

## Technology Fee Full Proposal

**Title:** Enhancement of Innovative Digital Fabrication Technology in the New Infinity Fab Lab at UF

**Proposer:** Professor Peggy Carr, Associate Dean of College of Design, Construction and Planning  
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**Sponsoring Organizations:** A<sup>2</sup> Fab Lab - College of Arts and College of Design, Construction and Planning  
UF Housing and Residence Education – Division of Student Affairs

**Purpose:** This is a call for enhancement of the instructional technology resources of the A<sup>2</sup> Fab Lab, to continue to provide the University of Florida's students and faculty with a *preeminent digital fabrication research and learning laboratory*.

*Term: Digital fabrication: the act of creating (fabricating) through mediating between digital design and physical making processes. Ex. 3D Printing*

The Fab Lab began in 2009, as a way of bringing advanced digital fabrication technology like 3D printing, 3D scanning, CNC milling and laser, to the College of Arts and College of Design, Construction and Planning. In 2012, due to high demand from students and faculty from disciplines campus-wide, we opened our doors to all at UF to meet the growing need of digital making capability in today's age. As part of the next steps in the evolution of the Fab Lab, this August 2015, the Fab Lab will be expanding its campus and community presence, moving to an exciting new location in Infinity Hall at Innovation Square and deeming a new name – The Infinity Fab Lab!

Infinity Hall is the nation's first entrepreneurial-based academic residential living/learning community. Directly above the Fab Lab will be 308 bright minds, 180 of which will be students of Innovation Academy. Down the hall to the Fab Lab will be the Center for Entrepreneurship and Innovation, Mint Studio, and MADE at UF. This is the best group we could ask to be surrounded by as the Fab Lab soars to new heights in its offerings to the University. This collaboration of Fab Lab with Housing and Residence Education is one that will help many people at UF exceed and succeed. Now is the natural time to increase the innovative resources we can provide our students and faculty and meet the growing demand of users in this highly specialized, cross-discipline learning laboratory.



Rendering of Infinity Hall at Innovation Square

It is crucial for the University of Florida to continue to foster creativity, research and invention by utilizing the most advanced tools of our time. We are reaching a point in history where we can make almost anything and, if given the right tools, are only limited by the power of our own mind. Physical making is still incredibly important, and in the A<sup>2</sup> Fab Lab we provide a place on campus where there is unlimited creative potential to make, discover, problem solve and invent in futuristic, forward-thinking ways. With the moving of locations, we will also have more space and the capacity to serve the 49,000 students at the University of Florida, its faculty, and the greater Gainesville area.

This proposal is specifically for the purchase of new digital fabrication technology that is a) ground breaking in its newness to the market and b) unavailable anywhere else in the region. With new technology like the pieces we are requesting with this grant, everyone on campus can excel in their individual areas of expertise, from students on campus creating art or product prototypes, to doctors at UF developing medical device prototypes. People like this and resources like these make "The Gator Good, the Greater Good" and push UF into preeminent status of universities doing real, world-changing work.

**Impact/Benefit:** The A<sup>2</sup> Fab Lab has grown immensely in the six years since its inception, becoming a key resource for students and faculty at the University of Florida and helping over 10,000 people to date. In addition to our core of Arts and Architecture students and faculty, the Fab Lab has had makers from the Business School, Psychology, Anthropology, Museum Studies, Health Science, Anesthesiology, Radiology, Neuroscience, Marine Biology, Computer Science, the Vet School, almost every unit in Engineering and many, many more. Other campus leaders such as Shands/UF Health, the McKnight Brain Institute, the Florida Museum of Natural History and the Office of Technology Licensing have also all been impacted by the Fab Lab's efforts to provide a resource that is second to none in digital fabrication technology and expertise. No other lab with this type of digital fabrication technology is so open to anyone and everyone at the University of Florida; all it takes to become a member is an orientation and a small access fee of \$120 for 4 months. This fee is what keeps the Fab Lab self-sustaining, providing operational support, maintenance and smaller evolutionary additions to the tools we provide.

We also use our technology for community outreach, doing volunteer projects with organizations such as the YMCA, Lincoln Middle School SECME Club and the PK Yonge Robotics Club. There is a Fab Lab Student Design Team, doing real client projects that allow students to put their skills to work, gaining real world experience, a paycheck and also help to sustain the lab. There is also a Fab Lab Internship Program and a Fab Lab Club for those seeking to further their interest or skill in these emerging fields that are quite possibly the most impactful technological innovation since the industrial revolution.

We help a minimum of a few thousand people complete innovative projects every year. This is done in a very personal and hands-on way. The Fab Lab provides the most sophisticated technology and expertise on campus and in the north Florida region to produce tangible outcomes efficiently and successfully. This grant, if awarded, will ensure to our community full access to 21<sup>st</sup> century industry standard digital fabrication and rapid prototyping tools required to fulfill their research and realize their concepts to their full potential. 20-30 courses, hundreds of faculty and thousands of students, rely on the Lab's resources every year.

