UNIVERSITY OF LOUISIANA AT LAFAYETTE

STEP Committee

Technology Fee Application

C.O.A. Digital Fabrication Lab 3D Printers
Title

Chad Aldridge, Adam Feld, Thomas Cline, Annika Miller, and Tim Karoleff
Name of Submitter
(Faculty or Staff Only)

College of the Arts		
Organization		
Title:	C.O.A Digital Fabrication Lab 3D Printers	Date:	7/10//2021
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ABSTRACT (250 words or less):

Many of the departments within the College of the Arts (C.O.A.) work in 2 and 3 dimensions in the development of objects for their assignments. The act of making such objects is vital. Students first learn the importance of traditional hand-craftsmanship but once they understand that process, they progress to digital fabrication allowing for greater accuracy and quicker development of ideas. In the past two years, the College of the Arts, with help from Director Chad Aldridge, has worked to create a Digital Fabrication Lab that is housed on the first floor of Fletcher Hall. This lab, a C.O.A. resource, is available to all students in the School of Architecture and Design, Visual Arts, and Music and Performing Arts. Equipment in the lab provides students the ability to incorporate computer-based processes into the production of their 2- and 3-dimensional work. As such, the lab allows those processes to be implemented earlier in student curricula allowing them more opportunities to master them prior to graduation. Combining traditional handcraftsmanship and digital fabrication better prepares students for the professional world. Funded equipment can seamlessly be incorporated with our current equipment and space.

a. **Purpose of Grant and Impact to Student Body as a Whole**
The purpose of this request is to purchase 2 new 3D printers that can be combined with current machines to allow students from the entire college to broaden their scope of work and their classroom experiences, by expanding our current and robust digital fabrication lab within the College of the Arts (C.O.A.). The use of these machines has a direct impact in many of the professional fields for the production of designed objects. This equipment will allow students, utilizing digitally based skills learned in other classes, to experiment, problem solve, and express themselves in new ways with current technology. Digital processes are currently being incorporated throughout all College of the Arts curricula. The implementation of this equipment has the potential to bring students from all C.O.A. majors to the same area (the lab itself), potentially allowing for an environment that supports all of our different majors as well as encourages more collaborative projects.

The past academic year has not been without its trials and tribulations but the Digital Fabrication Lab has been one resource that has not felt the impact too greatly. During the Spring Semester of 2020 the lab began developing PPE for Lafayette General and for the University. During the Summer of 2020 more PPE was produced. Additionally, the lab produced brackets that allowed for the attachment of protective barriers for some of the furniture on the first floor of Fletcher Hall. In the Fall 2020 Semester the lab was restructured as a "clean room" that only student workers and staff were allowed to enter. The limitation of access did not reduce the amount of work produced by our students in the lab. Restructuring of the lab allowed for more student files to be processed and as a result more work was produced. This past Spring 2021 semester the fabrication lab successfully processed nearly 300 3D prints for students working remotely. This Fall with students returning to campus the lab anticipates an increase in file submission and production. It is because of that increase of produced work that

the new 3D printers are being requested. It is the intent to develop different stages or levels of lab qualifications as well as designate machines for each level of production quality. In addition, the two Raise3D Pro2 Plus 3D printers are intended to be placed on rolling carts allowing them to be placed anywhere in the lab or be brought into classrooms as teaching and demonstration tools.

The continuing use of this equipment will help UL Lafayette and the College of the Arts maintain its standard of excellence by providing students and faculty with current and viable technologies. The spirit of experimentation and expression, that the infusion of this equipment brings, will keep our programs cutting edge and attractive to potential students. The ability for faculty to teach traditional approaches while integrating evolving concepts and technologies falls in-line with the spirit and letter of the university and College of the Arts mission statements.

b. **Projected Lifetime of Enhancement**
   i. The Raise3D Pro2 Plus printer can be projected to last for 8-years of heavy use.

