

Technology Fee Full Proposal

Title: Selective Laser Sintering and Generative Design to Produce Complex and Durable 3D Printed Objects

Proposer: Juan Griego, Director, DCP Fab Lab, 978 SW 2nd Ave Gainesville, FL 32601
juanjosegriego@ufl.edu 352-294-9187

Sponsoring Organization: DCP Fab Lab - College of Design, Construction and Planning

Purpose: This project will bring selective laser sintering 3D printer technology and hands-on instructional workshops in generative design to the University of Florida via the College of Design, Construction and Planning Fab Lab.

Term: Selective laser sintering (SLS): A 3d printing process (additive manufacturing) that uses high-powered lasers to sinter, or bind, finely powdered material together into a solid structure.

Term: Generative design: A method of using AI algorithms to generate and evaluate multiple design alternatives based on input from the user.

The DCP Fab Lab wishes to combine SLS 3D printing technology with monthly hands-on instructional workshops that feature the latest Rhino 8 software workflows. These groundbreaking tools will grant students and faculty the software and machine technology necessary to begin mastering generative design. By combining new software along with no cost SLS 3D printing, we seek to enhance student education and experience for years to come.

UF has encountered a surge in demand to engage with Artificial Intelligence. Students and faculty are beginning to create increasingly complex models using generative design. These files are very difficult if not impossible to print with the machines currently available at the University of Florida. Most 3D printers use additional support structures or scaffolding that “prop up” objects as they are being printed. Support structures can weaken objects, leave rough surfaces and generate excessive waste that must be carefully removed and discarded in post processing. The Formlabs Fuse 1+ SLS 3D printer solves this issue by laser fusing a recyclable nylon powder within a chamber of loose powder. Once a set of prints are complete, our experienced staff simply remove the printed objects from the chamber. Every bit of the unused material is then recycled for the next set of print jobs.

For our Technology Fee Proposal, we request funding in order to purchase a Formlabs Fuse 1+ 30 watt SLS 3D printer, the Fuse Sift and Fuse Blast post processing stations with 2 years worth of materials and support, along with a Rhino 8 Educational Lab license. This acquisition will provide the University of Florida with a first of its kind SLS 3D printing suite along with robust AI design software and instruction, to be located at the DCP Digital Fabrication lab.

Impact/Benefit: The addition of SLS technology will allow students and faculty to print complex models at no cost for the first 2 years. The addition of Rhino 8 software at the DCP Fab Lab will allow for students to learn and practice through on-site, monthly workshops specifically based in generative design workflows. We expect an improved learning experience through high engagement from our students and faculty in the College of Design, Construction and Planning as well as students and faculty outside of our college. Our main goal is to provide the tools and instruction necessary to continuously improve the technical skills, competency, and success rate of students attending our university.

The impact and benefit of our project will be monitored through workshop surveys. The surveys will be reviewed by the Fab Lab Advisory Board throughout each semester in order to ensure we maintain a high-quality learning environment.

Sustainability Plan: Over the past 15 years, the DCP Fab Lab, through the School of Design, Construction and Planning, has continuously supported and maintained over \$1 million dollars worth of digital fabrication equipment. We have accomplished this sustainable environment by charging low cost consumable fees and laser-room membership. With this said, our comprehensive project proposal includes 2 years of SLS consumables. This will result in no additional print costs to students and faculty of the University of Florida. Our project proposal, if accepted, will foster a common good for our entire university. The College of Design, Construction and Planning will be responsible for costs incurred by instructional staffing as well as the maintenance, upkeep and repair of all items funded by this grant.

Timeline: **August 2024:** Purchase of software and equipment. The vendor is aware of the possibility of our order and has the equipment and consumables on stand-by. Software will be installed on DCP Fab Lab workstations in preparation for hands-on instructional workshops in generative design.

Mid-August 2024: Arrival and installation of equipment. We have space allocated for the installation of said equipment. Staff training will begin in preparation for the Fall semester. Workshop sign up will commence.

September 2024: All equipment will be installed and operational. hands-on instructional workshops in generative design will commence and repeat on a monthly basis.

BUDGET

Rhino 8 Educational Lab license	\$975.00
Fuse 1+ 30W Printer	\$24,990.00
Fuse Series Build Chambers	\$7,998.00
Fuse Series Powder Cartridges	\$298.00
Fuse Series Printer Stands	\$897.00
Fuse Sift 120V	\$9,999.00
Fuse Blast	\$10,990.00
Industrial Vacuum 110V	\$2999.00
Fuse Series Complete Service 2 years	\$8750.00
Fuse 1 Series Air Intake Filters	\$294.00
Fuse Series Replacement Exhaust Filters	\$534.00
Sift HEPA Air Filters	\$298.00
Fuse Series Optical Cassettes	\$747.00
Nylon 12 Powder 144 kg	\$14,376.00
Shipping and Handling	\$2,311.59
Budget Total	\$86,465.59

Technology Fee Full Proposal Sponsor Signature Form

Title: Selective Laser Sintering and Generative Design to Produce Complex and Durable 3D Printed Objects

Proposer's Name: Juan Griego, Director, DCP Fab Lab

Note: By signing this form the sponsor is making a commitment to support the project. This may include providing startup, recurring or equipment replacement resources as presented in the attached budget.

Signature of sponsor: College Dean, or Unit Director, or VP for Student Affairs.

Chimay J. Anumba

4/11/2024 | 10:46 AM EDT

Dr. C. J. Anumba, Dean and Professor
Name and Title

Date

Note: By signing this form the UF IT unit is making a commitment to manage the project if selected for submission of a full proposal. This may include providing startup, recurring or equipment replacement resources as presented in the attached budget.

Signature of unit UFIT Director of a core unit:

Mark McCallister

4/11/2024 | 3:21 PM EDT

Director, Academic Technology
Name and Title

Date