

# 3D Printing User's Guide



MCLD 257



# Table of Contents



## Content Page

### Section 1 – Summaries

Training & Access 3

Quick Guide 4

### Section 2 – Detailed Guides

Training & Access Notes 5

Journal Vouchers 6

Laboratory Rules 7

Printing Notes 8

Preparing to Print 9

Embedded & Host Computers 10

Printing Software 11

Laying out Parts 12

Design & Layout Notes 13

Printing Parts 14

Cleaning Up 15

Logging the Print 16

# Training & Access - 3D Printing

## Training

- Request a training session via: <http://engservices-ece.sites.olt.ubc.ca/?p=3366>
- Attend the scheduled training session, in MCLD 257

## Journal Voucher

- Submit a completed journal voucher to the finance clerk, in KAIS 5500
- **IMPORTANT:** keep a record of the reference RT# and speedchart

## Access

- Access to 3D printers will be granted only once these steps are complete
- Remember to log all of your prints and clean up after yourself

More information is located on our website at:  
[eng-services.ece.ubc.ca/fabrication/3d-printing/](http://eng-services.ece.ubc.ca/fabrication/3d-printing/)

# Quick Guide - 3D Printing

## Before Printing

- Check info board for notices to users
- Saves files in your own directory
- Place any waiting parts on counter

## Printing

- Print your parts
- Report any issues to [3d@ece.ubc.ca](mailto:3d@ece.ubc.ca)

## After Printing

- Clean up in and around the printer
- Log your print using the online form

Scan here



to log your print

The Self-Serve 3D Printing Form is located at:  
[eng-services.ece.ubc.ca/fabrication/3d-printing/self-serve-3d-printing-form/](http://eng-services.ece.ubc.ca/fabrication/3d-printing/self-serve-3d-printing-form/)

# Training & Access Notes

Engineering Services reserves the right to cancel access at any time for improper use of the laboratory

