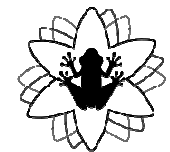




# Laminación e Impresión 3D

con Hardware y Software Libre

por bioplastic3D



[www.bioplastic3D.es](http://www.bioplastic3D.es)

–Slic3r, PronterFace, Prusa, Arduino

Puesta en Marcha y Calibración de la impresora 3D RepRap Prusa i3

–Ajustes de la Laminación con Slic3r

Modo Básico y Modo Avanzado, la Primera Capa

–Imprimiendo y Editando el G-Code con Pronterface

–Primera Impresión y análisis

–Preparación de Modelos para Impresión

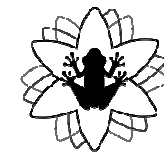
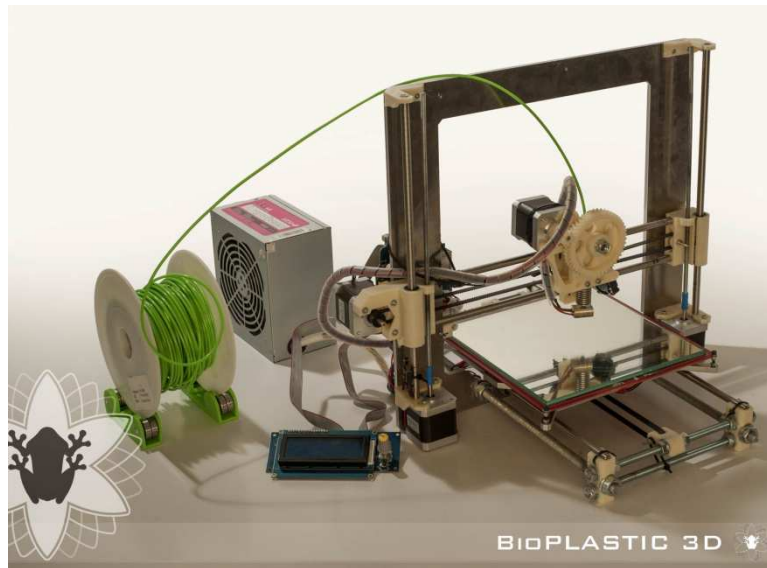
Formatos, búsquedas, reparaciones de malla

–Ejemplos Prácticos



# Puesta en marcha y calibración de la Impresora 3d repprap prusa i3

- 1) El Marco está estable y correctamente alineado
- 2) Las Correas están tensas
- 3) La Cama está a Nivel con las trayectorias del Extrusor
- 4) El Filamento rueda libremente desde el carrete
- 5) La corriente de los motores paso a paso, está ajustada correctamente
- 6) El Firmware está correctamente configurado:  
control de temperatura, fines de carrera, dirección de los motores...
- 7) El Extrusor está calibrado en el firmware con el nº correcto de pasos por mm de filamento



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# Ajustes de Laminación con Slic3r

