

2019 Technology Fee Full Proposal

Title: Fabrication Technologies Supporting Student Coursework

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Sponsoring Organization: George A. Smathers Libraries, Innovation Academy

Purpose: We are requesting a total of **\$30,286** to provide University of Florida students with technology they need for course assignments and innovation projects. All the equipment requested in this Technology Fee proposal has the common goal of making students innovators and allowing them to design and create.

Students are often required to use technology to complete class assignments. If the student does not own the technology or if it is not readily available through the department, this is a barrier for student success. Free and open access to new technologies for UF students facilitates innovation and entrepreneurship regardless of socio-economic status. This proposal will bring a suite of robust technologies to students that allow them to successfully complete class projects and to innovate. For example, to fabricate items out of wood, paper, plastic, and metal along with creating new digital media, a Computer Numerical Control (CNC) machine and/or laser cutter are useful tools. These technologies will be freely accessed or checked out from the Marston Science Library (MSL), Architecture & Fine Arts Library (AFA) and Education Library. Each space is hosted by expert staff that are on hand to educate, provide trainings, and support students during their technology engagement.

Through confirmation from instructors and students, the following is an example list of UF courses where the proposed technology can assist with instruction and coursework:

ARC 1301/1303 Architectural Design 1 & 2	EGN 2020C: Engineering Design & Society
ARE 2456: Digital Media in Art Education	EME 2040: Intro to Educational Tech
ART 1802 Workshop for Art Research & Practice	EME 4401: Integrating Tech in the Elementary Curriculum
ART 2702C: Sculpture: Gravity and Buoyancy	EME 4401: Integrating Tech in the Early Childhood Curriculum
AST 3043: History of Astronomy	EME 4406: Integrating Tech in the Secondary Curriculum
DIG 3305C: 3D Digital Animation Technique	EME 3813: Tech-Enhanced Learning Environments
DIG 3713: Game Design Practices	RTV 4930: Online Sports Reporting: Podcasting
DIG 4306C: Advanced Digital Animation Techniques	College of Education Teaching Practicum and Internships
DIG 4715C: Game Development	

UF was the first university in the nation to circulate 3D printers and usage by students across all disciplines has been [extremely strong](#). Unlike other top universities that host makerspaces, the UF Libraries' maker services have pushed innovation by expanding student access to technology that can be checked out and used outside the library. Coupled with the Libraries' guiding commitment to ensure that all students have *affordable* access, this proposal will allow UF to meet the requested demand by students for new tools and technology for both academic and entrepreneurial activities. The equipment requested is described below and reflects student input from each library's predominant user base with an emphasis on making and facilitating creative pursuits.



Carvey Computer Numerical Control (CNC) Machine (MSL)

Creates 3D objects through cutting wood, foam, plastics and some metal. A CNC machine using a router bit to carve out a 3d model or engrave a sheet of material. The Carvey gives students the flexibility to fabricate parts using materials not possible with most 3D printers. For use in-library.

"In the History of Astronomy (AST3043) class students are required to build a fully functional ancient astronomical instrument and use it to collect data. Some of the instruments built include sundials, quadrants, sextants, astrolabes, cross-staffs and armillary spheres. The instruments need to look historically accurate, but students do not need to follow

historical methods to build them. Materials commonly used in the project include wood, metal, acrylic and clay. Students use workshop tools as well as 3D printing, and the availability of the Glowforge laser cutter and Carvey CNC Mill will give them even more capability for recreating these instruments.” ~Dr. Naibi Marinas, Department of Astronomy

“Having access to a CNC machine would allow students to create objects that are too intricate to build by hand.” ~ Tiffany Su, Instructor for ART 2702C: Sculpture: Gravity and Buoyancy



[Glowforge Pro laser cutter \(AFA, Education, MSL\)](#)

Laser cuts and engraves designs on a variety of materials. Built-in filtration system so can be used anywhere. The Glowforge’s innovative interface and software are designed for beginners to easily begin cutting materials. For use in-library.

“EGN2020C Engineering Design & Society, is a hands-on first-year prototyping course. Students are actively engaged in practicing the human-centered design process while learning makerspace skills (solid modeling, 3D printing, programming, microelectronics, sensors, actuators, basic hand & power tools). Students then incorporate these skills into the design process in a multidisciplinary team to research, design, build, document, and present on their functional prototype of a solution to help humanity to meet specific needs (examples: self-watering planters, disability assistive devices, interactive toys for children with prosthetics, etc.). While the engineering makerspace classroom has a number of 3D printers and other prototyping tools, we do not have a laser cutter. Making this centrally available in the library would help engineering students design, cut, and assemble the physical components of their course functional prototypes.” ~ Dr. Pamela Dickrell, Institute for Excellence in Engineering Education, Herbert Wertheim College of Engineering



[Silhouette Cameo 3 vinyl cutter \(AFA, Education\)](#)

Cuts and draws on paper and vinyl. Students in Education Student Teaching Practicums would use this tool to create letters and shapes in paper and vinyl for bulletin boards in their classrooms that display their students’ work and support current instruction lessons (i.e. the alphabet (with pictures), math units, vocabulary (word wall), calendars, seasons, etc.). For use in-library.