Usage  
Limitations

Training

Training session may be done individually or in small groups

Completion and submission of a journal is required before any printing can begin

Journal  
Vouchers

Access  
Timeframe

Access is valid for the time period specified on the journal voucher

Keep a record of your Reference RT, given during training

Reference  
RT#

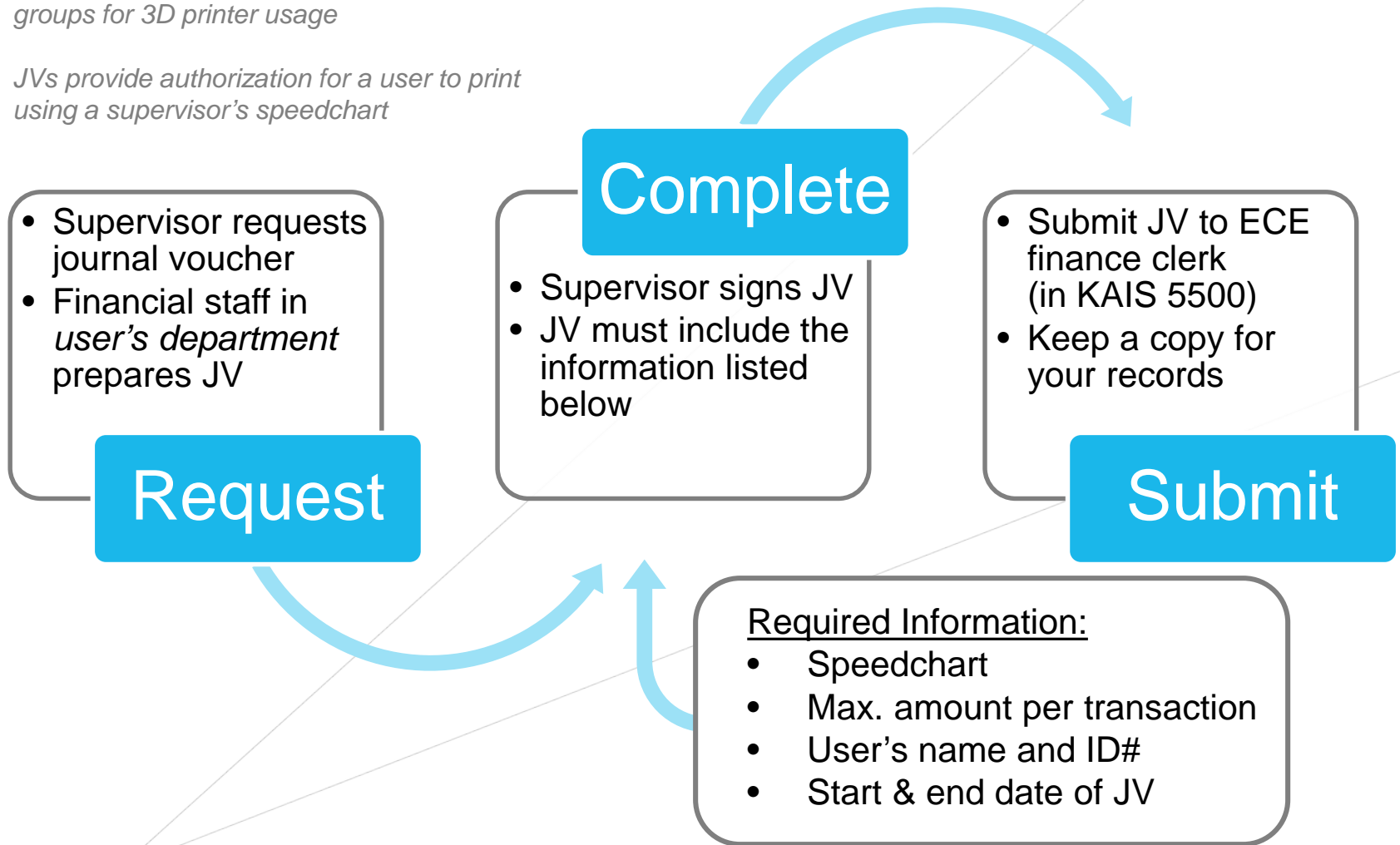
Access  
Expiry

Access expires annually on March 31st

# Journal Vouchers

ECE uses journal vouchers (JVs) to bill groups for 3D printer usage

JVs provide authorization for a user to print using a supervisor's speedchart



# Laboratory Rules

## 1. Maintain laboratory safety

- No food or drinks allowed
- Clean up printer after every print
- Clean up around sink after removing support material

## 2. Access is non-transferable

- Do not provide access to other persons, including in your research group
- User access will be revoked if found providing access for non-authorized persons

## 3. Each print must be logged

- Use the online form to log the material used for each print
- Card access will be revoked for all users if parts are printed without being logged – parts will need to be submitted through the Engineering Services staff

# Printing Notes

Keep in mind;  
3D printing is primarily a *prototyping* process, not a production process

Material  
Limitations

The price for materials is posted on our website

Material  
Cost

The final cost is based on the material used (build + support)

Time and cost can be balanced by changing the layout of the parts

Time/Cost  
Tradeoffs

You can also submit parts for printing online (+\$15 setup fee)

