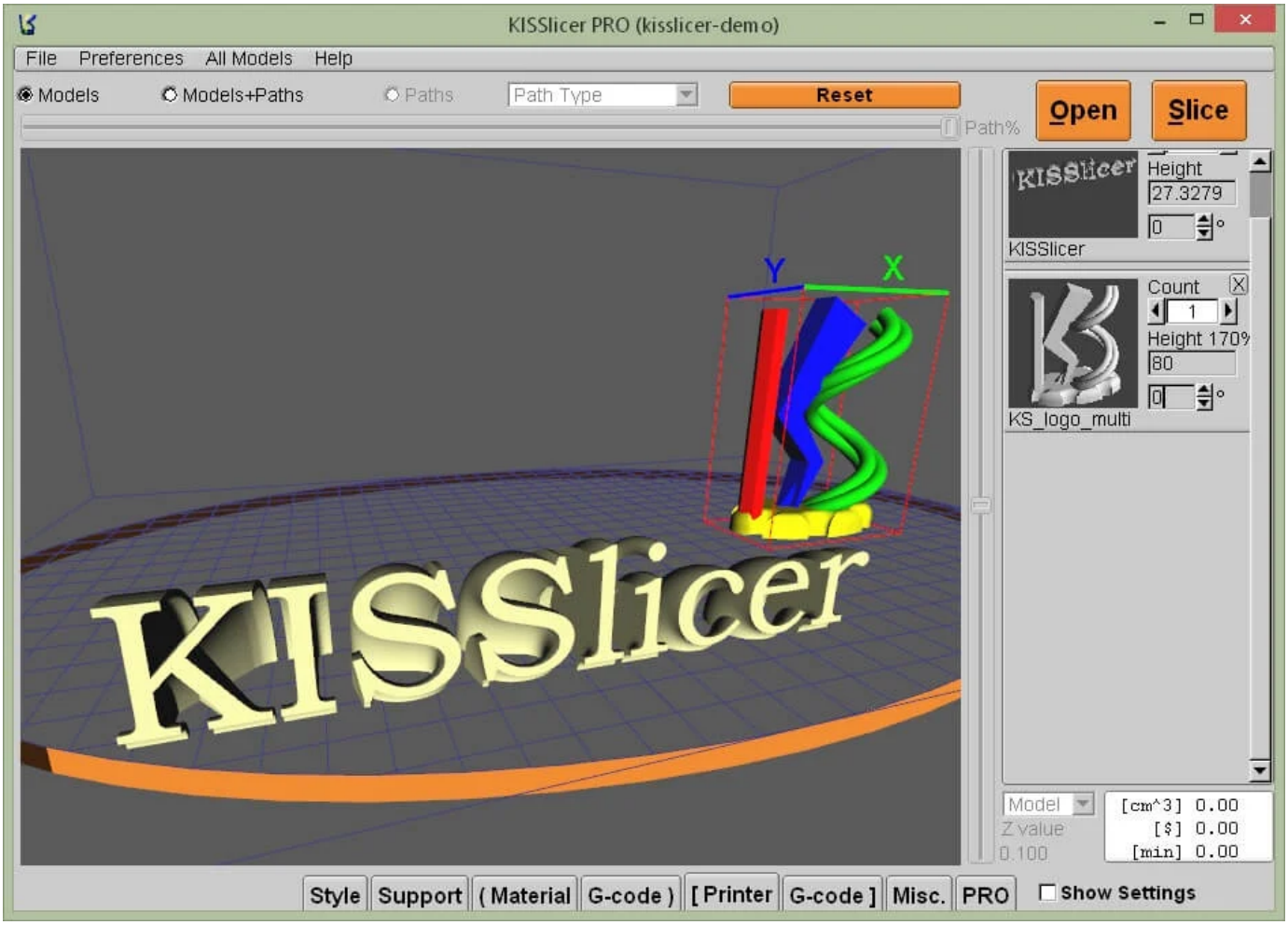
Repetier

This open-source slicer software supports three different slicing engines; Slic3r, CuraEngine, and Skeinforge. Repetier can also handle up to 16 extruders with different filament types and colors simultaneously, and you can visualize your end result before printing. There is a lot of customization and a lot of tinkering involved, making Repetier ideal for more advanced users. You also get remote access to your printers with Repetier host.



