

## **Supporting Research, Interprofessional Team Projects and STEM Outreach by providing Free 3D Printing to Students. A System-Wide Project for a Multi-Campus Health Sciences Library**

C. Erik Wilkinson, MLS | Regional Library Director - Odessa  
Texas Tech University Health Sciences Center – Libraries of the Health Sciences

### **PROJECT:**

We are focusing on providing all TTUHSC program students the opportunity to learn about and engage in the innovative application of 3D printing to be used in research, academic, practical, and clinical environments by providing access to free 3D printing consumables, instruction and guidance.

Interest and awareness will be measured in a pre-program survey of each School's cohort near the end of the Spring 2022 semester (see appendix). With this data, program's will be briefed and partnerships to market and encourage research and scholarship will be established within the respective programs and Office of Interprofessional Education.

### **WHY IS IT IMPORTANT:**

Starting at the Lubbock campus, TTUHSC introduced 3D print services in 2014 with the application as a rotation in the School of Medicine program. Residency placement of rotation participants spread across all disciplines: Family and Internal Medicine, Pediatrics, Physical Medicine and Rehabilitation, Psychiatry, Neurology, OB/Gyn, Child Neurology and Emergency Medicine.

To date, the Methodology Lab on the Lubbock campus and maker space in the Odessa library have completed a wide range of 3D-printing related projects at the department and individual levels, contributing PPE after the onset of COVID, and developing medical simulation prototypes like suturing devices and patient-specific anatomical models. This focus on meeting the current needs of faculty and students has supported undergraduate and graduate medical curricula in teaching practical skills within specialties like obstetrics, surgery, sports medicine, radiology, and other academic uses.

3D print technologies are now ubiquitous in the health sciences. The literature demonstrates clinical applications (i.e. models for patients to manipulate to understand their condition more fully), plus the printing of custom surgical tools for the theater and anatomical models used for practicing complex procedures are quickly becoming the norm. It is clear that TTUHSC students looking to the future will need an introduction to 3D print skills to be successful in their respective fields. Our intent is to continue our mission of promoting scholarly activity on the broad adoption of best practices and innovative incorporation of the technology in meaningful ways.

## **INSTITUTIONS INVOLVED:**

Texas Tech University Health Sciences Center – Libraries of the Health Sciences (Lubbock, Amarillo, and Odessa).

## **WHO WILL CARRY OUT THE PROJECT AND WHAT ARE THEIR ROLES?**

C. Erik Wilkinson, MLS | Principal Investigator, Odessa

Kate M. Serralde, MA | Project Manager, Lubbock

Brandon Cruz | Project Assistant, Lubbock

Rebecca Brandenburg, MLIS | Project Assistant, Odessa

## **WHAT IS THE TIMELINE?**

<b>Planning:</b>	April 2022
<b>Survey Distribution:</b>	
School of Medicine:	May 2022
School of Nursing:	May 2022
School of Health Professions:	May 2022
School of Biomedical Sciences:	May 2022
School of Pharmacy:	May 2022
<b>Data Collection:</b>	June 2022
<b>Data Reporting, Program Partner Communication &amp; Marketing Development:</b>	June/July 2022
<b>SCAMeL Research Committee Report:</b>	March 2023
<b>Post-Survey:</b>	April 2023
<b>Post-Survey Reporting to Program/Stakeholders:</b>	June 2023
<b>Scholarly Activity:</b>	May-December 2023
<b>Comprehensive Report and Recommendations to TTUHSC Stakeholders:</b>	December 2023

**BUDGET:**

Consumables:	\$2000
Funding of student research projects*:	\$2000
Funding of interprofessional-team projects:	\$500
STEM/Fine Arts Outreach:	\$500

\*: Must result in some form of scholarly activity, i.e. poster/paper presentation, article or book chapter.

*Andrew Escude*

02/28/2022

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Andrew Escude, Interim Executive Director | Date

## APPENDIX I

### DRAFT SURVEY<sup>1</sup>:

3D print technologies have become ubiquitous in the health sciences. The literature demonstrates clinical applications (i.e. models for patients to manipulate to understand their condition more fully), the printing of custom surgical tools for the theater and anatomical models used for practicing complex procedures are quickly becoming the norm. It is clear that TTUHSC students need an introduction to 3D print skills to be successful in their respective fields.