Parts  
Submission

Copy your files to your own folder, within your supervisor's directory

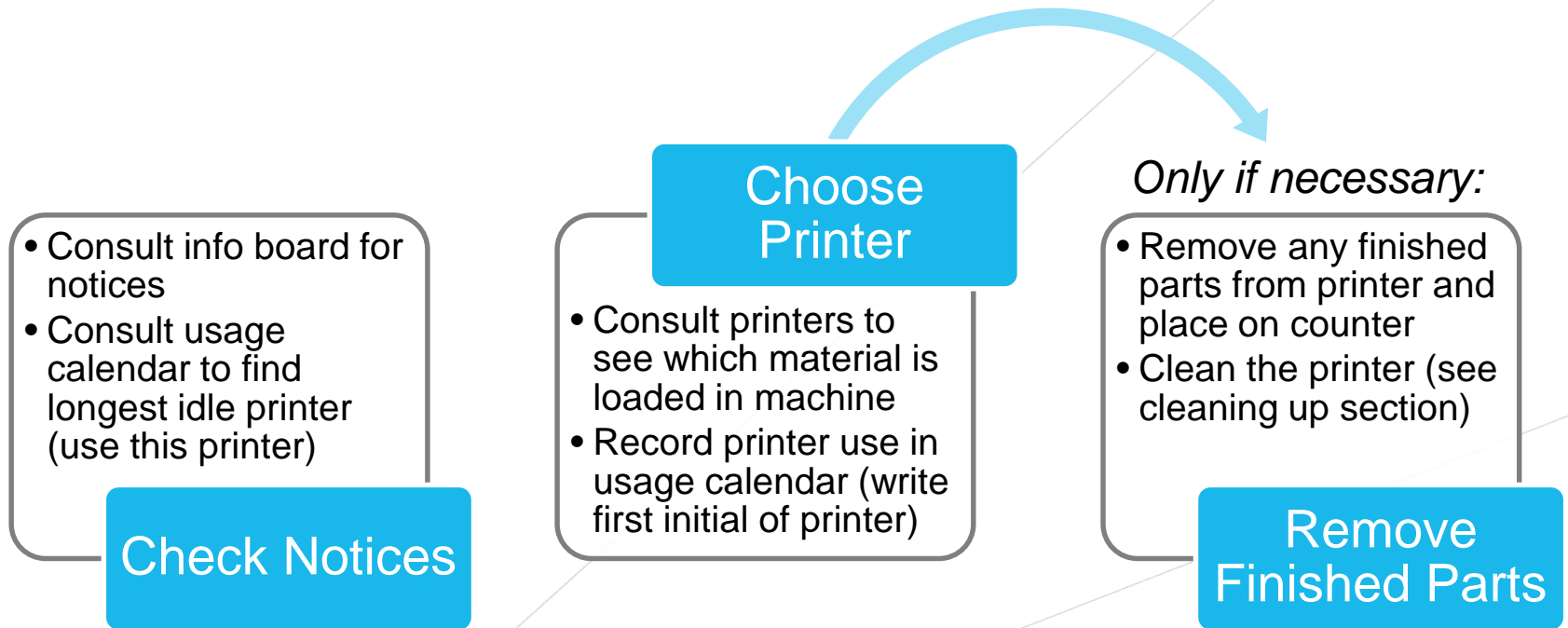
File  
Directories

Materials available:  
VeroWhite Plus (build)  
VeroBlue (build)  
FullCure 705 (support)

