



Systemic Projects Grant Application Cover Page

PROPOSAL TITLE: ____ A Pilot Program for Cloud-Based 3D Printer Management _____

Department Chair / Leadership:

NAME: ____ Matt Bohm _____

EMAIL: ____ mbohmf@floridapoly.edu _____

DEPARTMENT: ____ Office of Industry Engagement and Capstone Projects _____

In order for the project to be considered for committee review, each section must be completed in its entirety. Any missing or incomplete sections will disqualify the project from consideration for funding.

PROJECT PLAN:

Submit this document as a separate attachment. This section must describe your project and how it addresses specific enhancement to your department's ability to deliver its mission (instructional or otherwise).

This document is required to use 1 in margins and be typed in Arial 11-point font or Times New Roman 12-point font. Page numbers must be entered in the footer.

The research/project plan should be a maximum of 6 pages, including any figures, images, and/or tables.

This section must address the following questions/concerns:

- What problem, gap, or deficiency is being addressed by this project?
- How does this project enhance student learning, student achievement, or student progression?
- Are there other sources of funding being sought or available to support this request, if so, what are they and in what amount?
- Describe, specifically, the impact of this proposal on the following:
 - What courses, programs, or student types will benefit?
 - Describe how they will benefit.
- Timeline for the project (may include milestones or specific tasks associated with the project)



Budget

Complete the relevant budget categories below, including subtotals. Leave the rest blank. If you need to add more lines to a table, tab to add another line.

Budget Overview

Category	Subtotal	Anticipated date needed
Supplies/ Equipment	\$2,000.00	May/June 2021
Payment for Services	\$5,500.00	July 1, 2021
Miscellaneous	\$	

Total requested budget: \$7,500_____

Supplies / Equipment

- List each item separately
- Quotes are required for all equipment over \$5,000

Item	Amount	Anticipated date needed
Raspberry PI and hardware for physical connection to 3d printers (x20)	\$2,000	May/June 2021
	\$	
	\$	

Supplies / Equipment subtotal: \$__2,000_____

Provide a justification of the items listed above, including a statement of purpose and how the amount was determined .

In order to connect our 3D printers to the 3DPrinterOS.com system there needs to be a hardware to cloud bridge. Each connection kit contains a Raspberry PI (micro-computer), a video camera, and an ethernet cable. The cost of each set of equipment is roughly \$100. For implementation on 20 machines, 20 sets are needed thus the \$2,000

Payments for Services

- Includes vendors and services. Signed contracts may be required and may need to be reviewed by procurement
- Payment to students or faculty is not allowable

Service	Amount	Anticipated Date	Additional Info (optional)



3DPrinterOS Access for 1 year	\$5,500	July 1, 2021	Quote is attached, unlimited users and up to 20 3D printers
	\$		

Payments for Services subtotal: \$5,500 _____

Provide a justification of the items listed above.

Quote is attached. Without the service there can be no system.

Miscellaneous

Expense	Amount	Anticipated Dates
	\$	
	\$	

Miscellaneous subtotal: \$ _____

Provide a justification of the items listed above.

Signature of all applicants below certifies the statements in the application are true, complete, and accurate to the best of her/his/their knowledge. All faculty applicants agree to accept responsibility for the scientific conduct of the project and to provide the required progress reports if a grant is awarded as a result of this application.

a) Department Chair or Leadership responsible for the project



Date 4/13/21

A Pilot Program for Cloud-Based 3D Printer Management Project Plan

Introduction:

Currently, Florida Poly makes use of an archaic system for students, faculty, and staff to submit and request 3D printing resources. The process involves an individual sending an email to makerspace@floridapoly.edu that would ideally include the appropriate file for the object they wish to be printed, a brief justification of why the part is needed, and finally when they need the finished part. When that email is finally checked by a student intern or staff, often appropriate information is missing or it is found that incorrect part files have been submitted. It can often take the exchange of several emails for the MakerSpace lab to have actionable information. The staff or intern would then download the file into a SLICER (a program that prepares a print file for a specific printer with specific print parameters) and the output of the SLICER is loaded on to a USB stick and physically inserted into a 3D printer to be printed. Once the print is completed ideally the staff or intern would email back the individual letting them know their part is ready to be picked up. While this system works well with low volumes of requests, the process begins to deteriorate rapidly during peak times for example when there are projects to be done across classes like Skills and Design. Better solutions exist to streamline the process and to allow the requesting individual to “take control of” and understand the nuances of 3D printing for themselves.

