Request for Technology Fee Funds: FY20

NOTE: A separate request should be made for each initiative.

I. Department Number/Department Name: 360 College of Computing, CREATE-X

Title of Request *(please be brief):* Collaboration to Provide Open Prototyping Facilities to Campus

Amount of Request *(formula from detailed budget below):* $168,426

Type of Proposal: Atlanta or Dist Lrng/Non-Atl Atlanta

Was this project request funded in FY19? No (Yes or No)

Are there installation/renovation costs associated with this request? Yes (Yes or No)

If "Yes" then indicate the source of approved funding:
(Note: Tech Fees are not allowed for installation/renovation) GVU/CREATE-X

Executive Summary of Request (100 words or less):

GVU and CREATE-X offer prototyping spaces that serve a large number of students across Georgia Tech's campus. Using the funds from this joint proposal, we will outfit these labs with equipment to allow students to rapidly realize their academic and entrepreneurial goals.

Specific class and/or lab initiative(s) if applicable: GVU Center, CREATE-X

Contact person for this request (incl. phone #): Tim Trent - (404) 385-7610

Responsible faculty for this request (incl. phone #) Thad Starner (GVU), Craig Forest (CREATE-X)

Indicate priority per department if applicable: Number ____ of ____

Indicate priority per college or unit: Number 3 of 9

II. Impact on Students - Provide course title, course number, and anticipated enrollments:

Titles/Numbers of Course(s) see below

Anticipated Enrollments

Graduate:	*363*	*(per*	yr	) sem or yr
Undergraduate:	1,694	(per	yr	) sem or yr
Total:	2,057			

The estimated percent use of the resources in the item by:

Students	95%
Faculty	5%
Other	
Total:	100%

Brief explanation of how estimate was achieved.

Based on current usage, the vast majority of the utilization of these prototyping lab spaces is graduate and undergraduate students.

NOTE: Other impacts on students should be described in narrative to include benefits to the students affected.

III. Detailed Budget - Requested Items by Category *List separately any equipment, software, and other allowable expenses (see Tech Fee Guidelines). There is a formula in the "total column" that multiplies the number of items times the unit price. You may enter a figure into the total column if the unit pricing is not applicable. If you need additional rows, contact the Budget Office to receive a modified form. Software or data license proposals should indicate how many years the item has been funded through student tech fees in narrative.*

Supporting documentation is required *- Include price justification in some form, such as quotations, published price lists, etc. as a separate PDF attachment. All supporting information should be in a single PDF.*

	Proposed Number of Items	Estimated Price per Unit	Total ($)
Global Finishing Solutions Spray Booth	2	$3,968	$7,935
Speedaire Air Brush Kit, General Rating, 28mm Nozzle Size	2	$100	$199
Speedaire Air Brush Kit, General Rating, 0.013" Nozzle Size	2	$74	$148
Sony Alpha 7 III	4	$1,998	$7,992
Canon 24-105mm f/4 lens	4	$1,099	$4,396
ikan IFD2014 Featherwight Daylight LED Flood Fixture	4	$999	$3,996
Manfrotto Xtra Aluminum Tripod with 804 3-Way Pan/Tilt Head	4	$179	$716

Manfrotto Large Still Life Shooting Table	**4**	**$799**	**$3,196**
Canon imagePROGRAF PRO-1000	**2**	**$1,300**	**$2,600**
Canon imagePROGRAF PRO-6000	**2**	**$10,195**	**$20,390**
Stratasys F270 3D Printer	**2**	**$36,844**	**$73,688**
Formlabs Fuse 1 SLS 3D Printer	**2**	**$9,999**	**$19,998**
Formlabs Form2 SLA 3D Printer, Wash, and Cure Package	**2**	**$4,999**	**$9,998**
Ultimaker S5	**2**	**$5,995**	**$11,990**
Cricut Maker	**2**	**$592**	**$1,184**
Total *(linked to the total amount of request line above)*			**$168,426**

Please return form via e-mail in Excel format to: techfees@business.gatech.edu. Supporting information only in a PDF file.

IV. Narrative - Provide narrative justification for your intended use of the technology fee funds. Include narrative on how the education or research of the students will be enhanced. To include curricular, co-curricular, and extracurricular benefits expected to accrue to students through provision of this resource, including students outside the unit. Briefly state how information regarding similar technology use elsewhere on campus to benefit from lessons learned, to standardize, or differentiate, and to avoid duplication. Also include how the request aligns with the Strategic Plan of Georgia Tech.

Impacted Course: GT2803, MGT4803, CS7470, COE/CS2701, ME/CS4699, ME4182, CS4853, CS8903, CS4980, ME 2110, CS 3651, CS 4605, CS 4690, CS 4699, CS 2698, CS 2699, CS 4903, CS 4980, CS 4698, CS 8903

The Georgia Tech GVU Center (GVU), in conjunction with CREATE-X, has the potential to dramatically accelerate the success of the next generation of Georgia Tech entrepreneurs. GVU's vision — to imagine and build computing solutions to social, scientific, and technical challenges — dovetails with CREATE-X's vision to instill entrepreneurial confidence in Georgia Tech students. We propose to partner in order to equip existing shared facilities that are embedded near residential dormitories on east and west campus, respectively. We will equip these shared facilities with state-of-the-art fabrication and branding technology, specifically aimed towards presentation-ready prototyping and high-resolution digital marketing.

