NDSU Student Technology Fee Action Plan Request #1910

I. Action Plan Introduction and Authorizations

NDSU ORGANIZATION OR UNIT NDSU Libraries			
TITLE OF PROJECT **Digital Fabrication Lab Computer Cluster**			
Project Duration (3 years maximum)	**From: Spring 2019**	**To: Fall 2019**	
Type of Project (Check one)	**New X**	**Previously Submitted**	**Renewal**
Total Technology Fee Request $11,021.00			
Project Director **(Must be NDSU faculty or staff)** **Adam Elznic- Emerging Technology Coordinator**	**Campus Address: Department 2080** **1201 Albrecht Ave** **Fargo, ND, 58108-6050** **Office 111** **Phone: 701-231-9746** **Fax:701-231-6128** **E-mail:adam.elznic@ndsu.edu**		

Name (Type or Print)	Signature	Date
Project Director Adam Elznic Emerging Technology Coordinator		02/14/19
Unit Head Josip Mocnik-Dean of Libraries		2-14-19
Unit Head Scott Meyer- Executive Director of Entrepreneurship Initiatives		2/15/2019
Unit Head Beth Twomey-Head, Research and Instruction-NDSU Libraries		2/14/2019
IT Division Consultant Mitch Axness-Systems Support Specialist-NDSU LIbraries	**Signature**	**Date** 02/14/2019

Executive Summary (maximum of 175 words)

The NDSU Libraries is seeking funding for six computer stations and necessary furniture to support our new Digital Fabrication Lab. Since opening its doors, we have seen an exponential growth in student use and require updated computer components to support the Lab. We currently have two Daktech computers that serve as the main terminals for ten 3D printers and two desktop CNC Mills. Students using the space are experiencing a bottleneck in workflow due to the lack of adequate computer equipment. The TFAC Grant will allow us to a build a computer cluster in room 119 of the Main Library that would house computers that will feature upgraded RAM, graphics cards, and current core processors. They will be capable of handling the demands of file size, graphics, and allow us to update to current versions of software. The award will allow us to fulfill our Strategic Plan of supporting our student population and teaching digital literacy to all students through drop-in clinics and 3D modeling classes.

The Technology Fee Advisory Committee will only accept for consideration Student Technology Fee Action Plan Request forms which are fully completed and signed, and whose Project Directors have no past due reports on previously awarded projects as of the current submission deadline date, according to the guidelines listed in the Instructions, pages 1 and 2.

Technology Action Plan Request forms will be opened and reviewed after the submission deadline.

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II. Project Overview

1. **How does this project meet student needs?**
   The NDSU Libraries is seeking funding for six computer stations and necessary furniture to support our new Digital Fabrication Lab and its mission to energize and advance research, teaching, and learning in an evolving information environment. The Digital Fabrication Lab is an open and easily accessible workshop that allows students, faculty, and staff access to 3D printers, desktop CNC Mills, and basic hand tools to complete projects. We are unique in the fact that we cater to all majors and programs across campus and have enjoyed strong support from diverse programs on campus. The TFAC Grant will allow us to purchase computers and furniture and build a computer cluster in room 119 of the Main Library. This will allow us to teach 3D modeling software, hold drop-in tutoring sessions, and alleviate the bottleneck in workflow we are experiencing. We have two Daktech computer stations that support ten 3D printers and two Desktop Milling Machines. During our beta testing phase of the Lab, this was adequate and kept up with demand. As we have opened our door to the general student population, we are experiencing a slowdown in workflow for our students who are waiting to use one of the two computers. We currently are experiencing high demand on a daily basis and have seen exponential growth is use in the past few months. We expect a high volume of use based on this semester's metrics.

2. **What audience does this project directly serve? What audience is indirectly served? How many students are affected? The project will support our students who have already found use in the Digital**

The NDSU Library and Digital Fabrication Lab are committed to providing all students, faculty, and staff access to digital technology tools like 3D printing and 3D modeling software. Funding will directly serve students who use the Digital Fabrication Lab and its services. The past few months have proven that we are having a direct influence on campus by helping a diverse number of programs. An influx of students from Apparel Design, Interior Design, Business and Entrepreneurial, and STEM focused programs like Mechanical, Electrical, and Industrial Engineering have all used our services.
By supporting an initiative to teach digital literacy to our-campus community we are impacting the campus by creating an entrepreneurial and innovative environment NDSU will benefit from. In addition, the Lab, with its accessibility and high visibility, will be an effective recruitment and retention tool for current and prospective students.