**Sustainability:** This proposal will provide technology that requires a small amount of recurring resources in order to run the OMAX waterjet and 3D printers. The College of Arts and College of Design, Construction and Planning will be responsible for maintenance, upkeep, and replacement of all items funded by this grant, as it has with all current items valued at over \$500,000. The Fab Lab has had a working, self-sustaining model of membership for the last 6 years where operational costs for new equipment are built in from the start.

**Timeline:**     **August 2015:** Purchase of all noted equipment. Vendors have been fielded and are aware of the possibility of our order.

**Mid-August 2015:** Arrival of most of the equipment; begin installation. The new space for the Fab Lab at Infinity Hall is being built to accommodate all of the listed resources and will be prepared for the technology upon its arrival.

**September 2015:** All technology in place and operational. Training will have commenced and students/faculty may now begin to utilize this for research and creation. An Open House will follow to showcase.

## Technology Fee Full Proposal Budget

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**Proposer's Name:** Dr. Peggy Carr

### Budget Narrative

We have composed the list below through researching the newest and best offerings of digital fabrication technology today, while making use of existing resources and services and without any duplication of services or infrastructure at the University of Florida. We also feel that we have tried to remain well-rounded in our technology offerings, even in this highly specialized field, to offer the most good to the greatest number of students and faculty. All items listed include start-up costs and a plan for sustainability, listed in that section. By the end of this project, the Fab Lab will have gained a number of technology resources and will be capable of providing resources and an experienced team second to none of any University in the world.

#### What we are requesting and why:

**OMAX Waterjet** – This technology uses an extremely high jet stream of water, providing the ability to digitally fabricate with glass, ceramic, stone, plastics, metals of all kinds and much more. No other type of tool duplicates what a waterjet can do. There is currently only one water jet in the entire North Florida region, which is inaccessible, high cost and not available to the University of Florida community. With this grant, the Fab Lab will be the first to grant access to water jet technology at a minute fraction of the \$200/hour cost one would find anywhere else. The high cost of the system covers the machine, it's computer and software, delivery, installation, training, safety enclosure, and startup materials.



**MARK FORG3D - Carbon Fiber/Kevlar/Fiberglass 3D printer** – This 3D printer is the first of its kind, to allow for 3D printing of carbon fiber, Kevlar and fiberglass materials. As this technology was just released, we would be the first in the state to acquire one these new tools and provide new heights of capability with high-strength and low-weight materials like carbon fiber. We feel this will be especially applicable to our

materials science engineers as well as others in aerospace and beyond.

**5AxisMaker** – This is a machine that uses a spinning bit to cut away excess stock material to get to a final part. This machine in particular allows for cutting in all directions (5 axis) of the x,y,z directions. This would allow for new levels of fabrication. It is also small enough to fit on a large table and allow for more hands on learning and research with the machine and less lab administration monitoring and operation.

**Opiliones Extra Large Format 3D printer** – One facet of 3D printing that has always been an issue, is the size of the object one is able to print. The technology has finally arrived to be able to 3D print in large scale, with object size capability comparable to that of a small child!

**Experimental Ceramic/Concrete 3D Printer** – Materials science is a field that is increasing in all realms, from engineering to architecture and beyond. As you cannot yet buy a printer that already prints in ceramic or concrete, this portion of grant money would cover the supplies to build in house our University's first ceramic and concrete 3D printer, as well as other materials as they arise.

**Vinyl Cutter – U.S. Cutter Titan 3 Digital** – This digital vinyl (an other sheet materials) cutter provides the ability to make interactive, immersive scenery through walls covered in imagery and groups of students and faculty a way of making signage of multi-media displays.



**Cubify Sense 3D Scanner** – A new type of 3D scanner utilizing 3D photography to digitize objects in the real world and bring into the computer. This would speed up the 3D scanning process and provide abilities that are not capable with our current 3D scanner for certain types of objects, like digitizing the human body in under 1 minute.

**3Doodler 2.0 – 3D Printing Pen** – This low price 3D printing pen is a free-form 3D printer that puts creation directly in the hands of the user. No other item is similar to the 3Doodler. This is also a great tool we intend to

use for outreach as we work with organizations like the YMCA, PK Yonge and the Dream Team – an organization that visits terminally ill children while living in hospitals for extended periods of time.

**Steelcase ēno Interactive Smartboard** – This smartboard, rather than a small computer monitor, will allow for communication and collaboration in a much more immersive environment, so that Fab Lab staff and it's users can cooperatively experience 3D models and other tasks more closely together. We also feel this will allow faculty to create better learning environments for those that teach directly out of the Fab Lab.

**Singer S18 Studio Digital Sewing Machine** – In some instances, such as creating a rapidly deployed emergency relief shelter, a student or faculty may need to create with fabrics or sheet plastics in a way that cannot be done by hand. With this digital sewing machine, our users will be given free reign to compose orchestrations of flowing materials that result in 3 dimensional structures or an artists take on the future of fashion.

**Innovative transportation system** – Working together with a local bicycle trailer manufacturer, we will create a bike and trailer system that utilizes high levels of suspension, to ride smoothly from main campus to the new Fab Lab location 2 blocks from campus at Infinity Hall. We will have two sets of bike and trailer, which will have set pick-up and delivery times for which we will bring materials and models to and from the Fab Lab.