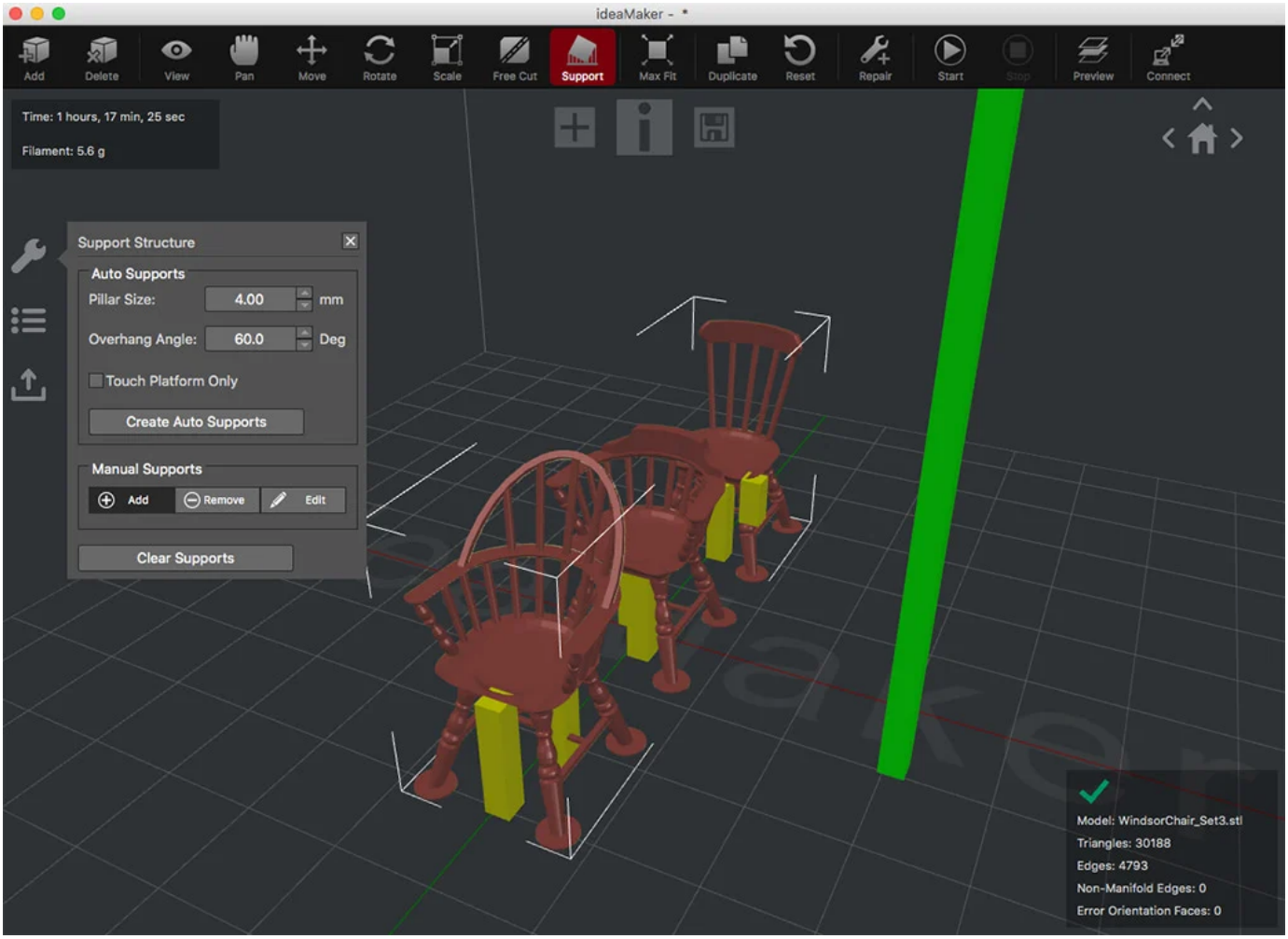
KISSlicer

This slicing software does its job well, although the user interface is somewhat basic. Still, if you just need a slicer that delivers great results, use KISSlicer. Note that the basic version is for single-head machines only. You'll need a PRO version for multi-head machines.