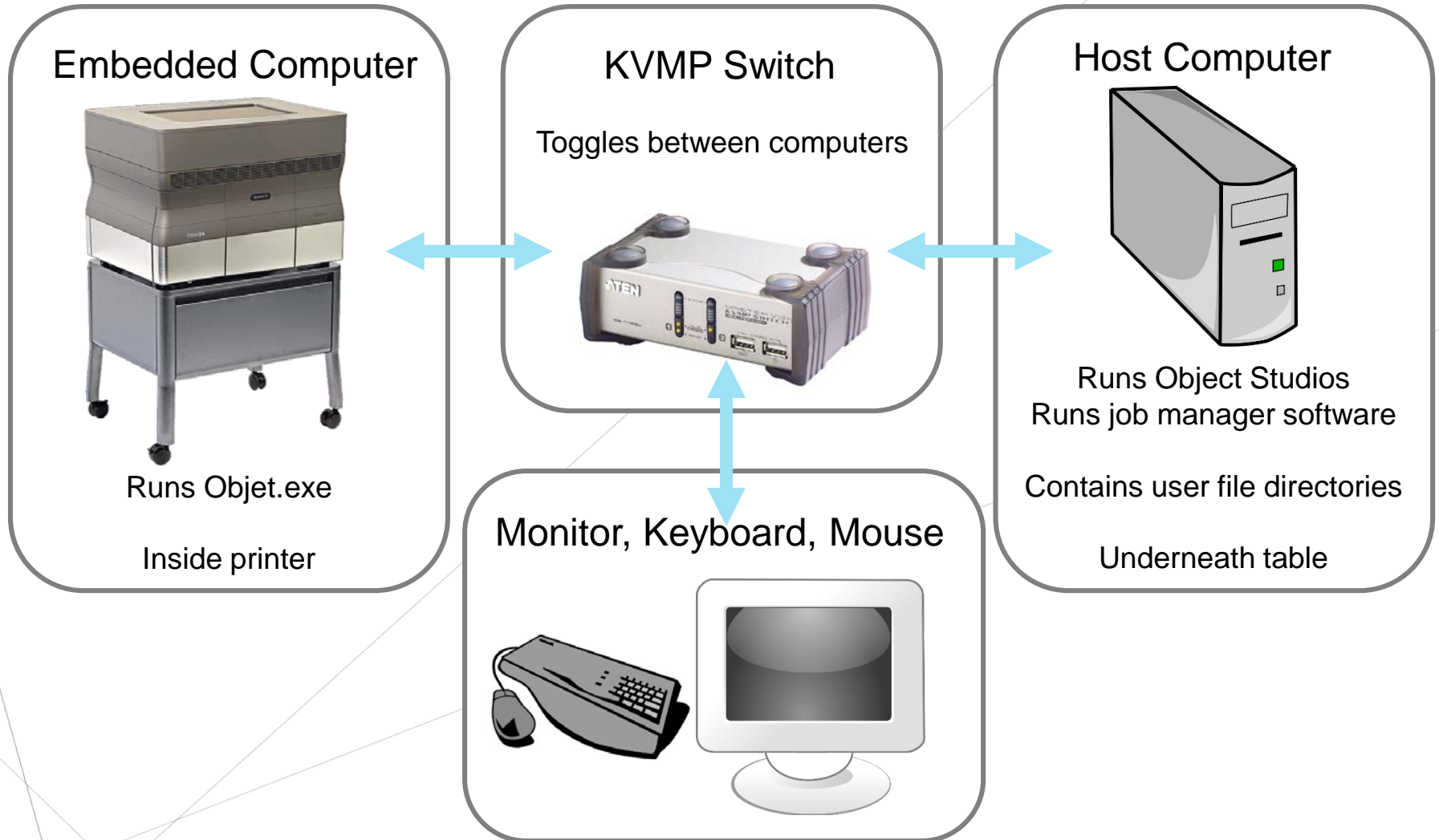
Printer  
Materials



# Preparing to Print



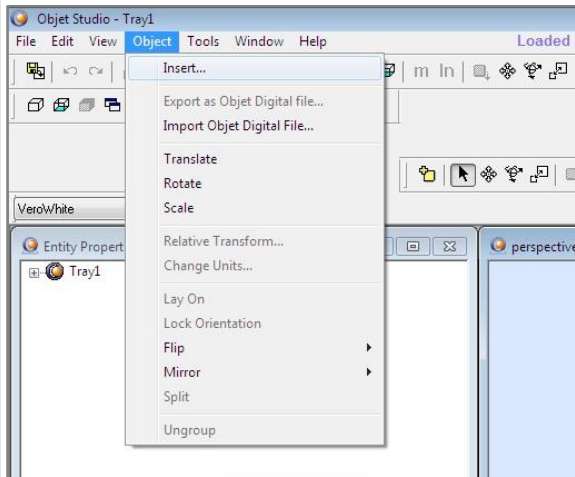
# Embedded & Host Computers



# Printing Software

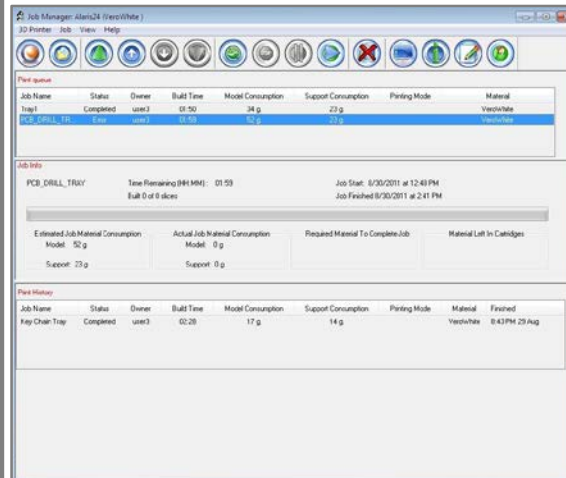
## Objet Studio

- Insert STL files
- Places models on tray
- Estimates material use
- Verifies layout



## Job Manager

- Manages print jobs in queue
- Runs automatically once models are set up and 'Build Tray' is pressed



## Objet.exe

- Turns printer online/offline
- Indicates material levels
- Displays current printer functions & information



Report low material  
supply levels to  
[3d@ece.ubc.ca](mailto:3d@ece.ubc.ca)

# Laying out Parts

## Import

- In Objet Studio, press **Object** -> **Insert** to import your STL files
- Check the units and overall dimensions
- Choose **Glossy** under the **Options** tab (lower left corner) for all parts

## Layout

- Press the **Automatic placement** button
- Manually adjusting the placement of parts *may* save material (see next page for tips for better design & layout)

## Verify

- Press the **Production estimate** button to estimate material consumption (estimate will appear on the status bar)
- Press the **Tray validation** button to check for layout errors
- Press **Save Tray As** to save the tray in .OBJTF format in your directory



**Automatic  
placement**



**Tray  
validation**



**Production  
estimate**

# Design & Layout Notes

Automatic placement aims to minimize print time; it may use more support material

Automatic Placement

Support Material

Build material always has support material underneath it; design to minimize overhang & lay out to face cavities upwards

Enclosed cavities will be filled with support material; design to be able to clean out cavities

Enclosed Cavities

Surface Spec.

Matte finish is better for gluing & painting; but covers the part in a thin support layer