For aspiring entrepreneurs, the ability to present their ideas in a realistic and convincing manner is a key determining factor for a start-up's success. While a number of high-end fabrication facilities exist on Georgia Tech's campus, there is currently no facility on campus that offers fabrication and branding technology specifically geared towards high-resolution digital marketing and presentation-ready prototyping. The tools proposed will complement many of the courses students take within the CREATE-X and GVU curriculums, e.g., GT2803, MGT 4803, ME/CS4699, CS7470, etc. (see full course list above). The GVU Center, headquartered at Tech Square, currently attracts over 1,200 users across five disciplines and is strategically situated to serve Georgia Tech's east campus student population. Similarly, CREATE-X, which in the last year has served over 1,100 students representing all six colleges, has recently renovated an 8,000 sq. ft. facility on the west side of campus — formerly the Woodruff Dining Hall — into a co-working space located in Georgia Tech's west campus student community. This proposal aims to equip these two existing, shared facilities and facilitate open access between them. GVU Staff will accommodate installation, maintenance, training, and operation of the proposed equipment at GVU. CREATE-X will provide staffing and training using the Invention Studio model, which was founded and led by Craig Forest.

Detailed descriptions and justification for the equipment proposed:
Professional-grade Spray Booth (item 1-3) -
A ventilated spray booth will enable students to finish and stylize their products with the appropriate finishes and textures to create presentation-ready mock-ups. Currently, 3D printing technology is not sufficient to provide realistic, presentation-ready prototypes. Accordingly, this equipment will enable student to post-process their prototypes for high-fidelity mock-ups.

Professional photography studio (item 4-8) -
A professional-grade photography studio will enable students to capture high-resolution images of their products to use on digital marketing materials. Additionally, the listed camera is capable to capturing 4k video and has built-in stabilization. Thus, students will be able to use the photography equipment to film marketing videos for digital marketing, e.g., social media campaigns, Kickstarter, etc.

Professional-grade printing (item 9-10) -
These tools will give students the ability to print professional-grade digital materials for marketing and presentations, such as large-format posters, banners, and pamphlets.

High-resolution 3D printing (item 11-14) -
Each of the 3D printers listed has its own capabilities and specialties. As a suite of 3D printers, students will be able to use these tools to rapidly print virtually any product idea and finish it using associated tools for post-processing, e.g., spray booth. In addition to the descriptions below, a table summarizing the differences between these 3D printers will be attached along with the quotes.

Stratasys F270: The most commonly used 3D printing technology for those first learning to create physical prototypes is FDM technology. FDM printers are often the most economical choice for creating rapid design iterations and can yield professional quality parts with the right post-processing. The best material in this arena is ABS printing, as it is a durable material which facilitates the creation of parts and components which will be subjected to a fair amount of wear and abuse. Adding an FDM printer to the GVU Prototyping Lab's professional print capabilities will allow students in the early phases of design projects rapidly iterate on their designs without committing to the cost of a more advanced print. An FDM machine such as the F270 would bring the option of high-quality, durable parts by printing with a much stronger material than the UV-Cured plastic the Prototyping Lab currently uses.

Fuse 1: While FDM is the most common 3D printing technology, others exist which are important for users to have access to. One such technology is SLS printing, which uses powdered material and lasers to eliminate the need for support structures in 3D prints while increasing the speed and resolution of jobs compared to FDM. The material costs on SLS printing are higher, which make it less suitable for initial prototyping phases compared to machines like the F270, but the technology allows for much greater complexity. As print layers are completed, the unused material remains in powder form around the material, which means only the final structural integrity of the print must be considered. Given the increasingly small form factors of wearable technologies and the like, more and more late-stage designs are requiring high-precision, high-complexity models that cannot be achieved with FDM printing. The Fuse 1 is an approachable machine that is the first of its kind in a desktop form factor, and will provide students attempting to take their projects to the next level an incredible opportunity to experiment with new technology. By adding printers with the new capabilities of complex geometries as well as water-tight, animal-safe parts unlike other printers in the lab, many active projects from the project based courses listed on this proposal will be able to explore their projects further than currently possible.

Form 2: The Formlabs Form 2 is an entry level printer that uses UV curable resin as its print technology. This is similar technology to the Projet included in the GVU Prototyping Lab proposal, however it has a more approachable entry-level design. This allows it to yield a higher resolution than printers in the same price-range, however it is not an "industrial" machine yielding professional-level prints. Much like an entry-level ABS printer allows for rapid prototyping of initial ideas, an entry-level UV Curable printer is perfect for the mid-stage prototyping that will be the primary use of CREATE-X lab space.

Ultimaker S5: While the ABS prints coming from the Stratasys F270 are an essential addition for students in the Create-X or Inventure Prize stage of developing projects, it is also important to have a much lower cost and faster option for printing early-stage designs or concepts that 1000 and 2000 level courses might require. The Ultimaker S5's are highly reliable printers that offer lower quality final products, but operate much cheaper and quicker than the professional printers above. This "pro-sumer" range of printer further allows for unique material opportunities compared to other models of 3D printer, and allows students to develop with experimental materials such as conductive, silicone, and carbon-fiber based print filaments. The addition of a quick "first-draft" print option will make 3D printing significantly more accessible to the users of these spaces.

Cricut Maker (item 15) -
The Cricut Maker will enable rapid planar fabrication of paper or fabric-based branding materials, such as stencils, stickers, cloth patches, etc. Additionally, the blade cutter can be used to create foldable prototypes for rapid ideation and prototyping.

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