## Modo Básico

### Ajustes de la Impresión. Print Settings

#### General:

Altura de Capa, Perímetros, Capas Sólidas

#### Relleno:

Densidad del Relleno, Patrón de Relleno

#### Material de Soporte:

Generar Soporte, espacio del patrón de soporte, falda de apoyo

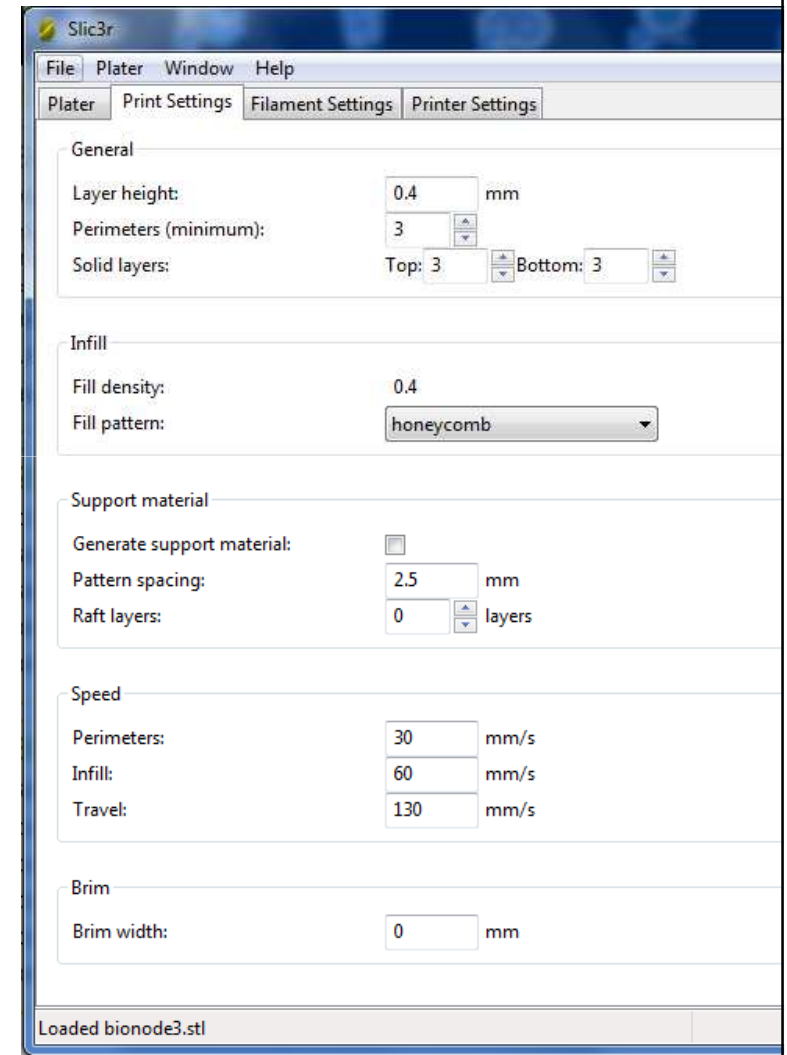
#### Velocidades

Perímetros, Relleno, Velocidad de Viaje

#### Alas o Brim

Impresión Secuencial de Objetos

“Los Print Settings se ajustarán prácticamente para cada impresión”



## Modo Básico

### **Ajustes del Filamento. Filament Settings**

#### Filamento:

Diámetro, Multiplicador de Extrusión  $\pm 5\%$

#### Temperatura:

Extrusor, Cama

“Los Filament Settings se ajustarán para cada rollo de filamento.”

### **Ajustes de la Impresora. Printer Settings**

#### Tamaño y Coordenadas

Tamaño de la Cama, Centro de Impresión, Desfase en Z

#### Firmware

RepRap (Marlin/Sprinter/Repetier)

#### Extrusor:

Diámetro del Nozzle

#### Retracción:

Longitud, Desplazamiento en z



# Ajustes de Laminación con Slic3r

## Modo Avanzado

The image displays three overlapping screenshots of the Slic3r software interface, focusing on advanced settings for filament printing. The top-left window shows the 'Printer Settings' tab with the 'Extrusion width' section. The top-right window shows the 'Printer Settings' tab with the 'Retraction' section. The bottom window shows the 'Printer Settings' tab with the 'Cooling' section.

**Extrusion width settings:**

Default extrusion width:	0	mm or % (leave 0 for auto)
First layer:	200%	mm or % (leave 0 for default)
Perimeters:	0	mm or % (leave 0 for default)
Infill:	0	mm or % (leave 0 for default)
Solid infill:	0	mm or % (leave 0 for default)
Top solid infill:	0	mm or % (leave 0 for default)
Support material:	0	mm or % (leave 0 for default)

**Retraction settings:**

Length:	1	mm (zero to disable)
Lift Z:	0	mm
Speed:	30	mm/s
Extra length on restart:	0	mm
Minimum travel after retraction:	2	mm
Retract on layer change:	<input checked="" type="checkbox"/>	
Wipe while retracting:	<input type="checkbox"/>	
Retraction when tool is disabled (advanced settings for multi-extruder setups)		
Length:	10	mm (zero to disable)
Extra length on restart:	0	mm

**Cooling settings:**

Enable auto cooling:

If estimated layer time is below ~30s, fan will run at 100% and print speed will be reduced so that no less than 30s are spent on that layer (however, speed will never be reduced below 10mm/s).  
If estimated layer time is greater, but still below ~60s, fan will run at a proportionally decreasing speed between 100% and 35%.  
During the other layers, fan will be turned off.

