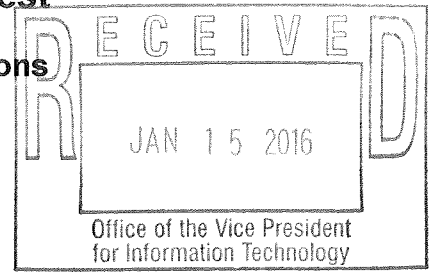


# NDSU Technology Action Plan Request

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## I. Action Plan Introduction and Authorizations



<b>NDSU ORGANIZATION OR UNIT</b>			
Department of Theatre Arts			
<b>TITLE OF PROJECT</b>			
Digital fabrication for Theatre Arts Scene Shop Lab			
<b>Project Duration (3 years maximum)</b>	<b>From: Spring 2016</b>	<b>To:</b>	
<b>Type of Project (Check one)</b>	<input checked="" type="checkbox"/> <b>New X</b>	<input type="checkbox"/> <b>Previously Submitted</b>	<input type="checkbox"/> <b>Renewal</b>
<b>Total Technology Fee Request \$29,444.00</b>			
<b>Project Director (Must be NDSU faculty or staff)</b>	<b>Campus Address: 126 Askanase Hall</b>		
<b>Mark Engler</b>	<b>Phone: 1-7706</b>		
	<b>Fax:</b>		
	<b>E-mail: mark.engler@ndsu.edu</b>		
<b>Name (Type or Print)</b>	<b>Signature</b>	<b>Date</b>	
<b>Project Director Mark Engler</b>		1-15-16	
<b>Unit Head Hardy Koenig</b>		1-15-16	
<b>IT Division Consultant Lincoln Bathie</b>	<b>Signature</b> 	<b>Date</b> 1-15-16	

### Executive Summary (maximum of 175 words)

The Department of Theatre Arts is requesting funding to purchase a ShopBot™ CNC (computer numerical control) router for the Scene Shop Laboratory in Askanase Hall. The funds would cover the cost of the router, the installation of a 220v electrical outlet in the shop, and a new computer to run the software required for the router operation.

We will only accept for consideration Technology Action Plan Request forms which are fully completed and signed 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.

## NDSU Technology Action Plan Request

### II. Project Overview

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1. How does this project meet student needs?

In the past 10-15 years live entertainment (theatre, opera, concerts, etc.), has begun adapting modern manufacturing methods and processes in the creation of scenery and properties for the stage. The most exciting adaptation has been the growing use of digital fabrication CNC router technology. The demand for technicians who can operate and program CNC equipment is high. This project will allow students to train using modern production equipment.

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2. What audience does this project directly serve? What audience is indirectly served? How many students are affected?

Directly, this project will affect all Theatre majors and minors plus those students who enroll in Stagecraft (THEA 270), Theatre Practicum (THEA 210), Theatre 370 (Technical Theatre Production), and Opera Workshop (MUSC 319), approximately 80-100 students. Indirectly, this technology will improve the experience of all students and community members who attend NDSU Theatre and Opera productions. The Theatre has averaged 1500 annual student ticket sales over the last few years.

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

This technology is used in many diverse industries and the potential for crossover is high. This equipment, and similar equipment, is used by everyone from artists to engineers, from big manufactures to small businesses. Students in Art, Architecture, and Engineering could benefit from this tool. I employ many work study students from those disciplines and the equipment would absolutely be available for them to use on school projects. An agreement with the departments of Art and Architecture is possible to make the equipment available for their students when it's not being used by Theatre.

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

The immediate impact will be to improve the quality of the scenery produced for NDSU Theatre and Opera Theatre in the departments of Theatre and Music. Long term, students who are interested in careers in Entertainment Technology will be better prepared to find jobs or continue their education in a graduate program.

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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)?

Future upgrades to this equipment, computer, and software will be handled by, the Department of Theatre or the Division of Performing Arts.

