how to get your 3D print

|| *manual* ||

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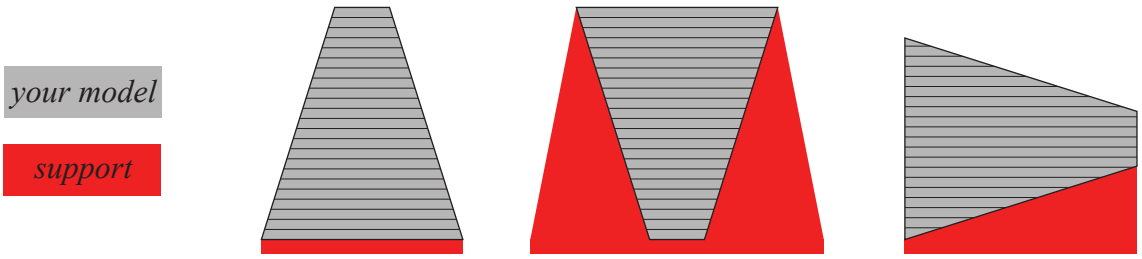
how to get your 3D print
|| general information ||

1| prices

ETH internals will pay 2.00 CHF/cm3 material and externals 3.50 CHF/cm3. unfortunately it is not so easy to simply take the model's volume and multiply it with the price....
depending on the geometry, the printer needs different amounts of support material as it has to print more layers onto something. The printer starts at the bottom of the model and works its way up.
apart from that, you can choose if you want to have the model solid or sparse. Sparse means that only the outer surface will be printed solid and the interior with a lighter structure.
so it is very hard to tell how much your model will cost as the price is dependent on many variables. The most common option is to print the model sparse, not solid, and to have the model standing so you will have horizontal layers later. based on our experience so far you can roughly estimate that you'll need 0.8 cm3 support material per 1.0 cm3 of the model
for an approximate cost calculation send us your file.
for a precise cost calculation we will need proper mesh data of your model.



2| what we need from you

as mentioned above, we need proper mesh data in order to process the model for a precise cost calculation and later for printing. if your file is not a good mesh, the 3D printer program can't process it and therefore we neither can tell you the precise price nor print it later.
so what is a good 3D mesh file?
a good 3D mesh file contains the volume to be printed as only one single continuous mesh. Self-intersections, holes, non-matching or naked edges are NOT allowed - the program is very picky in that sense. For tips in how to check your mesh or how to repair it, you can read the next page

3| duration

this is again dependent to your mode: how big it is, what the geometry is like etc. small pieces take 1-2 hours, medium-sized prints (architectural models) 1-2 days. On average it takes about 5.5 min per cm3 of model. after the printing, we have to put it into a lye bath to dissolve the support material, this will take some more hours.

4| colours

from the available colour range (see right photo) we store ‚natural' (far left), ‚white' (second from left) and ‚black' (far right) at the moment. if you want to have different colours contact us.

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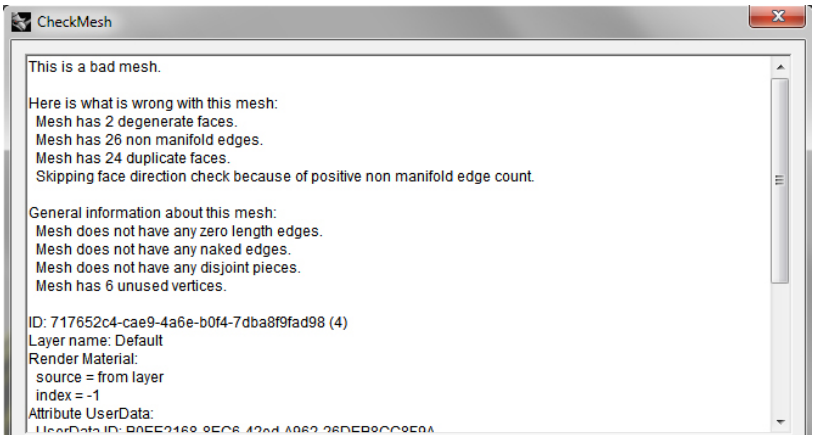
how to get your 3D print
|| making good 3D data with rhino ||

make a good 3D model

all you need to do is proper 3D modeling. But, as you know, this is not as easy.
what often leads to problems are complex boolean operations with many surfaces, or working with a lot of point clouds etc. when you are modeling something more complex it will almost always happen that the result will be a bad mesh. so it is very likely that you'll have to repair your mesh.

check your 3D mesh with rhino

there is an easy way to check if the mesh is good just by typing „_CheckMesh" into the command line and then pick the mesh you want to check. this will open a window with all the details of your mesh.
if it is a bad mesh, as in this case, you will need to take care of all the problems listed on top.



repair your 3D data

first (and cheaper) way: repair it yourself
to repair your model you have to open rhino help and look for „Check/repair meshes". there you'll find solutions to most of your problems. you'll have to do most of the commands several times in order to fix everything. So e.g. you first repair the degenerated faces, then check the mesh again, then take care of something else, then check the mesh again etc. etc. until all the problems are solved.
sometimes for very complicated problems you will have to delete single mesh surfaces and rebuild them by hand. but this happens only for very messy meshes when surfaces are in between each other and intersect etc.
second way: let us do the work
you send us the file and we fix it for you. we will charge you the hours spent on repairing the mesh with 25CHF/hour. normally a bad mesh takes 1-2 hours, a very bad mesh up to 4 hours. sometimes it is not possible to fix it at all but we will already tell you this before spending 4 hours on it.

export your mesh

when everything is fine with your mesh, rotate it to the position you would like to have it printed later depending on how want to have the layers visible.
then select the mesh and export it as an .stl file. when asked for the options choose binary.

