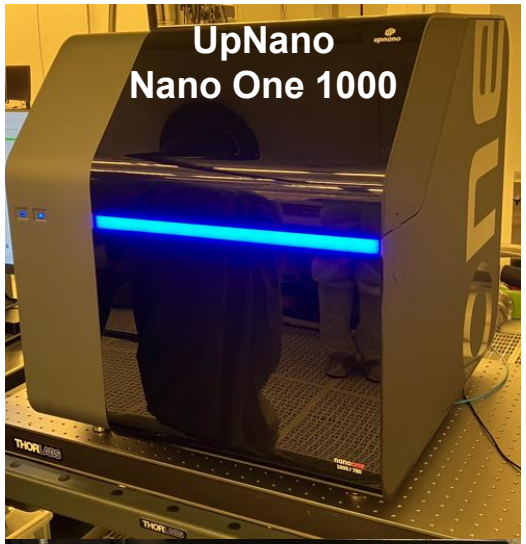
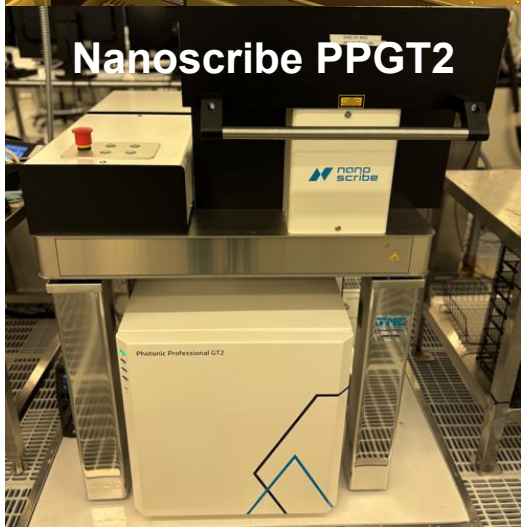
Dec. 2, 2025





Two Photon Polymerization (2PP) Printers Selection Guideline

Primary contact: Sung Oh Woo, sung.woo@tamu.edu
Sr. Research Engineer
AggieFab
Texas A&M University

- **Specifications**
- **Printer selection guideline**
- **Information on objective lens**
- **Information on both printers**

2PP Printer Specifications

Item	Nanoscribe PPGT2	UpNano Nano One 1000
Max Laser power (mW)	180	1000
Laser Wavelength (nm)	780	780
Max Printing Speed (mm^3/h)	6.8	300
Focus	Interferometer	2PP Laser
	Δn (resin & substrate)	Fluorescence intensity from resin
Autofocus	Yes	Limited to fluorescence resins
Substrate type	Si, glass, or ITO Restricted to resin & objective	Any surfaces
Max Substrate size	4” wafer	4” wafer
Max printing height	8 mm	42 mm
Printing mode	Top down	Top down, Bottom Up, & Vat
Tilt Correction	NO	YES

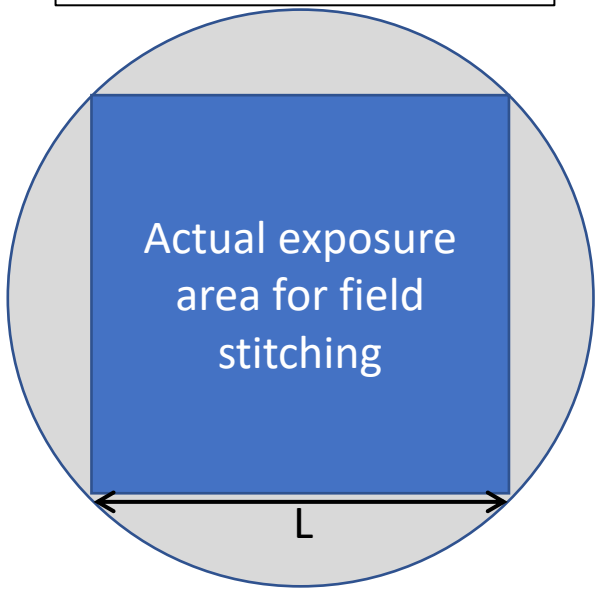
2PP Printer Selection Guideline

Criteria	Suggestion	PPGT2	Nano One	Note
Cost	**N/A**	One time setup fee $20 Plus, flat rate $10/h	$75/h	
Resolution	**Both**	Lateral: ~200 nm Vertical: ~ 1 – 1.5 µm	Lateral: ~220 nm Vertical: ~ 0.55 µm	Printing parameters, resins, objectives are critical
Throughput	**Nano One**	6.8 mm^3/h	300 (mm^3/h)	Nano One: practically > X10 faster
Substrate	**Nano One**	Si, glass, or ITO	All	Information - PPGT2 slide
Autofocus	**PPGT2**	All	Fluorescent resins, manual	
Large structure	**Nano One**	Height: <8 mm	Height: < 42 mm Tilt correction	
Customization	**PPGT2**	Laser power adjustment	N/A	PPGT2: allows printing a single structure with various laser power
Sample handling	**Nano One**	Taping Multi-sample loading	Vacuum holding Tilt correction Bio well plate	