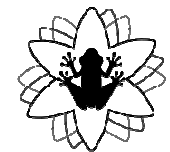
**Fan settings:**

Fan speed:	Min: 35	Max: 100
Bridges fan speed:	100	%
Disable fan for the first:	1	layers

**Cooling thresholds:**

Enable fan if layer print time is below:	60	approximate seconds
Slow down if layer print time is below:	30	approximate seconds
Min print speed:	10	mm/s

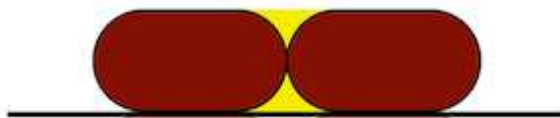
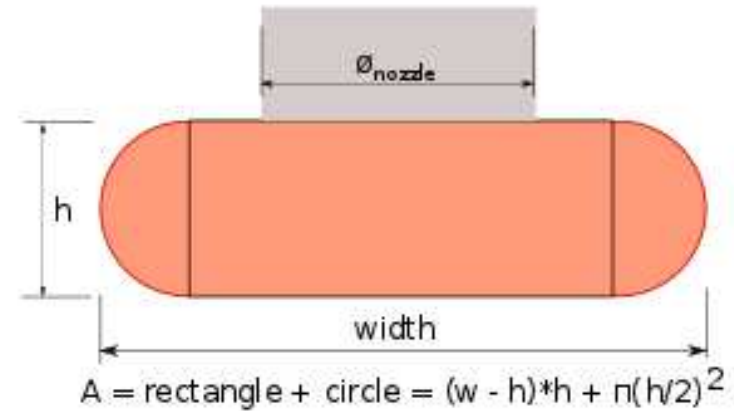
Version 1.0.0RC2 - Remember to check for updates at <http://slic3r.org/>



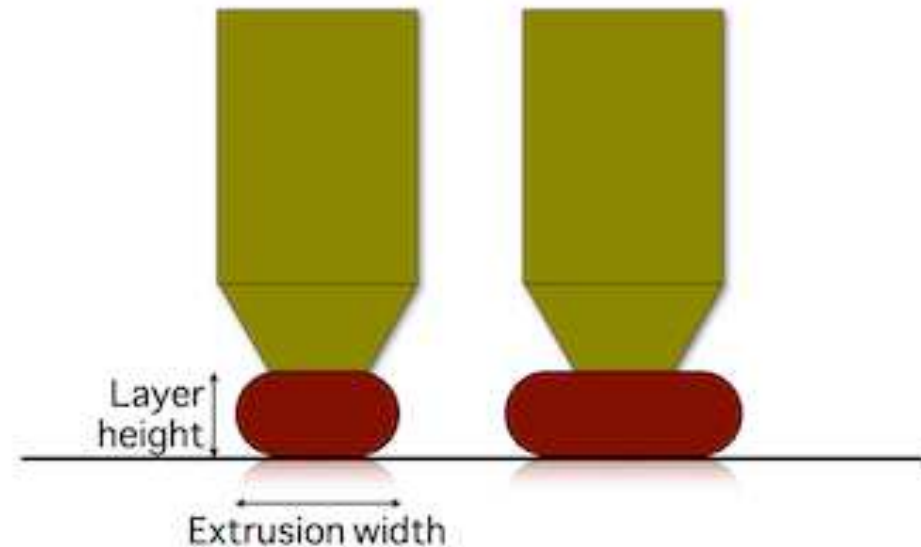
# Ajustes de Laminación con Slic3r

## La Importancia de la Primera Capa

- Correcta Nivelación de la cama
- Incrementar la temperatura
- Bajar la Velocidad
- Correcta Calibración del extrusor
- Altura de la Primera Capa
- Ancho de la Primera Capa
- Material Adherente de la Cama
- Sin Ventilación



