

# 3D PRINTING AT AN ACADEMIC LIBRARY: SEVEN YEARS LATER!

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ATSU

A.T. STILL  
MEMORIAL LIBRARY

THIS PRESENTATION WILL DISCUSS THE 3D PRINTING PROGRAM AT A. T. STILL UNIVERSITY AND HOW THE LIBRARY HAS IMPACTED: FACULTY AND STUDENTS RESEARCH, LEARNING, AND TEACHING DURING THE LAST SEVEN YEARS, INCLUDING:

- BRIEF OVERVIEW
- BENEFITS OF HAVING A 3D PROGRAM.
- THINGS TO THINK ABOUT WHEN STARTING AND IMPLEMENTING A 3D PROGRAM
- SUCCESS STORIES
- QUESTIONS/COMMENTS



Dysfunction Dice  
2017 Spark Tank-ATSU  
Winner

3D Ophthalmotrope

2017 Winner of the AT Still Memorial  
Library 3D Contest

# BRIEF OVERVIEW:

- THE 3D PROGRAM AT A.T. STILL MEMORIAL LIBRARY WAS CREATED WITH A \$5,000 GRANT IN 2015. THE LIBRARY PURCHASED A DESKTOP PRINTER AND WASHING SYSTEM TO CLEAN THE MODELS.
- THE LIBRARY CURRENTLY RUNS 3 STRATASYS F170 PRINTERS AND 1 AFINIA PRINTER.
- THE LIBRARY 3D PRINTS FOR THREE CAMPUSES, A DENTAL CLINIC, AND ANY STUDENT ON ROTATIONS OR FACULTY RESEARCH PROJECT. (over 3,900 students)

# BENEFITS:

## STUDENTS

- IN-HOUSE PRINTED 3D MODELS ALLOW RAPID CHANGES OR CUSTOMIZATION OF MODELS
- FREE TO ALL STUDENTS/SMALL FEE TO DEPARTMENTS REQUESTING 3D PRINTS
- IMPROVES ANATOMICAL LEARNING AND PATIENT EDUCATION
- CREATION OF A 3D PRINTING CLUB, OPEN TO ALL STUDENTS & FACULTY
- PROMOTES AND STIMULATES CREATIVITY AND INNOVATION