1. In an earlier focus-group we found that most students prefer a 3D printing course, like MIDS 8420<sup>2</sup>, instead of a workshop. Would you participate in a course or workshop focused on 3D printing opportunities in your program?
  - a. Yes?
  - b. No?
  - c. Not Sure
  - d. [If no, Why? If yes, what level? – Text Box]
2. As regenerative medicine advances, would you be interested in an introductory bioprinting workshop, and in the long-run, a course?
  - a. Yes?
  - b. No?
  - c. Not Sure
3. Fabrication services for developing medical simulation tools for suturing and other surgical practice are currently available. Would you like more information about this? <<Hyperlink
  - a. Yes?
  - b. No?
  - c. [If no, Why? If yes, what level? – Text Box]
4. If yes, what project ideas would you like to pursue? [Text Box]
5. If material costs for 3D printing were free would you use it?
  - a. Yes?
  - b. No?
  - c. Not Sure[If no, Why? If yes, Why?]
6. Which is your preferred method for learning more?
  - a. Phone?
  - b. Email?
  - c. Online Portal
  - d. Face-to-Face
  - e. Other
  - f. [Text Box]
7. What would you include in a 3D makerspace tailored specifically for healthcare? [Text Box]
8. I am open to the idea of using 3D printing in my future medical career:
  - a. Yes?
  - b. No?
  - c. Not Sure[If no, Why? If yes, Why?]

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<sup>1</sup> ADDENDUM: All survey participants receive a free 3D printed keychain. “To enter the drawing for a Starbucks gift card, please provide your contact information.”

<sup>2</sup> MIDS 8420: Thinking in 3D - An Introduction to 3D Printing and Medical Imaging | Course Description:

This two-week elective is designed to provide the fourth-year medical student with the basic competencies in 3D printing. To define the purpose of the 3D printed object in medicine, students will learn how to segment and 3D print using medical imaging, explore the historical roots of 3D printing, and apply certain forms of idea generation. Registration is through the School of Medicine.

**TTUHSC - Libraries of the Health Sciences - SCAMeL Speedy Startup 2021**

<b>Item</b>	<b>Description</b>	<b>Cost</b>	<b>Quantity</b>	<b>Ext. Cost</b>
White PLA+ 1kg	Sunlu white filament for general prints	\$ 23.99	15	\$ 359.85
White ABS 1kg	Sunlu white durable filament for general prints	\$ 21.99	10	\$ 219.90
Black PLA+ 1kg	Sunlu black filament for general prints	\$ 23.99	15	\$ 359.85
Black ABS 1kg	Sunlu black durable filament for general prints	\$ 21.99	10	\$ 219.90
Gray Standard Resin 1kg	Elegoo resin for general prints	\$ 29.69	2	\$ 59.38
White Standard Resin 1kg	Elegoo resin for general prints	\$ 31.99	2	\$ 63.98
Beige Standard Resin 1kg	Elegoo resin for general prints	\$ 34.99	2	\$ 69.98
Transparent Tough Resin 1kg	Siraya Tech tenacious resin - high impact resistance	\$ 65.00	2	\$ 130.00
Transparent yellow flexible resin 500g	eSUN flexible resin for special projects	\$ 47.99	2	\$ 95.98
<b>Misc.</b>				
Super Glue	Used to attach printed parts	\$ 8.99	3	\$ 26.97
Instant set	Used to cure super glue	\$ 8.00	3	\$ 24.00
Bolts	Used to create assemblies	\$ 32.98	2	\$ 65.96
Threaded inserts	Used to create assemblies	\$ 18.99	2	\$ 37.98
Silicone	Used to make skin-like material	\$ 11.25	10	\$ 112.50
Silicone Pigments	Used to color silicone for special projects	\$ 32.08	2	\$ 64.16
SD cards (x5)	Used for transferring prints to printers	\$ 36.98	2	\$ 73.96
			<b>TOTAL:</b>	<b>\$ 1,984.35</b>