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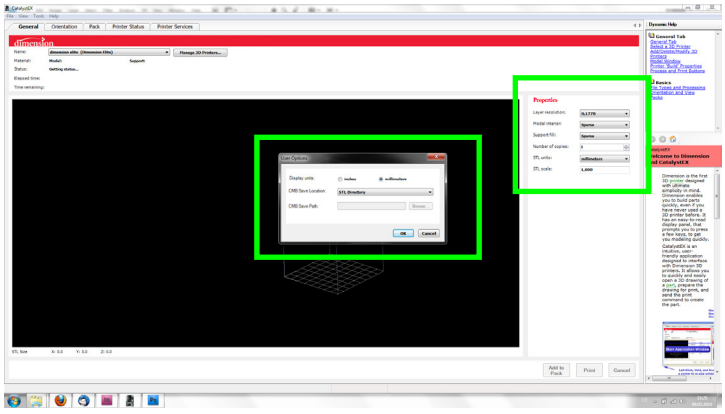
how to get your 3D print
|| check your file for production ||

process the file with the printer program

if you finally have a good 3D mesh out of rhino, it is ready to print in most cases.
there is the possibility to check your file with the 3D printer program. You can find this program installed on two computers(#4 and #5) in room HIL E65 at ETH Hönggerberg.
by processing the file with this program, you make sure that everything is fine, you'll know exactly how much it will cost and how long it will take to print.
if you don't have access to these computers, you can e-mail us the stl-file containing the good mesh and we will check it and tell you the exact price and time needed.
if you have access to the computers, it will be faster for you to check the file by yourself as it will mostly likely need back and forth and therefore quite some time.
in order to check the file, go to one of those computers and open the program Dimension/CatalystEx and follow the instructions below.

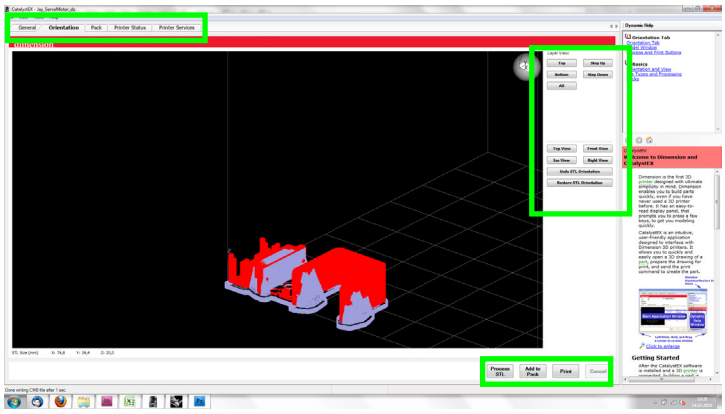
|1| general settings

after opening the program make sure that the correct settings are set up:
- tools/options:
display units millimeters
- properties:
choose whether you want to have the normal or the fine resolution. then choose whether you want to have a solid or a sparse model interior. support has to be set to sparse. all of this will have an effect on speed and the amount of material used.



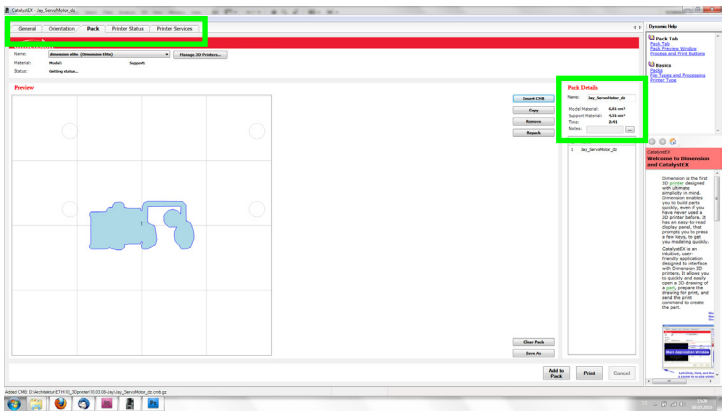
|2| loading your file

go to file/open stl file. you will see your model now in the window. then go the orientation. here you can still rotate your model if you want to. then click on „process stl". the program will now process your file which might take a while. if everything is fine, you will get something similar to this here. the red lines are the tool paths for the model, the blueish lines represent the tool paths for support material. then click on „add to pack"



|3| check price and time

now click on pack on the top. in the new window you'll see now exactly how much model/ support material will be needed and how long it will take. simply add the model and support material and calculate it by 2.00 CHF for ETHaffiliates or 3.50 CHF for externals.



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