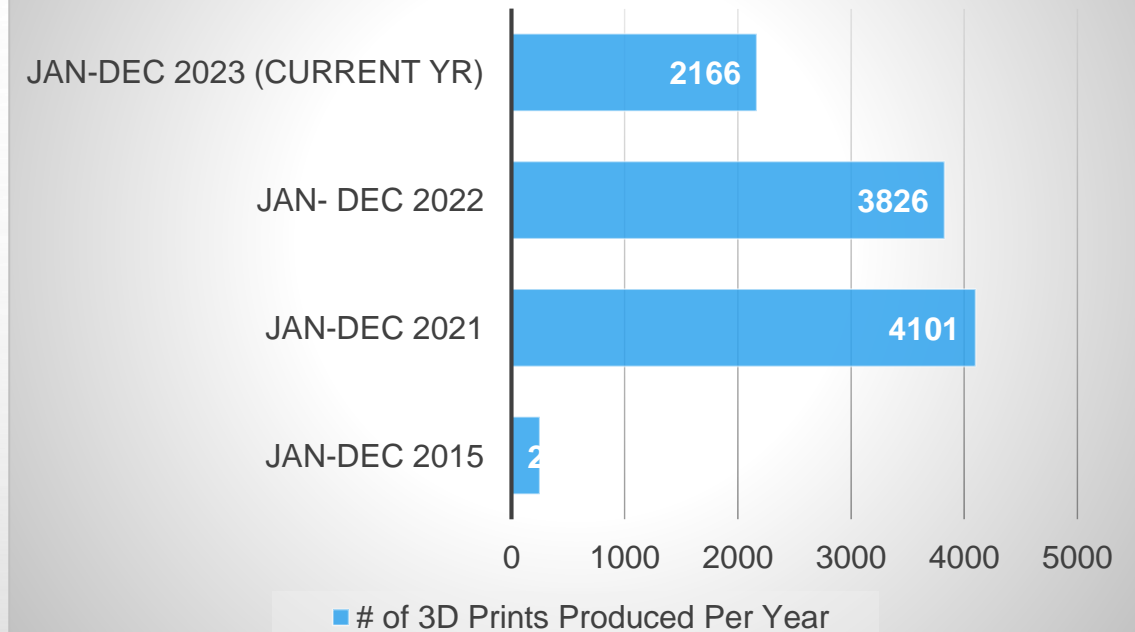
## FACULTY

- ENCOURAGES GREATER CREATIVITY AND COLLABORATION IN SOLVING PROBLEMS
- RESEARCH AND PUBLISHING OPPORTUNITIES

## LIBRARY

- INCREASED BUDGET FOR 3D PRINT EACH YEAR
- STRONGER COLLABORATIVE FOCUS BETWEEN THE LIBRARY, FACULTY, AND ADMINISTRATION
- GREAT OUTREACH AND MARKETING TOOL FOR PROSPECTIVE STUDENTS/EMPLOYEES

## # of 3D Prints Produced Per Year

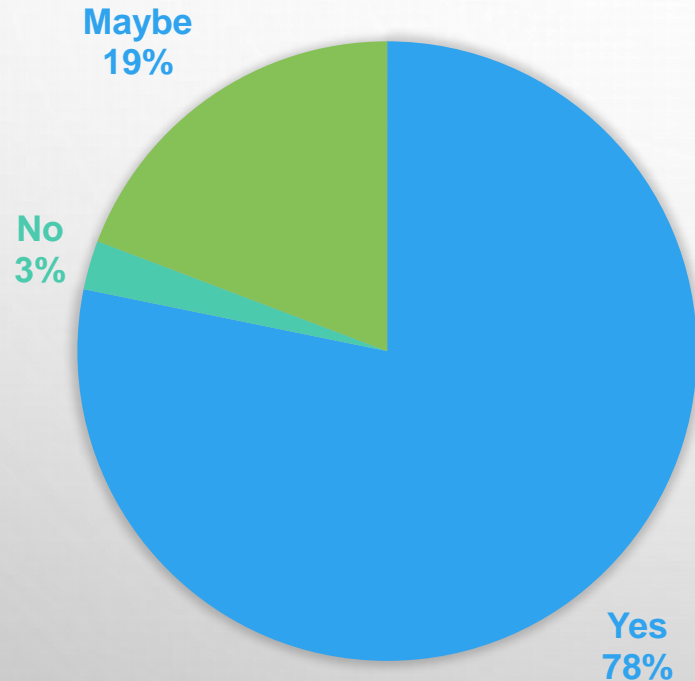


\*2021 included PPE of 380 masks

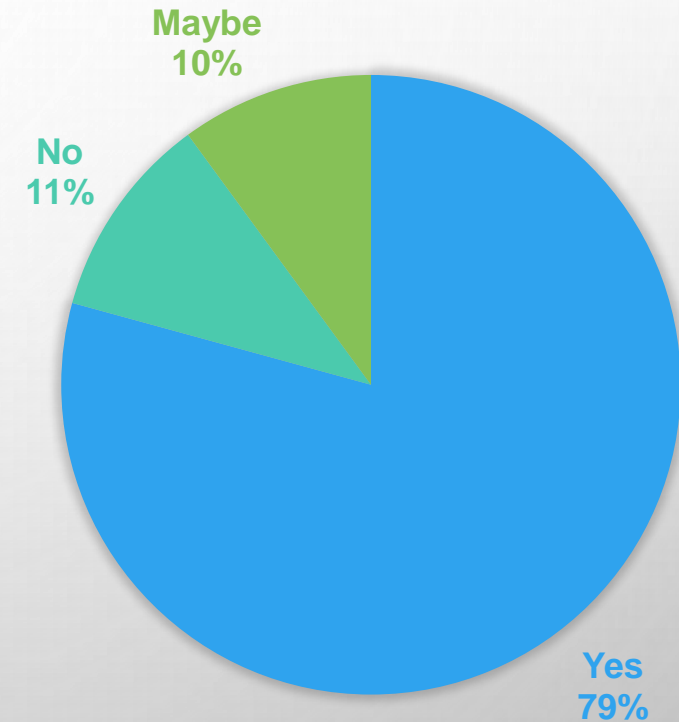
DO YOU BELIEVE THAT HAVING THE OPPORTUNITY TO PRINT 3D MODELS IMPROVES ANATOMICAL LEARNING?