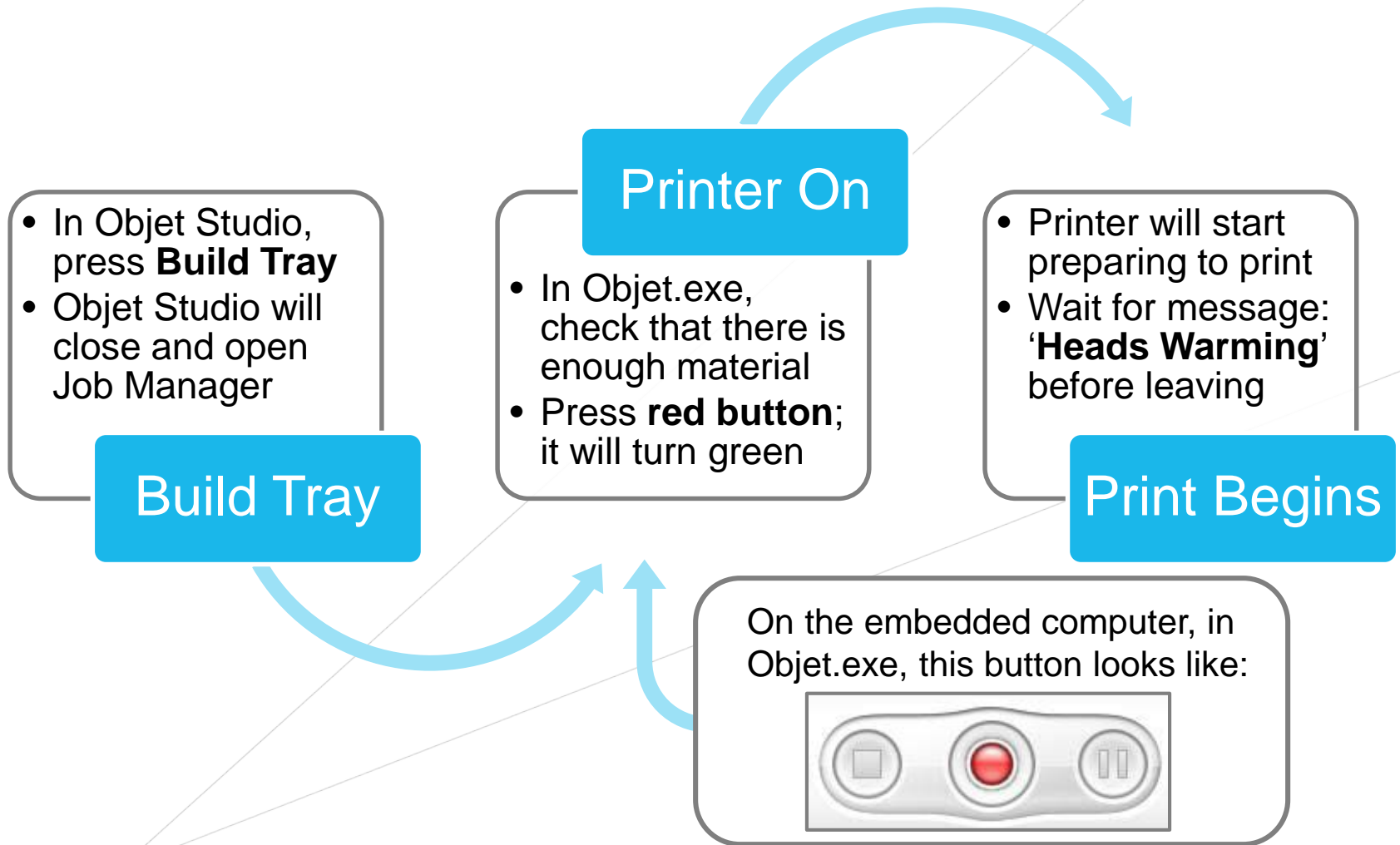
The part's mechanical properties are different along layer axis vs. across the layer axis

Layer Direction

Lay Parts Flat

Parts will print faster laying down, but use a bit more support material for the bed

# Printing Parts



# Cleaning Up

## Parts

- Gently remove your parts from the print tray
- Clean off support material at sink using dental-type tools

## Printer

- Clean inside printer and print tray with water and towels provided in lab (**do not** use acetone or isopropyl alcohol on print tray)
- Manually center the print head on the print tray (push by hand)

## Sink

- Put any scraps of support material from sink area in garbage
- Wipe any water off the counter

# Logging the Print

When you are picking up your parts, log your print using the form on our website.  
You will need the following information:

- Your name, email, research group
- Speedchart
- Reference RT#
- Amount of material used (grams)
- Which printer you used
- Info on any issues when printing

## Self-Serve 3D Printing Form

Please use the form below to record each print on the 3D printers in MCLD 257.

### 3D Self-Serve Printing

Use this form if you are requesting 3D printing for research work (i.e., ECE faculty and graduate students, and other researchers).

Name \*

<input type="text" value="FirstName"/>	<input type="text" value="LastName"/>
First	Last

Email \*

Department & Research Group \*

Scan here



to log your print

The Self-Serve 3D Printing Form is located at:  
[eng-services.ece.ubc.ca/fabrication/3d-printing/self-serve-3d-printing-form/](http://eng-services.ece.ubc.ca/fabrication/3d-printing/self-serve-3d-printing-form/)