“In Creativity in Context (IDS1353), Creativity in Action (IDS1359), and Innovation Academy Senior Project (IDS4950), Innovation Academy student work in interdisciplinary teams to identify problems related to the Gator Good areas of focus, prototype potential solutions, and present the innovation to the UF campus community, Innovation Academy stakeholders, and potential investors and business partners. The Silhouette Cameo Vinyl Cutter along the CNC machine, laser cutter, Wacom tablet, and podcasting kit will allow students to develop and produce more complete prototypes, professional quality packaging, and other supporting media to promote their innovative concepts.” ~ Charlie Cummings, Innovation Academy



[Tikteck Light Board Tracer \(AFA\)](#)

Illuminate images and photos so that they can be more easily traced for artwork. Accurately trace images for creating animation for classes such as DIG 3305C 3D Digital Animation Technique and DIG 4306C Advanced Digital Animation Techniques. Can be checked out for 7 days.



[Kodak Mini Digital Film and Slide Scanner \(AFA\)](#)

Scan film negatives and slides to create digital versions for preservation and modification for use in course ARE 2456 Digital Media in Art Education. Can be checked out for 7 days.



[Wacom Intuos Pro Drawing Tablet \(AFA, Education, MSL\)](#)

Portable tablet, the size of an iPad Mini, that allows students to draw digitally using a pencil-like stylus. Their portability distinguishes them from the Cintiq monitors previously funded in another technology fee proposal. Can be checked out for 7 days.

This tablet is [listed](#) by UF Digital Worlds as required technology for all students pursuing a BA in Digital Arts & Sciences and used in courses such as DIG 3713 Game Design Practices and DIG 4715C Game Development.

“Drawing tablets are practically required for many students, and not only those who are studying the arts. Pen tablets like the Wacom are used in 3d modeling, engineering, and the arts. Considering how ubiquitous these devices are, it would be extremely useful for students to have access to them.” ~ Marco Pagani, Digital Arts and Sciences Major ‘20



Podcasting Kit (AFA, Education, MSL)

Kit has microphones and recorder so that students can record audio and create podcasts. MSL currently circulates 2 kits but demand for this technology is so high that the kits are often reserved. The kits were reserved 49 times (primarily 1-week checkouts) from August 2018 – April 2019. With new courses integrating podcasting, students will need additional kits to meet their class deadlines. Can be checked out for 3 days.

Students can produce a podcast for marketing a new product or for journalism assignments in courses such as RTV 4930 Online Sports Reporting: Podcasting.

“Teaching with podcasts enables writing instructors to exemplify and put into practice the ideas, mediums, and content that we in fact teach in writing courses. For both writing and teaching to be effective, the audience must be drawn toward a subject, and connect with it. Podcasting enables teachers to draw an audience in by diversifying the modes whereby students/audience can access a subject. For instance, podcasts can supplement oral and text-based instruction, increasing the likelihood that students’ will engage with course content – not only by better accommodating for various learning styles, but by enabling students to reinforce what they’re learning by accessing content frequently, and across numerous modes. And, the very aspects of why we’re drawn to podcasts for information, are important for teaching writing – the structuring of engaging storytelling, for instance, or leveraging the appeal to our human impulse of experiencing someone speaking or conversing with others. Teaching podcasts, and learning to compose them, encourage students to stay attuned to how composition affects audience, and vice versa.” ~Dr. Andréa Caloiaro, University Writing Program

Impact/Benefit: A significant [fraction of top universities](#) already provide their students with makerspace type areas and available technology, however UF still lacks such a centralized resource available to all students, staff and faculty. This proposal moves UF towards parity with these other top institutions by increasing free access to technology, tools, and training to students so they can acquire practical experience using the maker equipment.

The libraries’ guiding objective is to ensure that all students have **affordable** access to the technology and tools that they need to succeed in their coursework, research, and entrepreneurship, regardless of their socio-economic status. This goal is coupled with a commitment to offering training and workshops to better support less-experienced students. The libraries on campus are open evenings and weekends, allowing students access to technology almost 24 hours per day. The library staff are trained in the use of the equipment and are available to show students how to operate and troubleshoot the technology.

Usage of the Libraries is extremely high, especially MSL with more than 1.5 million visitors per year. The newly renovated Education Library also experienced a sharp jump in usage with 64,000 visitors in the Fall 2018 semester. These highly visible spaces provide significant promotion and access to the maker services and circulating technology. In partnership with faculty in the Innovation Academy, these resources will be incorporated into coursework so that students will both be aware of and develop expertise with the technology.

Several of the items will be available for 7-day student check-out including the TikTeck portable light boards, the podcasting kits, the film and slide scanners, and the Wacom digital drawing tablets. Other larger non-portable equipment will be available for students to use in the libraries during all hours that the buildings are open.

Sustainability: The central concern regarding the sustainability of new maker equipment is the inevitable need to repair or upgrade equipment. The Libraries are committed to financially sustaining the Maker resources and library staff will provide routine maintenance of the equipment included in this proposal.

Timeline:

MONTH	ACTIVITY
AUGUST - SEPTEMBER 2019	Funding received. New quotes requested for technology and orders placed.
OCTOBER – DECEMBER 2019	Technology received. Items processed for circulation or placed within libraries for in-library usage.
JANUARY 2020	All technology made available to students. Library staff create training and tutorials.