The Current Problem:

At peak user times it is virtually impossible to meet demand for 3D printed objects. Delays in the current process can not only cause a bad perception but potentially derail/delay student projects (read success) in classes such as Skills and Design, Mechanical Lab Design, or Capstone Design.

The Solution:

We propose to contract services with 3DPrinterOS.com to do a pilot study for a full calendar year such that we can evaluate how a system would work at Florida Poly and if it is found to be a good investment for future years. There are two distinct funding areas need for this project: 1.) contracting of the cloud-based management service as a flat fee, and 2.) hardware and supplies needed to augment our existing 3D printers to connect to the system. At this time funds from other sources are not being sought for this project.

Image a World (Use-Case Scenarios):

Imagine being a sophomore at our University and want to print a small object for a personal project. After the new system is implemented, you would simply log into the 3DPrinterOS portal using your normal User ID/password and upload and configure your print job, all being done by the cloud. Since this is a personal project, your print would have to be approved by a managing staff/faculty/intern, but once approved the job would automatically queue the appropriate available machine and printing would commence. You would then be notified by 3dPrinterOS that your job is being printed and you could even log in and watch your print being completed in real time. You'd be notified your print was done and you'd stop by and pick it up. In this scenario all lab interns/staff are required to do are to approve the request and then periodically make sure material is loaded and that proper maintenance is done.

Now, think of yourself as this same sophomore that is enrolled in Skills and Design and it is known that for the next two weeks a certain cohort of students will be working on projects. Print

lab staff could then bring those students into a new sub-group where it is known they have a project and can skip the “approval” step of this process and their print will automatically go to the next available appropriately configured printer.

Alternatively imagine that you are a senior and are enrolled in capstone design. At this point you could be assigned a “priority group” to any 3D printers located in the Capstone Design lab. Say it’s 1 AM and you just finished up your CAD file and you live 20 minutes from campus. You could simply log in to the system, start your print job, and when you get to campus at 10 AM the print will be finished before your class. An additional benefit is that the system will maximize usage of the fleet of 3D printers and does not require physical lab staff/interns to start and monitor print jobs.

Impact:

Primary impact from an educational standpoint will be for students that are enrolled in design courses and/or courses that contain a project component. Since our curriculum does leverage project-based learning, the swath of students impacted is a large number. Additionally, this will impact all students from a “cultural” standpoint as our students enjoy doing personal projects and almost expect if not demand that they have access to the newest and greatest 3D printing technologies. The 3DPrinterOS.com solution will widely open access to our entire student body in a way that can also be targeted and managed with ease.

Timeline:

Early summer 2021 – begin purchasing and assembling hardware components

Mid summer 2021 – flip the switch on 3DPrinterOS.com and begin conducting trials

End of summer/beginning of fall – introduce the platform to our student body

End of fall/early spring – preliminary impact report (for use in budget committee)

Continuously – monitor use and effectiveness of the system

Spring 2022 – conduct a user survey

Early summer 2022 – conduct an analysis of the system and prepare an impact report

Attachments:

Quote for 1 full year of 3DPrinterOS.com usage for an unlimited number of users (all students, faculty, and staff), for an install base of up to 20 printers.

3D Printer **Management** Software for Education

The complete end-to-end platform for 3d printing
Fast to deploy, uniquely easy to use