3. **For projects that target a subset of NDSU's students, please describe the possibility for broader application in the future.**

The six computer stations will allow the Digital Fabrication Lab to start hosting and holding 3D modeling program training sessions and teaching digital literacy to students who are not in programs that teach these types of specialized software. NDSU's Research initiative will be broadened by expanding opportunities to master new digital fabrication technologies across the curriculum

4. **Describe both the immediate and long term impact of this project.**

The immediate impact: Funding will allow for multiple students to use these computers designated for digital design in 3D modeling software. Our 3D printers and CNC machines are reliant on access to 3D modeling and programing software. Students will be able to design, model, and export the needed files to control the current machinery.
Long term impact:
We will be implementing a program of support for student learning of 3D modeling software. Drop in tutoring sessions in 3D Modeling software, Introduction to Digital Fabrication Classes, Microcontroller Classes, and STEM and Community outreach programs will be supported. The long term impact will be a campus with a better digital literacy of 3D modeling software and use of digital fabrication tools.

5. **Who will pay for ongoing expenses following the technology fee funded portion of this project (e.g., who will replace hardware or software after it has reached its end of life)?**

The computers purchased will be supported and replaced by a refresh program we have discussed with our administration. The computers will be updated periodically with new software and updates. When it is time to replace the hardware, we will purchase newer models that support new machinery. Our intent is to use the TFAC Grant as a pilot program to justify a larger computer cluster that we will support through our own funds.

6. **Describe how this project will follow NDSU's best practices in information technology. (Please make sure the NDSU IT Division staff you consulted signs in Part I of this form.)**

Computers will follow NDUS and NDSU usage policies.

Installation will be done by Libraries' IT staff, namely Mitch Axness.

7. **What service on campus is most similar to the one proposed here? How does this project differ?** The model that is most similar would be the Math Emporium that is already located in the NDSU Library. We have developed a plan based on dedicated computers with the software needed for students to learn and utilize our digital fabrication services. This project differs in that the core focus will be on Digital Design. The computer cluster will be supported by the Libraries' Emerging Technologies Coordinator and will allow for classes and tutoring sessions to be taught on a weekly basis. The core focus of the lab will be to teach digital fabrication. Students will have access to the software/hardware needed and help from professional staff.

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III. Project Description (5 pages maximum)

Include information on the background of this project: how did it come to fruition?

The Digital Fabrication Lab is a direct result of support from grants like the TFAC Grant. Starting in 2014 with a successful Impact grant application to the NDSU Alumni Foundation, four 3D printers were purchased to start the NDSU Libraries 3D printing program. The grant provided funds for three years to purchase, market, and provide access to 3D printing technology. This included hiring student workers and the appropriate supplies and materials to support the operation. Over the course of those three years, adjustments were successfully made in order to transition from a grant-funded to a self-sustaining model. The departure of the staff member who had been most involved with the project in the summer of 2017 created room for the Libraries to retool the positon and firmly commit to hiring a person with the skills and knowledge to create the Digital Fabrication Lab. Through the support of the Dean of Libraries, the position of Emerging Technologies Coordinator was created. Space and resources were then allocated to transform the 3D Printing service into the Digital Fabrication Lab.

In the Spring Semester of 2018, a TFAC Grant was award to the NDSU Libraries to help further the expansion of the facility. In the Fall of 2018, purchases were made that furthered the capabilities beyond 3D Printing. Two Desktop Mini-Mills were purchased to introduce subtractive manufacturing processes along with other components like a Cricut Maker and power tools. Workbenches and common hand tools were acquired to assist students in completing personal and class based projects. The lab was also moved from room 121 to room 119 on the main floor of the Library to better accommodate students and add a more visible workshop area.

That same semester, the NDSU Library was awarded an Impact Grant from the Alumni Foundation to purchase a laser cutter to be installed in room 121. The laser cutter will add another resource that will improve the Digital Fabrication Lab's ability to create rapid prototypes and further students' understanding of fabrication. We have committed the Impacts Grant's funding to the installation of the laser cutter, HVAC, and electrical upgrades needed.

Furthermore, we have committed our own departmental funding of $11,800 to the building of a computer cluster in the same space. This is where we would install and support the aforementioned computers from this TFAC Grant. Work will begin in July of 2019 and will add the needed accommodations and space for the Digital Fabrication Lab.

If awarded, the 2019 TFAC Grant, will provide our students with a spacious lab area where they can work and collaborate on projects. Steelcase brand furniture will be purchased to accommodate the equipment and will tie into the Libraries' existing furniture. Whiteboards and collaborative technology will be implemented throughout the lab for brainstorming and planning sessions. This creates a collaborative and inclusive environment for students across the spectrum of degree programs.