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**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.)**

**Purchase of this equipment will allow for the better training of our students in preparation for employment in the industry. It will also allow better utilization of resources by reducing waste of expensive materials.**

**The Windows computer will be managed by ITS Desktop Support. Lincoln Bathie sees no issue with this computer being on the network and functioning within best practices. Support for the software that runs the CNC will be sought from the vendor.**

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**7. What service on campus is most similar to the one proposed here? How does this project differ?**

**There is a similar CNC router installed in Renaissance Hall downtown and it has been very effective in assisting their students as both an educational tool and also in assisting with improving the quality of their class projects. Its distance from campus and its heavy use by the Architecture and Art departments makes it impractical for the Theatre department to use as a teaching tool and for our productions.**

# NDSU Technology Action Plan Request

## III. Project Description (5 pages maximum)

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

The Department of Theatre Arts is requesting funding to purchase and install a ShopBot™ CNC router in the Scene Shop Laboratory in Askanase Hall. Funding would cover the cost of the router + shipping, a 220 volt electrical outlet installed by Facilities management to power the tool, and the cost of a new computer and software.

Digital fabrication is a manufacturing process where the machine or tool used is controlled by a computer. It is relatively new to the entertainment industry but has been used in other industries for some time. The cost and a steep learning curve has kept the technology inaccessible to smaller arts organizations until very recently. Those barriers have been slowly eroding over the last decade as more and more industries adopt the technology and small consumer oriented products have been introduced to the market.

I have been considering this technology for several years but I was reluctant to adopt it because I was unsure we would be able to use it effectively and because space in the scene shop is limited. My opinion changed last spring when I attended a national conference of entertainment professionals. At the conference, I participated in a workshop that demonstrated the technologies potential applications for the entertainment industry. I was also able to speak with professionals who have already adopted digital fabrication and are actively looking for employees who are trained in its use.

There are several benefits to digital fabrication. First, it allows for more complex and detailed cuts to be made than could be accomplished by hand. Which means for us, it will allow for larger, more complicated scenic elements to be produced. It should also save money on material costs due to the computer programming that allows for maximum effective use of material. One of the Theatre's biggest expenses is in lumber and plywood. Using a CNC machine to map out cuts on a sheet of plywood will hopefully result in less waste and fewer mistakes.

There are many manufactures of CNC equipment. The product I'm requesting is from Shopbot Tools™ (shopbottools.com), model # PRSAlpha 96-60-6. The reason for choosing this company is related to the learning curve and cost of other manufactures. Shopbot has the widest adoption in the entertainment industry, strong training materials and customer support, an active helpful user community, and costs competitive or less than other manufactures. They are also one of, if not the only manufactures who cater to the entertainment industry.

The number of students who will directly benefit from this technology is relatively small, 80-100 theatre and music students. However, it will greatly improve the quality of the scenery and props produced by the program, which will improve the experience of everyone who attends a NDSU Theatre production. Last year that was over 1500 students and 3000 community members. I also anticipate this will be an effective recruiting tool for the theatre program.

# NDSU Technology Action Plan Request

## 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.)

	<u>Date</u>	<u>Milestone</u>	<u>Expected Outcomes</u>	<u>Means of Assessment</u>
1.	Spring 2016	Purchase equipment and begin electrical work		
2.	Fall 2016	Installation and training complete	First use on fall musical production of "Peter Pan"	
3.	Fall 2016	Expose theatre students to current technologies used in the industry	Allowing NDSU theatre students to be more competitive in the employment market	
4.				
5.				

# **NDSU Technology Action Plan Request**

## **V. Supporting Documentation**

**ShopBot Tools, Inc**3333B Industrial Dr.  
Durham, NC 27704

(888) 680-4466 Phone

(919) 680-4900 Fax

# Quote

Customer No.: NORTHDAKOTA2

Quote No.: 61756

Bill To: **North Dakota State University**  
Mark Engler - Dept. of Theatre Arts  
Fargo, ND 58108-6050Ship To **North Dakota State University**  
Mark Engler - Dept. of Theatre Arts  
Fargo, ND 58108-6050

(701) 231-7706

mark.engler@ndsu.edu

Date		Ship Via		Terms		
01/12/16		YRC		Net 30		
Purchase Order Number			Sales Person		Required	
			Dianne Reynolds		01/12/16	
Quantity			Item Number	Description	Unit Price	Amount
Required	Shipped	B.O.				
1			10162	PRSalpha 96-60-6 zzero, dust skirt, prox kit VCarve Pro ShopBot Edition	18945.00	18945.00
1			10385	CBxAR 1Spd UL 4-5HP 110V 1Ø & 220V 2 Pole 1Ø PDF 004107-00 R0	0.00	0.00
1			12571	HSD 4HP 220V 1PH PRS 24V On Board Spindle Bearings not warranted.	3459.00	3459.00
1			13699	Router Bit Starter Kit	195.00	195.00
1			11163	Aspire Upgrade for Existing owners & w/new machine VCarve Pro ShopBot Edition	1400.00	1400.00
1			15160	Digitizing Probe - 3D Stylus: 2mm, 1/8", 1/4" R4	395.00	395.00
1			16601	Crating Fee - Domestic	275.00	275.00
1			16519	Central US- 48/60/96 Shipping	775.00	775.00
1			10812	USITT15	0.00	0.00
Quote subtotal						25444.00
Quote total						25444.00

This quote is good for 30 Days.