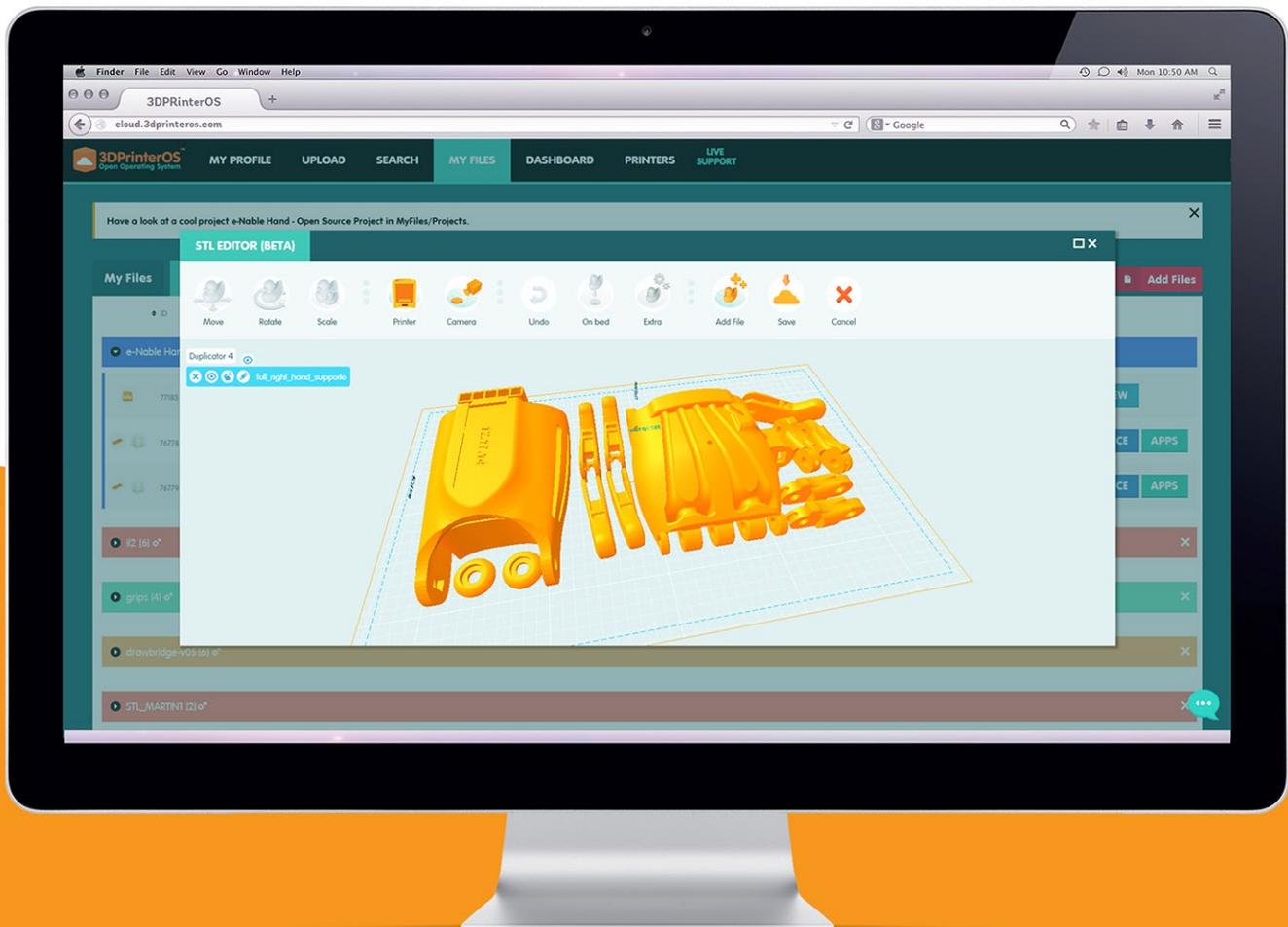


3D Printing Management

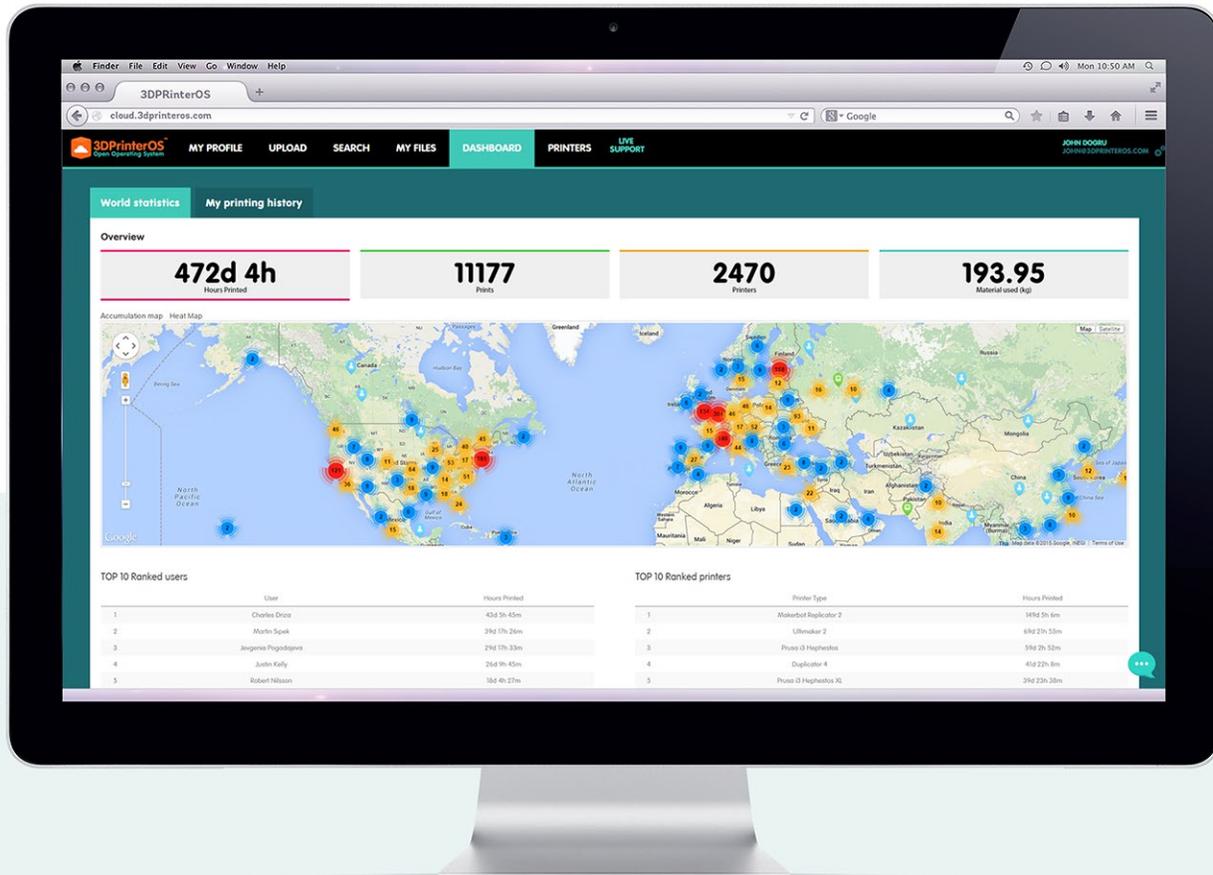
Manage users and files, fix, securely store, and stream 3D designs to 3D printers. Our system is SSO compatible and has passed independent security checks. No more excel sheets for queue management!

Data Tracking & Analytics

Track, monitor and audit every part of the additive manufacturing process with our reporting tools. Use reports to bill users, analyze trends and save money and time.



3D Printing Management



Manage Designs

Your students, users and staff can create design libraries and share files and projects with ease.

Centralized Platform

Unify workflows for all printers, staff and students with a single platform.

Make Printing Easy

We offer powerful visualization tools for every stage of the iteration process, so you can edit and print successfully.

Equitable Access

Create queuing or print permissions for workgroups with data tracking and share access to printers network wide.