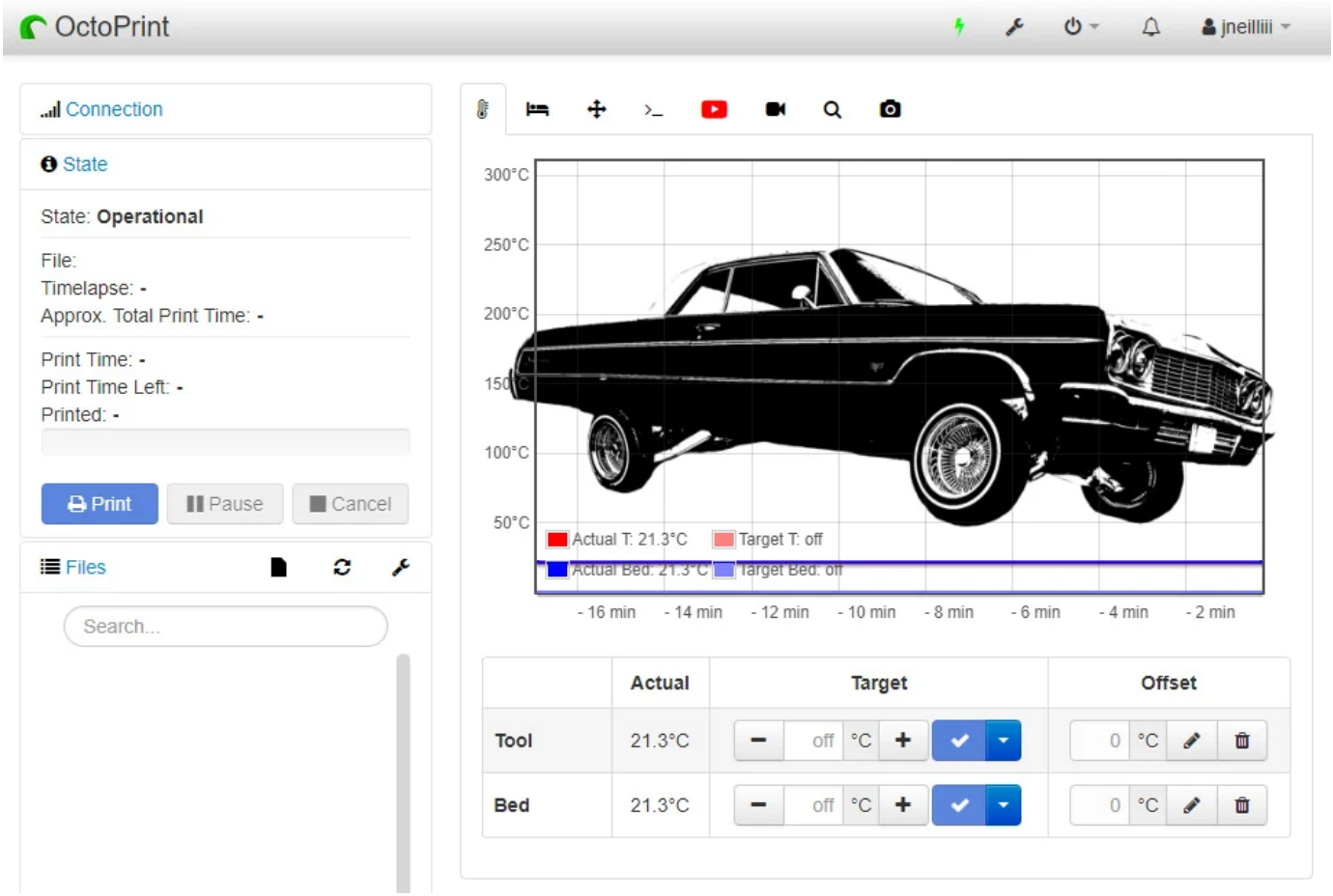
ideaMaker

This free slicer is distributed by Raise3D and provides fast, simple slicing for most 3D printers. Team members can share print profiles and supports can be automatically or manually placed. The adaptive layer height tool allows the software to adjust layer height depending on the level of detail in the model, maximizing print quality while minimizing print time. Remote monitoring and control is also available.