Ancho por defecto de Extrusión=  
Diámetro del Nozzle \*1,05



# Imprimiendo y Editando el G-Code con Pronterface

The screenshot displays the Pronterface software interface. On the left, there are control panels for temperature (Heater and Bed) and extrusion. The central area shows a 3D visualization of a red, multi-faceted object. On the right, a G-code editor window is open, showing the following code:

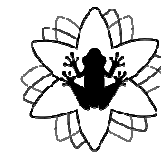
```

- from 88.03 mm to 111.96 mm in X and is 23.93 mm wide
- from 88.03 mm to 111.96 mm in Y and is 23.93 mm deep
- from 0.00 mm to 17.28 mm in Z and is 17.28 mm high
Estimated duration: 0:16:35
[INFO] Initialized 3D visualization in 0.05 seconds
[INFO] Vertex count: 28446
Reset.
Slicing C:\Users\user\Documents\00002014 TRABAJOS\CURSOS
FABRICACION DIGITAL\lamination\bionode3.stl
Slicing Slic3r\slic3r.exe C:\Users\user\
TRABAJOS\CURSOS FABRICACION
\bionode3.stl --output C:\Users\user\
TRABAJOS\CURSOS FABRICACION
\bionode3_export.gcode --load C:\
\Slic3r\printer\Bukan1 0.3.ini --load
\Slic3r\printer\WOZZ 0,4 Z +0.00
\AppData\Roaming\Slic3r\Filament
=> Processing triangulated mesh
=> Generating perimeters
=> Detecting solid surfaces
=> Preparing infill surfaces
=> Detect bridges
=> Generating horizontal shells
=> Combining infill
=> Infilling layers
=> Generating skirt
=> Exporting G-code to C:\Users\
TRABAJOS\CURSOS FABRICACION
\bionode3_export.gcode
G1 X99.049 Y94.293 E2.06267 F1800
M106 S255
G1 X100.951 Y94.293 E2.09494 F600.000
M106 S255
G1 X102.122 Y95.465 E2.12439 F1800
M106 S255
G1 X102.019 Y96.050 E2.13449 F600.000
G1 X102.053 Y96.351 E2.13961
G1 X102.126 Y96.704 E2.14574
G1 X102.256 Y97.045 E2.15193
G1 X102.531 Y97.423 E2.15987
G1 X102.701 Y97.576 E2.16375
G1 X102.874 Y97.697 E2.16734
G1 X103.222 Y97.858 E2.17384
G1 X103.861 Y97.979 E2.18489
G1 X104.069 Y97.968 E2.18842
G1 X104.547 Y97.890 E2.19664
M106 S255
=> Infilling layers
=> Generating skirt
G1 X105.566 Y100.886 F7800.000
G1 F1800.000 E1.25459
G92 E0
G1 X100.711 Y105.012 F7800.000
G1 E1.00000 F1800.000
G1 X99.289 Y105.012 E1.02631 F600.000
G1 X98.853 Y104.576 E1.03771
G1 X101.147 Y104.576 E1.08014
G1 X101.362 Y104.141 E1.08913
  