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IV. Milestones

List the date for each project milestone. These milestones should represent the ***significant*** accomplishments that will be associated with the action plan. For each milestone, please indicate its expected outcome and the means for assessing that outcome. (The table may be extended as needed.)

	Date	Milestone	Expected Outcomes	Means of Assessment
1.	August 15th 2019	Finish Construction Build	Facilities will have construction finished. Order components and furniture.	Completed construction/ completed purchases
2.	August 21th 2019	Installation of software/hardware/networking	Install hardware, software and configure components to network	Install Complete
3.	August 27th 2019	Lab open for student use	Equipment will be made available for student use at beginning of semester	Lab is opened to students upon opening of fall semester.
4.	December 20th 2019	Analytics Review	Sense of Initial usage	Analytical Data

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V. Supporting Documentation

Please see following letter of recommendation(s)

NDSU NORTH DAKOTA STATE UNIVERSITY

The Libraries
NDSU Dept. 2080
P.O. Box 6050
Fargo, ND 58108-6050

701.231.8753
Fax 701.231.6128
Ariel 134.129.115.34
ILL Fax 701.231.7138

To: NDSU Student Technology Fee Advisory Committee

From: Joe Mocnik, Ph.D., Dean of Libraries

Date: February 14, 2019

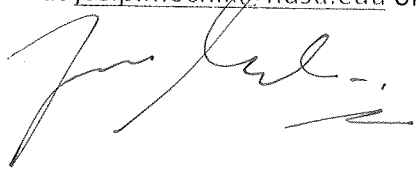
Re: Support for Libraries' Digital Fabrication Lab request

Please accept this letter in support of the Digital Fabrication Lab funding request that will foster collaboration, partnerships, and create innovative opportunities for learning across the curriculum.

The NDSU Libraries energize and advance research, teaching, and learning in an evolving information environment. Building on the successes of the 3D printing technology that was supported by the 2014 Impact Grant, a Digital Fabrication Lab will allow the Libraries to bring advanced tools and technologies into a central and universally available hub for innovation. Additional computers will help us teach digital literacy to the students of all majors. These efforts are aligned with the strategic plan. The other desired outcome is to enhance the services by alleviating the current bottleneck in workflows for students. For instance, students will gain access to design software and stations to complete work in a timely manner. It will also allow us to teach classes in 3D modeling software and host drop-in clinics for students that are struggling with such projects. We have already have buy-in to do this project and have taken the initiative by approving and funding room alterations to the old 3D printing room. This summer we will be removing the cabinets and countertops to make room for the computer cluster, as well as installing HVAC and upgraded electrical components for the Laser Cutter.

There are many potential positive outcomes of the implementation of these efforts that will strengthen and further develop a unique niche for the NDSU. For instance, student engagement and retention will increase by offering access to rapid prototyping equipment and conceptual design in neutral spaces that can be transformative for the users. The development of innovative curriculum will be strengthened by making new technologies available to faculty that is currently reserved only for few select units. There is also a potential to provide such services for extension offices and build stronger ties with the local community, including the Tri-College students.

Please feel free to contact me directly with any inquiries at josip.mocnik@ndsu.edu or 231.8887.



To Whom It May Concern-

As the new Director of Entrepreneurship at North Dakota State University, my number one priority is getting students to take a chance on themselves. They need to learn that they can create their future.. The most effective way I've found to give them this confidence is through experience. In my Intro to Entrepreneurship class and in the programs the Center for Entrepreneurship supports, we push students to test ideas and learn what problems need to be solved. The Fabrication Lab is key to this learning.

My students and other students in the entrepreneurship program are using the Fabrication Lab to launch prototypes of their ideas. This has taught them them importance of customer validation and interdisciplinary learning. Nearly 2/3rds of my students had no experience with the technology before we started working at the Lab. The help from the staff made it easy for these newbies to get excited about technology that they can continue to use throughout their career.

Adding resources, such as computers that help with 3D modeling, will enable more of our students to take advantage of the lab and prevent back ups as the students share resources. The challenge for the Lab is that as more students use the resources, more students continue to return and fill the space. With the momentum of the Fabrication Lab, it is important to continue to add resources so new learners are not scared away by a long queue when entering the space.

Kind regards,

Scott Meyer

Director of Entrepreneurial Initiatives
North Dakota State University

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VI. Budget

(double-click on the form to begin entering data)

1.	NDSU ORGANIZATION OR UNIT NDSU Library
2.	PROJECT DIRECTOR(S) (Must be NDSU faculty or staff) Adam Elznic-Emerging Technology Coordinator

3.	SALARIES AND WAGES			
	Personnel description	Number employed	Number of months	Funds Requested
	A. Staff			
	B. Graduate students			
	C. Undergraduate students			
4.	TOTAL SALARIES AND WAGES			$0.00
5.	FRINGE BENEFITS			$0.00
6.	TOTAL SALARY, WAGES AND BENEFITS			$0.00

7.	EQUIPMENT			$10,621.00
	Describe Equipment specifics in the Budget Justification section			
	Item	qty	Cost/ea	Ext Cost
	HP eliteDesk 800 G4	6	$680.00	$4,080.00
	Ram 16 gb upgrade	6	$110.00	$660.00
	AMD Radeon Graphics Upgrade	6	$107.00	$642.00
	Steelcase QiVi Collaborative Chair	6	$564.00	$3,384.00
	Steelcase Campfire Big table	1	$1,855.00	$1,855.00

8.	MATERIALS AND SUPPLIES			$200.00
	Describe Materials and Supplies specifics in the Budget Justification section			
	NEO and Telecomm Installation-Facilities	1	200	$200.00

9.	TOTAL TECHNOLOGY FEE REQUEST	$11,021.00

10.	MATCH (Describe in Match Section)	$12,748.00

11.	TOTAL PROJECT EXPENDITURE	$23,769.00

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VII. Budget Justification

Describe how you arrived at the budget totals in Section VI, Budget.

You are expected to follow all applicable university policies and procedures regarding salary expenditures.

You are expected to follow the state-approved purchasing guidelines when purchasing materials and supplies.

- Equipment: List name, estimated cost and quantity of each item and explain why it is important to the project. Include installation and maintenance costs in your estimates.

(a) **HP Elitedesk 800 G4-6x- $680.00 ea**- Features an Intel Q370 chipset, Intel Core i7, HP USB Keyboard and Laser Mouse. Solid State Hard Drive, Integrated Network Card, Integrated Sound Card. Will be upgraded using the components listed below to support the work they will be doing.
Installation: Steelcase furniture selected has integrated data and power supplies.
Maintenance: Will be services by NDSU Library's ITS Dept.

(b) **16 gb RAM (Upgrade)-6x-$110.00:** Desktop will be upgraded with 16 gb of RAM in order to support software applications.
Installation: Will be ordered from factory via NDSU Bookstore
Maintenance: Will be services by NDSU Library's ITS Dept.

(c) **AMD Radeon RX series Graphics Card (Upgrade)-6x-$107.00**: Will feature upgraded Graphics Card to meet demands of engineering software installed on to computer.
Installation: Will be ordered from factory via NDSU Bookstore
Maintenance: Will be services by NDSU Library's ITS Dept.

(d) **Steelcase QiVi Collaborative Chair- 6x- 564.00 –** Chairs will be used at computer station to provide students with maximum amount of comfort and ergonomic benefits.
Installation: chairs will be ordered and places in the lab area
Maintenance: general cleaning and yearly service of chairs

(e) **Steelcase Campfire Big Table (ft data and power supply)-1x-$1855.00-** The Steelcase Campfire Big table is a 28in table with built in data and power supply. Computers will be placed on tabletop 3 to each side. The Library has already invested in these table tops and have proven to be effective in high traffic areas.
Installation: Table will be assembled onsite and data and power supply will be plugged into appropriate power outlet.
Maintenance: general cleaning and yearly inspection

Materials and Supplies: List name, estimated cost and quantity for each non-equipment items and explain why it is important to the project.

(f)NEO and Telecomm installation- Facilities Estimate-$200.00: Facilities has estimated $200 for relocation of network cable / NEO in room 119 to adequately support our proposal.

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VIII. Budget Match

1. Attempted Budget Matches:
   - Computer Monitors
   - Room 119
   - Room 119 Construction Project

2. Actual Budget Matches: $12,748

Item	Qty	Cost Each	Exact Cost
Computer Monitors	6	$158.00	$948.00
119 Construction Cost	1	$11,800	$11,800
		Total	$12,748

3. Additional Budget Match information:
Computer Monitors supplies by Library ITS

Room 119 allocated to project

Room 119 Room Construction- Project Number 423
Signed /Approved by Dean of Libraries Josip Mocnik. Construction to begin after July 1, 2019.