Objective Lens Availability

- **Nanoscribe: 3 objectives are available**
- **UpNano: 5 objectives are available**

Objective view field
- L: side of square



Nanoscribe PPGT2			
Mag.	NA	WD (mm)	L (µm)
10X	0.3	0.7	354
25X	0.8	0.38	283
63X	1.4	0.36	141

UpNano Nano One 1000			
Mag.	NA	WD (mm)	L (µm)
5X	0.25	12.5	1986
10X	0.3	10	993
10X	0.4	3.1	704
20X	0.7	0.35	496
40X	1.4	0.13	248

PPGT2 information

- **Developer: PGMEA**
- **Due to autofocus method, only the following objective-substrate-resin combinations are allowed for printing**
- **Only AggieFab-provided resins can be used**

Objective	Substrate	Resin	Applications
10X	Si	IP-Q	Fast prototyping mm scale printing with micron scale precision
		GP-Silica	Glass printing, requiring sintering
25X	ITO/glass	IP-Visio	Low autofluorescence Biocompatible
		IP-S	High mechanical stability with smooth surface Micro optics components
63X	Si, glass	IP-Dip	Fine structures
		IP-L	Fine features with mechanical stability

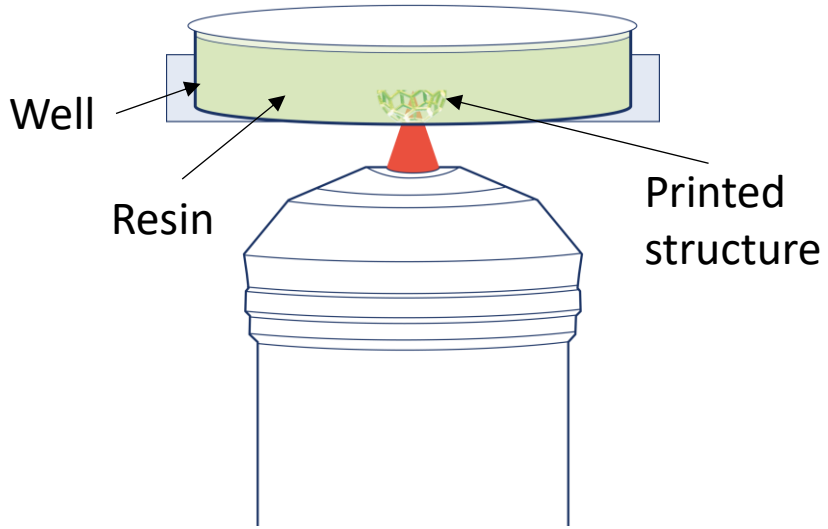
Nano One Information

Resin	Objective	Autofocus	Applications	Developer & post process
UpQuartz		O	Glass printing	PGMEA/sintering
UpBrix	40X	O	Ultra high resolution 2.5D structure printing	PGMEA or IPA
UpPhoto	All	O	High optical transparency Fast prototyping	IPA
UpFlow	10, 20, 40X	X	Low Autofluorescence Low viscosity	PEMEA or IPA UV exposure
UpOpto	10, 20, 40X	X	Ultra low Autofluorescence High optical transparency	PEMEA or IPA UV exposure

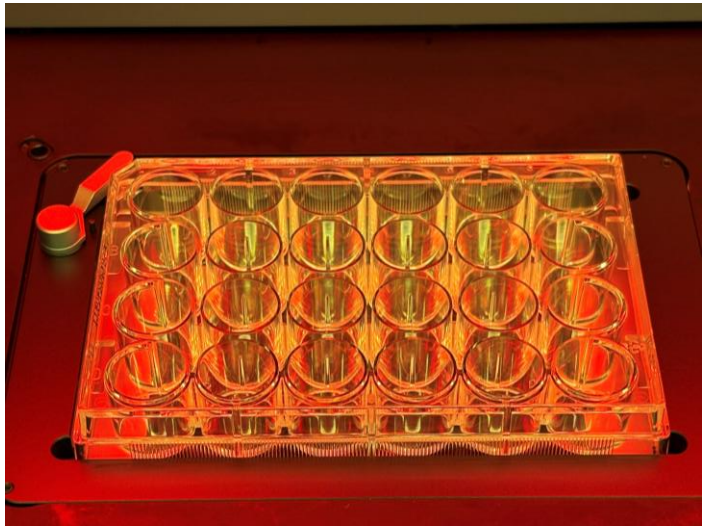
Nano One Bio Well-plate Package

- Well-plate stage insert is available for Nano One, enabling printing directly on a well-plate (up to 96 wells)
- Bottom-up printing mode is required
- Well Plate Dock software is available to streamline print job design
- For high-aspect ratio structures, 5X or 10X (WD=10mm) objectives should be used

Bottom-up Mode Configuration



Well-plate stage insert



10X objective (WD=10mm)