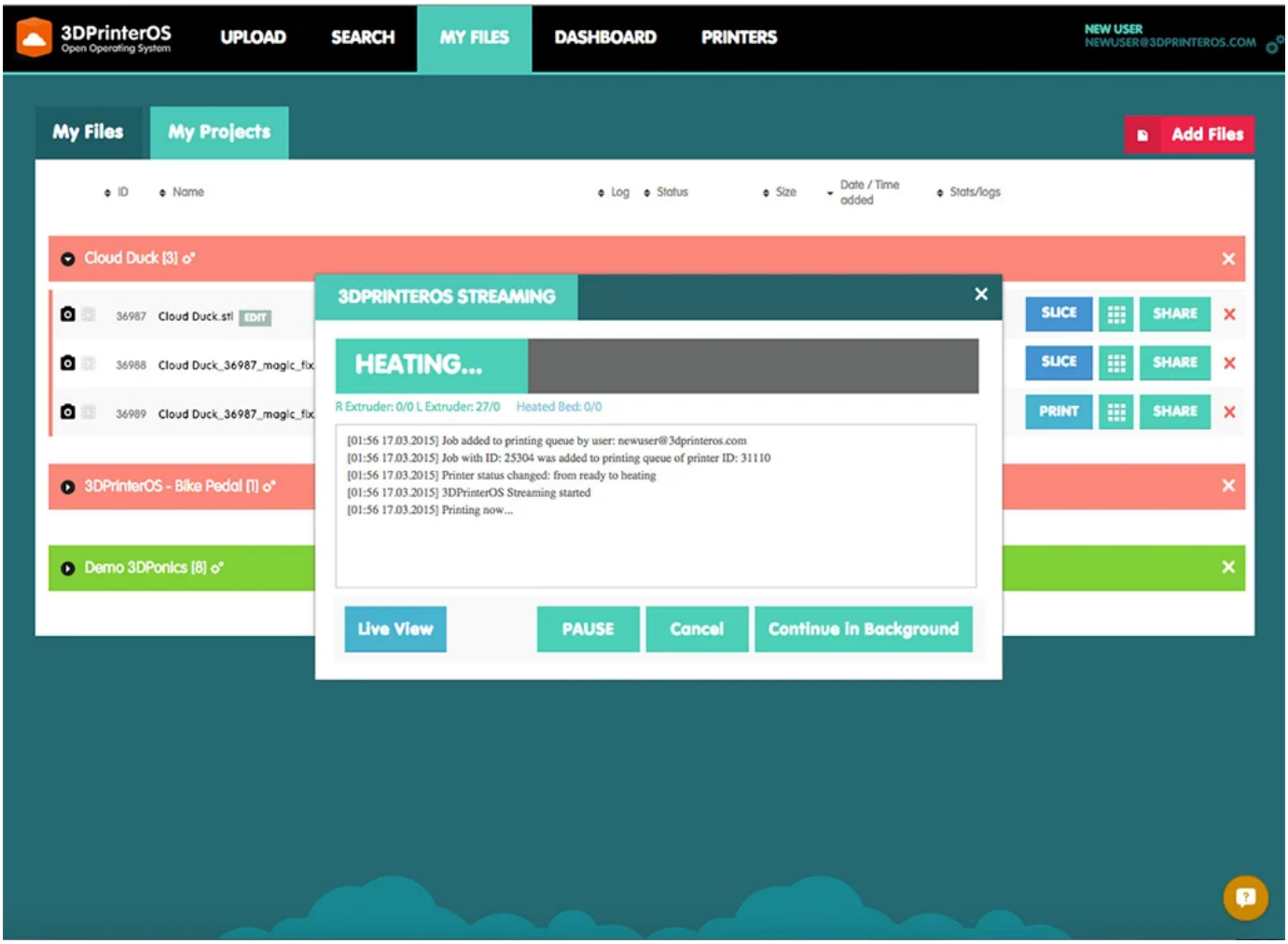
OctoPrint

A free open-source web-interface that allows for remote control and monitoring of 3D printers. It's compatible with most 3D printers and allows users to watch their prints with an embedded webcam feed. Prints can be started, paused, and stopped remotely, and plugins are available to track print statistics and send push notifications on job progress.



[3DPrinterOS]

This nifty cloud 3D printer management software comes at a cost. The essential idea is the management of the entire 3D printing process with one platform. Users can edit and repair designs, slice STL files from the cloud, and even send files for printing from anywhere in the world. The software also features the capability to share CAD files.


3DPrinterOS
Open Operating System
UPLOAD
SEARCH
MY FILES
DASHBOARD
PRINTERS
NEW USER
NEWUSER@3DPRINTEROS.COM
My Files
My Projects
Add Files
ID
Name
Log
Status
Size
Date / Time added
Stats/logs
Cloud Duck [3]
36987 Cloud Duck.stl EDIT
36988 Cloud Duck_36987_magic_fix
36989 Cloud Duck_36987_magic_fix
SLICE
SHARE
SLICE
SHARE
PRINT
SHARE
3DPrinterOS - Bike Pedal [1]
Demo 3DPonics [8]
3DPRINTEROS STREAMING
HEATING...
R Extruder: 0/0 L Extruder: 27/0
Heated Bed: 0/0
[01:56 17.03.2015] Job added to printing queue by user: newuser@3dprinteros.com
[01:56 17.03.2015] Job with ID: 25304 was added to printing queue of printer ID: 31110
[01:56 17.03.2015] Printer status changed: from ready to heating
[01:56 17.03.2015] 3DPrinterOS Streaming started
[01:56 17.03.2015] Printing now...
Live View
PAUSE
Cancel
Continue in Background