Fix and Distribute

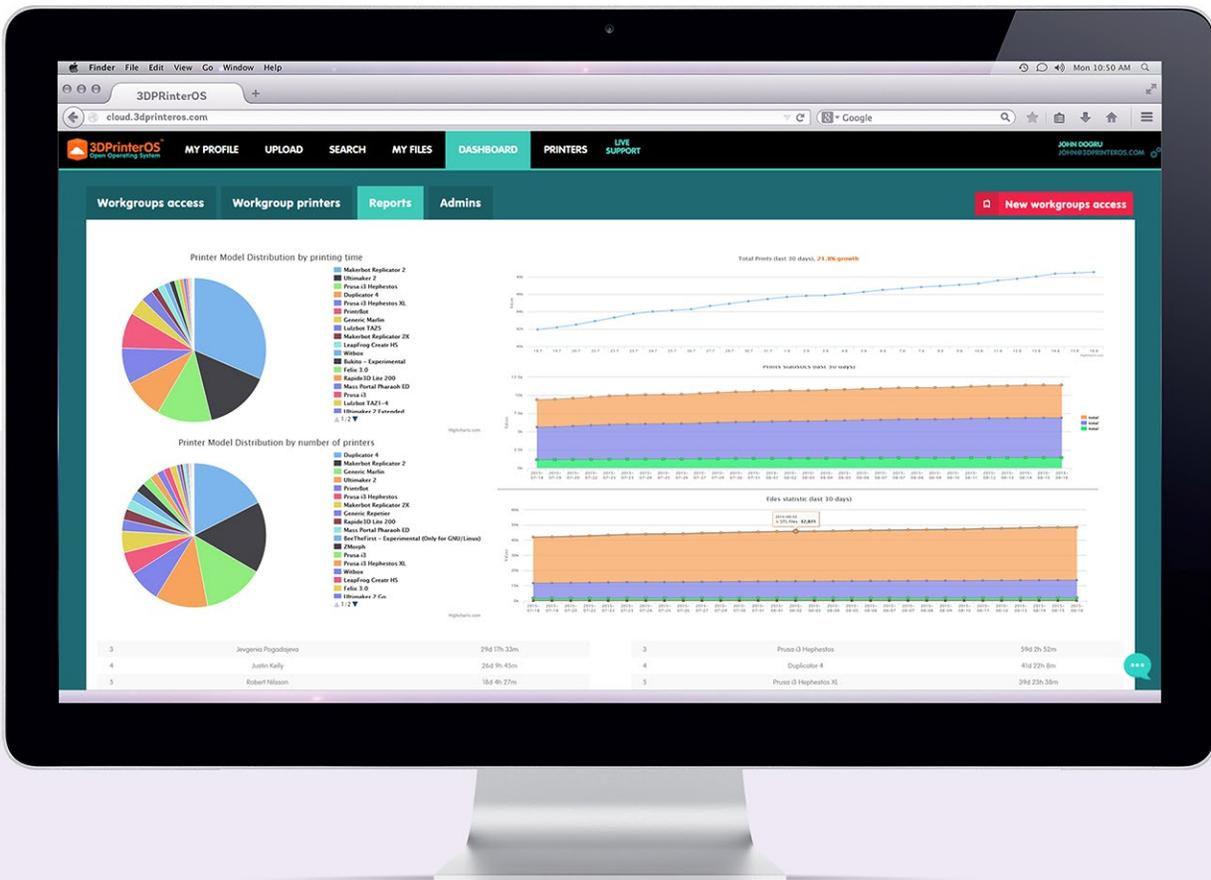
Repair designs using Magic Fix, NetFabb and Autodesk Mesh Repair then send files for printing anywhere in your network.

Give Admins Power

Once a user submits a print request, admins may review settings and contact users for changes at any point in the workflow.

Data Tracking & Analytics

“We use 3DPrinterOS to track the quantity of prints going through our doors and the amount of active users we have. We can use this data as a point for calculating funding and costs for semesters to come.” - **Davin Huston**, Purdue.