   Expected Service Life
   - Raise3D Pro2 Plus 8+ years

c. **Person(s) responsible for**
   i. **Implementation**
      Director COA Fabrication Facilities: Chad Aldridge

   ii. **Installation**
      1. Equipment will be installed in Fletcher Hall Room 109, the Digital Fabrication Lab, by Director Chad Aldridge, Assistant Professor Adam Feld, and staff assigned to the lab.

   iii. **Maintenance**
      The Director, staff, and student workers will oversee the use and maintenance for all machines in the lab.

      1. Raise3D Pro Plus
         i. Monthly (cleaning and lubrication)
         ii. Every 3 months (mechanical play, residue cleaning, and large axel lubrication)
         iii. Yearly maintenance (cleaning and replacement of Bowden Tubes), based on a 1,500-hour, 24 hour a day use.
         iv. Nozzle core replacement as needed.

   iv. **Operation**
      Because this is a C.O.A. Lab, it is overseen by Director Chad Aldridge as well as staff and student workers assigned to the space. In the Fall 2020 Semester, a new submission system was implemented; all files for either laser cutting and 3D printing were emailed to a newly established email account. Director

Aldridge, assigned staff and student workers were provided access to that account. Students emailed their file (.gcode or vector), ULID, Name, what process and machine needed, and a screen capture of the file to the email account. Submitted files were checked to ensure that all required information was present. After the check staff or student workers produced the files on the requested machine. Upon completion of the file, the student was notified for pickup. If there was an issue with the file, it was attempted a number (not specific) of times and on different machines. If the issue persisted, the student was notified. All machines were run by staff and student workers which resulted in having more work produced. The email system was first-come-first-served which encouraged students to submit files early and often. In addition, with each successful print, students were allowed to print for longer time periods (larger physical or higher detail/quality). For any student who successfully printed 4 times with print times under eight hours, they were allowed to submit prints that might last overnight. This resulted in increasing the amount of work that could be produced.

v. **Training (with qualifications)**
Current lab training is done by the Director and staff member assigned to the room. They train any hired and assigned student workers. File set up training is accomplished by the teaching faculty in conjunction with the director and assigned staff member.

d. **The narrative of each proposal must include the purpose and justification for each of the items listed in the Budget Proposal.**

i. **Raise3D Pro2 Plus**, 3D Printers will be the 5th and 6th Raise3D printers. The previous three have proven to be easy to use, are fully enclosed, and utilize free slicing software. These machines do not have arduous maintenance schedules. The Pro2 Plus affords a larger Z-axis, 23.8" high, for taller prints. The printer can be networked and contains a camera for the ability to check on prints at all times. If students have successfully printed 4–5 times without issues, they are allowed to print overnight. The Pro2 Plus offers the ability to print, larger format, for a longer period of time. In discussion with the sales rep, the company has set these printers to successfully print a 219-hour file. In addition, with the dual core printing capability, these will allow students and faculty to 3D print with more accuracy on positive and negative draft as well as for designs that have delicate parts that do not touch the print bed.

Budget Proposal

1. **Equipment** $ **11,998.00 Raise3D Pro2 Plus (2 at $5,999.00 each)**

2. **Software** $ **0.00**

3. **Supplies** $ 0.00

4. **Maintenance** $ 0.00

5. **Personnel** $ 0.00

6. <u>**Other**</u>   <u>$ 0.00</u>

TOTAL: $ 11,998.00

1.   Include any additional information relevant to your application.

2.   Discuss all previous funded STEP projects (if any). Two previous STEP grants were funded to purchase equipment for the lab. The first was for a laser cutter and three 3D printers. The second was for computers and software for use in the lab with the previously purchased equipment.

<u>ONE ELECTRONIC COPY (Microsoft Word or Adobe PDF) OF PROPOSAL SHOULD BE EMAILED TO</u> <u>stepproposal@louisiana.edu</u> <u>BY DEADLINE DATE.</u>

<u>For additional submission instructions and deadlines, please visit http://cio.louisiana.edu/step-process</u>

<u>NO HARD COPY SUBMISSIONS WILL BE ACCEPTED!</u>