Accessories (such as routers, vacuum pumps and spindles) are subject to their own manufacturer's warranties.

# Facilities Management Project Budget Estimate

Project # PR013407

Date: 01/12/2016

Requesting Department: Theater Arts

Contact Person/Phone Number: Mark Engler, 231-7706

E-mail Address: mark.engler@ndsu.edu

Building: Askanase

Description:

Askanase  
  
Labor and materials to provide a new circuit and receptacle for new CNC machine. See attached sheet for breakdown of estimated costs.

Total Construction Costs:\$ 3,000.00

Total Furniture/Fixtures/Equip: \_\_\_\_\_

Total Estimate:\$ 3,000.00

Authorized by Facilities  
Management:

Steve Sayle

1-12-16

(Date)

Please review above estimate and verify quantities and scope of work. Changes in quantities and scope of work may result in additional costs. Changes to project scope will require departmental authorization before any additional work will be performed. Prices are subject to change. Departments will be notified of any cost increases prior to materials being purchased.

NOTE: This is ONLY a project estimate and actual costs incurred will be billed. If the estimate is not returned within 60 days it will be removed from our estimating queue and your service/estimate request will need to be resubmitted. If you wish to use a different funding source than you provided on estimate request, please list below. You may use multiple funding sources split by percentage.

FUND \_\_\_\_\_ DEPT \_\_\_\_\_ ACCOUNT \_\_\_\_\_ PROGRAM \_\_\_\_\_ PROJECT \_\_\_\_\_

Requesting Department  
Authorization: \_\_\_\_\_

(Date)

RETURN TO FACILITIES MANAGEMENT UPON ACCEPTING OR REJECTING THIS ESTIMATE. SIGNING THIS FORM INDICATES YOUR PERMISSION TO PROCEED WITH THE PROJECT.

*CH*  
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Project number: 13407

Project Description: Askanase CNC 208/30amp circuit

<u>Detail</u>	<u>AMOUNT</u>	
Contingency	\$	500.00
Electrical labor and materials	\$	2,500.00

Provide a 30amp, 208 volt, single phase circuit and receptacle for a new CNC machine. Install #8 THHN cu conductors to compensate for voltage drop.

TOTAL:	\$	3,000.00
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# NDSU Technology Fee Action Plan Request

## VI. Budget

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

<b>1.</b>	<b>NDSU ORGANIZATION OR UNIT</b> Department of Theatre Arts
<b>2.</b>	<b>PROJECT DIRECTOR(S)</b> (Must be NDSU faculty or staff) Mark Engler

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

7. EQUIPMENT	
A. Shopbot PRSalpha CNC router, software, and accessories (see quote)	25,444.00
B. Electrical work in scene shop (see quote from facilities management)	3,000.00
C. new computer (estimate)	1,000.00
D.	
E.	
F.	
G.	
H.	
<b>8. TOTAL EQUIPMENT</b>	<b>\$29,444.00</b>

9. MATERIALS AND SUPPLIES	
A.	
B.	
C.	
D.	
E.	
F.	
G.	
H.	
<b>10. TOTAL MATERIALS AND SUPPLIES</b>	<b>\$0.00</b>

<b>11. TOTAL TECHNOLOGY FEE REQUEST</b>	<b>\$29,444.00</b>
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<b>12. MATCH (Describe in Match Section)</b>	
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<b>13. TOTAL PROJECT EXPENDITURE</b>	<b>\$29,444.00</b>
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# NDSU Technology Action Plan Request

## VII. Budget Justification

Quotes for requested equipment and labor/materials estimate from facilities management are attached.

There are no additional labor or installation costs. Once the electrical work is done it can be installed and maintained by myself and shop staff.

# NDSU Technology Action Plan Request

## VIII. Budget Match

### 1. Attempted Budget Matches:

I have requested funds from the Division of Performing Arts. None are available at this time.

### 2. Actual Budget Matches:

None

### 3. Additional Budget Match information: