

Title: DCP and FA Digital Fabrication Laboratory Enhancement

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Sponsoring Organization: College of Design, Construction and Planning and College of Fine Arts

Purpose and Rationale:

In 2009 the Colleges of Design, Construction and Planning and Fine Arts through the leadership of faculty members Mark McGlothlin and Jack Stenner developed a proposal submitted to UF's Division of Sponsored Research for the creation of a joint Digital Fabrication Laboratory (Fab Lab). The original purpose of the Fab Lab was to provide advanced technology to students, staff and faculty of the two colleges to support their research and teaching missions. The proposal was accepted with additional implementation funds supplied by both colleges. The lab was fully finished and operational in January 2012. Beginning in Fall 2012, with the hiring of a full time Lab Director, it was opened to all potential users from across campus. We are one of the first universities in the nation with a Lab of this kind accessible to an entire campus.

The Fab Lab now serves as a place of creative thinking and making for individuals from many different fields who fabricate digitally, by hand and with machine. The Fab Lab currently contains two laser cutters, three 3-D printers, one 3-D scanner, and one CNC milling machine. The equipment has been heavily utilized to support courses at the undergraduate and graduate level, particularly in the Schools of Art + Art History, and Architecture. Additionally the Fab Lab has been used by faculty from the sponsoring colleges to support their research efforts. Beginning in Fall 2012, use by other entities from across campus has grown significantly with current subscribers including faculty and students from:

- Chemical, Civil, Mechanical, Biomedical and Electrical Engineering,
- Business,
- Journalism, and
- ShandsUF.

The Fab Lab is even providing 3D printing possibilities to distance learners in the Engineering Innovation course in the College of Engineering. A partnership between the Center for Entrepreneurship and Innovation in the Warrington School of Business and the Fab Lab is currently being developed that promises to support further yeasty collaborations.

The goal of the Fab Lab is to serve the entire campus with high-end digital fabrication needs, providing tools, training, and design and production services. Our demonstrated expertise and experience will complement the basic 3D printing services being proposed by the libraries. But as Fab Lab utilization has grown, so has the need for additional and more advanced technology. Given that these are costly tools, the Lab is committed to providing wide access and support for those engaged in sophisticated digital fabrication.

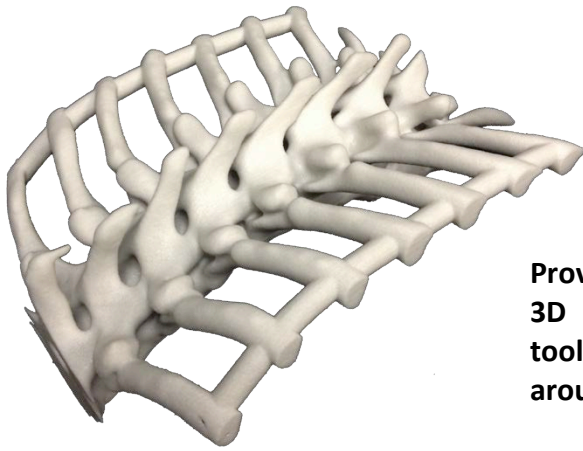
Impacts/Benefits:

Additional equipment will support the following:

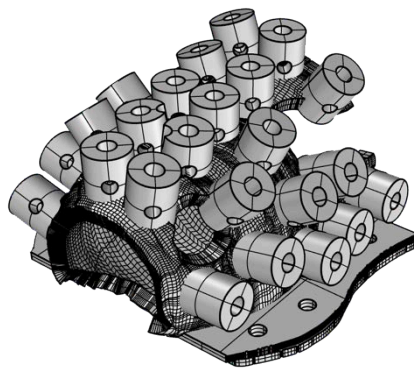
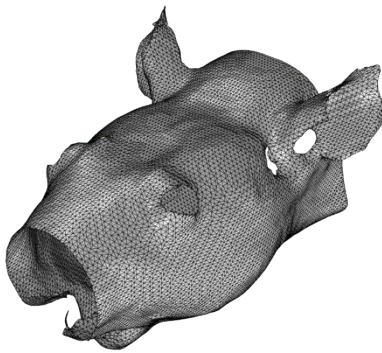
1. Access to digital fabrication for students in an expanded number of courses from across campus.
2. Access to digital fabrication to an expanded number of faculty, staff and students in support of their research.
3. An advance in the current level of technology and types of equipment available.
4. An expansion of the research and creative capabilities in many areas due to the new technology.
5. Increased opportunities for students to cultivate innovation skill sets and entrepreneurial concepts.

We anticipate the equipment will enhance service to the current student cohort of approximately 130 students from 5 colleges, and we anticipate a minimum of an additional 70 students will be added to our user base with the purchase of these additional technologies. We will also be able to better serve an increasing number of individual students and faculty engaged in research.

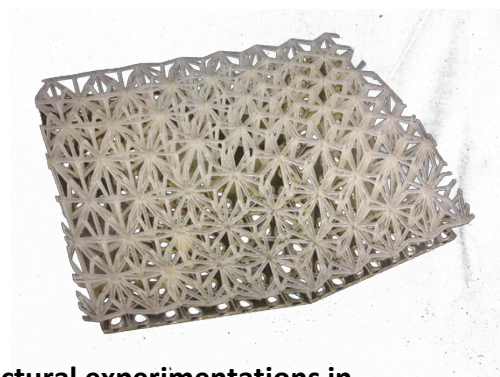
Please also see our website: www.arts.ufl.edu/aafablab



Providing the resources for ShandsUF to create a 3D Printed Thoracic Spine Model, this teaching tool is now used for regional anesthesia training around the world.



We were able to assist Biomedical Engineering in 3D scanning a live rat, designing a form-fitting helmet that will hold fiber bundles to monitor brain activity while the rat is mobile, and then 3D printing the helmet prototype. The research experiments are now in operation.



Architectural experimentations in structure and form allow students and faculty to push the boundaries of what is thought to be possible.



Large scale material experimentations of what a pavilion could be, using the Fab Lab CNC 3-axis router. The same router has helped graduate students from two different Engineering groups make 2 vacuum chambers from plexi-glas. It was also key in making the bench below.



Fabrication Lab

Provost Glover
and
Art Professor
Anna Callouri-
Holcomb
examine student
work

A photograph showing two men, Provost Glover and Art Professor Anna Callouri-Holcomb, examining student work in the Fabrication Lab. They are standing at a table, looking at a large, flat, curved wooden object. The background shows a wall with several framed pictures or posters.

Sustainability:

The Fab Lab was initiated through a DSR grant and has been sustained by a combination of user fees and subsidies from the Colleges of Design, Construction and Planning and Fine Arts. The initial agreement between the two colleges obligated DCP to the financial management of the Fab Lab and FA to the IT management. The collaboration has worked well. The structure of the user fees has been carefully monitored to ensure that operation and replacement costs of the equipment originally purchased through the DSR grant can be covered. A similar strategy will be used to operate and maintain the equipment proposed for purchase through this proposal.

An important part of the long term sustainability of the Fab Lab was the hiring of a Director in Fall 2012. Prior to that, two Graduate Assistants under the direction of faculty were responsible for operations. The hiring of a highly-trained director has been the key to the success of the Fab Lab. Not only is the Director knowledgeable about the machinery and the software that support the machinery, he is a great collaborator and enjoys facilitating the work of others. This has enabled many more students and faculty to take advantage of the facility. The importance of this human capital cannot be overstated.

Timeline:

Equipment purchases will be made just as soon as the money is transferred to the College of Design, Construction and Planning – Fab Lab account. Once received the Fab Lab Director can install the new equipment in short order so it will come on line very quickly. At a minimum, the new equipment will be ready for use at the start of the Fall Semester, 2013.

Budget & Budget Narrative:

The Fab Lab will acquire the following list of advanced digital fabrication technology:

- 1) Universal Laser Systems ILS 12.75 120watt laser cutter, 48"x24"x12" bed w/rotary attachment (\$59,600)
 - o Accompanying laser workstation computer/software package (\$2,000)
 - o Accompanying BOFA laser ventilation system and automation module (\$7,000)
 - o Replacement of outdated cpus that drive the Fab Lab's two existing laser cutters. (\$3,500)

The laser cutter will expand current capability. The two existing laser cutters are often in use 24 hours a day/7 days a week. There is an online reservation system for use of these devices to ensure no machine is idle. The additional machine will help meet the overwhelming demand for this technology.

- 2) Apple iPad 64gb Wi-Fi model and virtual touch modeling software (\$700)

The iPad will allow interactive 3D modeling using a touch surface. New software programs are regularly being released for touch surface product development. These software allow the user to create without the need to write code.

- 3) 2 replacement cpus for existing 3D printers (\$3,500)

New cpus will significantly enhance the productivity of the Fab Lab's two current 3D output devices. Software upgrades from the printers' manufacturers require increasing amounts of RAM.

Additional costs including electrical system upgrades, installation, and interior renovation are not included in this concept document but will be supplied by others when this proposal is funded.

BUDGET

DCP and FA Digital Fabrication Laboratory Enhancement	
1) Universal Laser Systems ILS 12.7t 120 watt laser cutter + supporting elements and replacement cpus	\$72,100
2) Apple iPad and software	\$700
3) Replacement cpus for existing 3D printers	\$3,500
Total Request	\$76,300