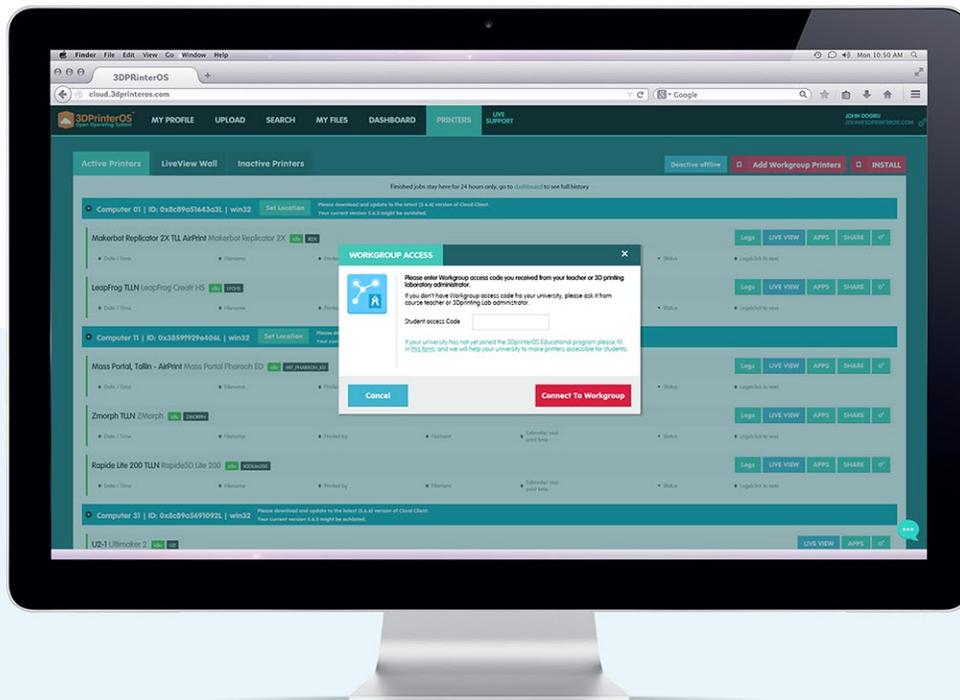
Smart Printing

Monitor success rates, job id's, individual filament usage, printing hours and much more. Analyze trends and control costs like never before.

Intelligent Timeline

Track print jobs through their lifecycle, including all revisions and user comments.

In-Depth - Workgroup Access Codes



Make 3D Printers Accessible

Workgroup codes, make it simple to cluster, network and distribute access to your 3d printers. Whether you have 1 user or 100+, you can easily create workgroup codes that can be shared out to specific groups network wide.

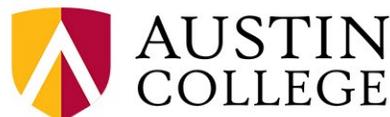
- ✔ Create additional admins for your network who can monitor and control access.
- ✔ Monitor workgroup printers for maintenance, track uptime and easily scale your printer infrastructure.
- ✔ Report on users printing time, filament used, usage history and success rates over time.
- ✔ Combine printers from different OEM's to standarize access portals.
- ✔ Admins can restart prints with a single click and see a full audit trail of all file details.
- ✔ Communicate with students in real-time with our In-App messenger.

What our users say!

"3DPrinterOS remote monitoring and control features for our printers makes our lives so much easier. I also really like that it maintains a log of print files and settings and allows for greater print control than some of the proprietary slicing software the printers otherwise are limited to." - **Hannah Olsen**, MyStemKits

"We've tested 3DPrinterOS, OctoPrint, AstroPrint, and PrintToPeer. I'm very happy to say that your product has been favored by our testers and technical staff. Scalability is important to us as we plan to grow in the coming year and 3DPrinterOS is a clear winner for us." - **Chip Bobbert**, Duke University

Universities already working with us:



Quote # 9706

DATE Apr 13, 2021

EIN: 46-5262248

DUE DATE: June 13, 2021

Billing address:

340 S LEMON AVE #9734 WALNUT, CA 91789

Make all checks payable to: 3D Control Systems, Inc.

BILL TO

Florida Polytechnic University

4700 Research Way, Lakeland, FL 33805, United States

Matt R Bohm

mbohm@floridapoly.edu

DESCRIPTION	Unit	AMOUNT
3DPrinterOS SaaS Platform - 1 Year Educational License - Unlimited users and storage - User Management (different levels of rights, roles and limits) - Manage 3D Printers and users in work-groups - Get detailed data for the entire organization with custom report - Quick & Secure access via SSO for your organization users - Custom Workflow & Project Management - Share & Control your IP securely - Version Control & Job Approval/Logging - Up to 20 Connected 3D printers	1	\$5,500.00

TOTAL**\$5,500.00**

Make all checks payable to:

WIRE TRANSFER INSTRUCTIONS

Pay to: Silicon Valley Bank - 3003 TASMAN DRIVE, SANTA CLARA, CA 95054, USA

Routing & Transit #: 121140399

Swift Code: SVBKUS6S

For Credit of: 3D Control Systems, Inc.
1518 Pershing Drive, Apartment F, San Francisco, CA, 94129

Final Credit Account #: 3301138405

FOR PAYPAL:

Company name: 3D Control Systems, Inc.

Email: payments@3dprinteros.com

If you have any questions about this quote, please contact
Rene-Oscar Ariko, Skype ID: rene.oscar.ariko, oscar@3dprinteros.com

Thank You For Your Business!