```



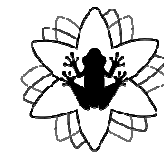
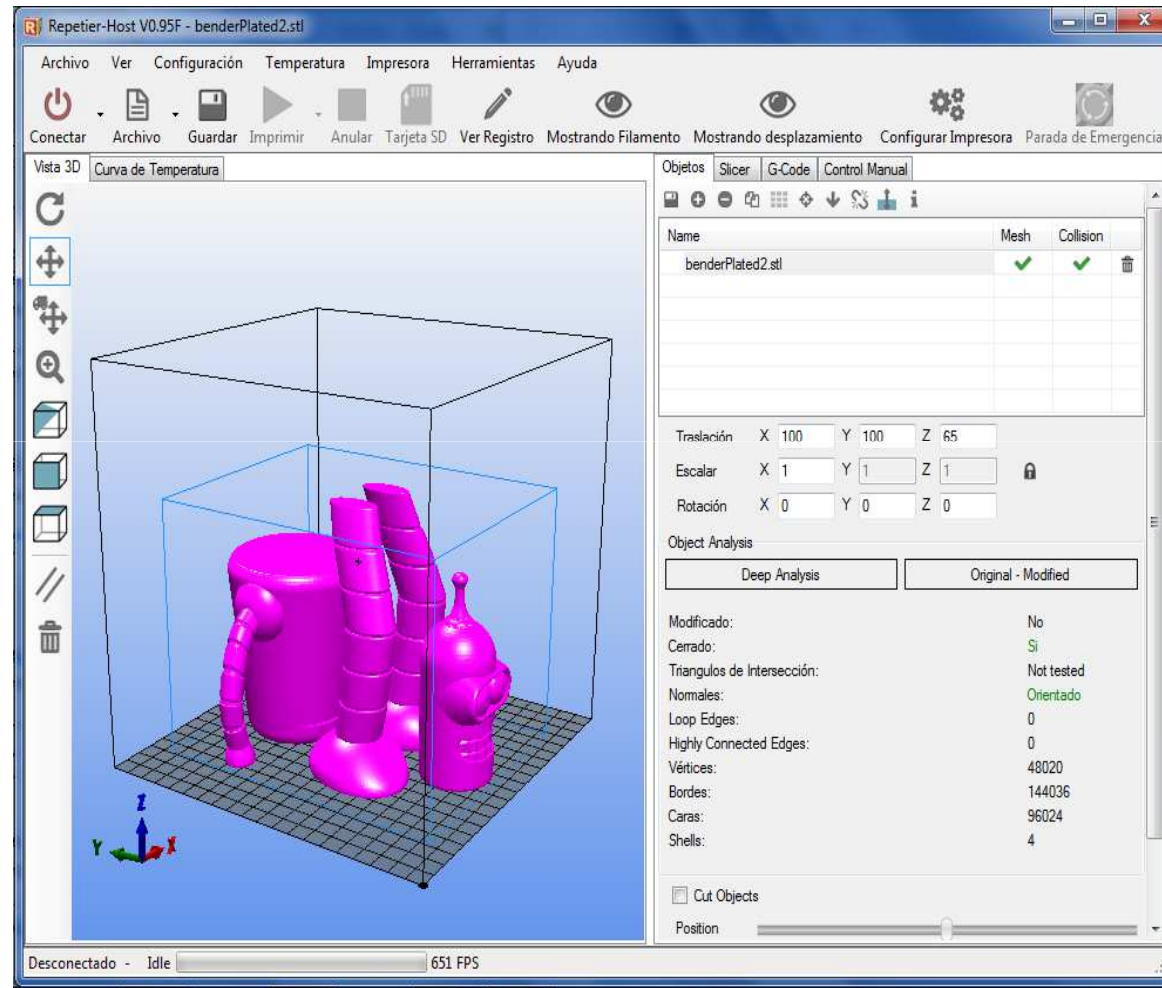
# Primera Impresión y análisis

The screenshot shows a web browser window displaying a Thingiverse page. The URL is [www.thingiverse.com/thing:338338](http://www.thingiverse.com/thing:338338). The page title is "Calibration Cube / Cubo de calibración" by Bioplastic3D, published May 21, 2014. The main image shows several 3D printed calibration cubes in various colors (yellow, orange, green, blue, white) and shapes. To the right of the image is a sidebar with interaction options: Like (3), Collect (4), Comment (0), I Made One (0), Remix It (0), and Share. Below these is a blue button labeled "Download This Thing!". At the bottom of the page, there is a navigation bar with tabs for Thing Info, Instructions, Thing Files, Comments (0), Made (0), Collections (4), and Remixes (0). The description area is partially visible, showing the text "Description" and "AutoCAD 2010".



# Preparación de Modelos para Impresión

## Formatos, búsquedas, reparaciones de malla



# Ejemplos Prácticos