Survey Response Review  
2015 – 295 Respondents  
2022 - 80 Respondents

2022



2015



# WHAT TO CONSIDER WHEN STARTING AND IMPLEMENTING A 3D PROGRAM?

- Cost (printers, computers, software, warranty, etc.)
- Staff involvement/training
- Are you charging fees for printing or is the university/college covering the costs
- Space (proper ventilation and disposal of materials)
  - OSHA
  - City or University policy on disposal



Reproduction of  
A.T. Still Hand  
& Spine Joint  
Injection Model  
(patent pending)



# COST:

MOST ENTRY-LEVEL 3D PRINTERS CAN RANGE FROM \$300 - \$500, WHILE LARGER AND MORE DETAILED (MULTI-COLOR) PRINTERS CAN RANGE SEVERAL THOUSANDS OF DOLLARS.

WHEN THINKING OF STARTING A 3D PROGRAM HERE ARE SOME THINGS TO THINK ABOUT:

- IDENTIFY THE REQUIREMENTS YOU WANT YOUR PRINTER TO HAVE:
  - INITIAL INVESTMENT
  - FILE TO FINISH SPEED
  - PART STRENGTH
  - ACCURACY
  - MATERIAL PROPERTIES
  - PRINT CAPACITY



# STAFF INVOLVEMENT/TRAINING



Montana reusable masks and face shield printed during COVID

- Training on how to use the 3D printer
- Upkeep of machine(s)/Tech Support
- Learning different 3D software:

Fusion 360

Blender

Sketchup

AutoCAD

GrabCAD

Maya, etc.

- Finishing time (cleaning)  
hand cleaning vs. water soluble support
- Promotional materials
- Storage of 3D files and formats (google drive?)
- Creating a LibGuide and policy: <https://guides.atsu.edu/3Dprinting>





# Space/Disposal

- OSHA  
Does your school/university have a hazardous waste policy that follows OSHA guidelines?
- City or University policy  
Is there a city or school policy regarding the disposal of hazardous waste?  
  
Do you have a written policy regarding what can/can not be printed?  
  
Do you have a written safety manual for the 3D printer(s) or lab?
- Do you charge for printing and how do you determine that cost?



Dental Demonstration Model, Thingiverse.com

## CONCLUSION/SUMMARY

- INCREASED REQUESTS FROM FACULTY FOR RESEARCH PRINTS OR TRAINING MODELS
- INCREASED REQUESTS FROM STUDENTS
- MAKING A DIFFERENCE IN EDUCATION HEALTHCARE

## MEASURING

- TRACKING OF THE NUMBER OF MODELS PRINTED/REQUESTED EACH MONTH
- WHAT ARE THEY SAYING- SURVEY

## MARKETING AND OUTREACH BEST PRACTICES

- WORD OF MOUTH AND BRAND LOYALTY WHEN YOU PROVIDE QUALITY SERVICE
- SHARE SUCCESS STORIES, SOCIAL MEDIA, NEWSLETTERS, PRESENTATIONS, ETC.
- CREATE A ONE-STOP SHOP LIBGUIDE ABOUT 3D PRINTING AND HOW TO REQUEST SERVICE

<https://guides.atsu.edu/3Dprinting>



ARTERIA LUSORIA CT SCAN  
PRODUCED MODEL

# 3D Printing Services

## Library 3D Facilities

[How to Request a Model](#)

[Printed Object Requirements & Limitations](#)

[STEP ONE : Find/Create STL file](#)

[STEP TWO : The Printers](#)

[STEP THREE : The Washers](#)

[3D Printing Policy \[2022\]](#)

[Download 3D STL Files](#)

[Create 3D STL Files](#)

[Repair & Upgrade Poor STL Files](#)

[Tutorials](#)

[ATSU Most Printed Objects Gallery](#)

[Back & Vertebrae](#)

[Chest + Abdomen](#)

[Dental & Jaw](#)

[Head & Neck](#)

## How to Request a Model

1. All 3D printing requests must be sent to our **3D Print Shop Manager, Debra Loguda-Summers**, who works in the Kirksville Campus branch of the Library. **MODEL REQUESTS ARE FOR YOUR PERSONAL STUDY USE ONLY**

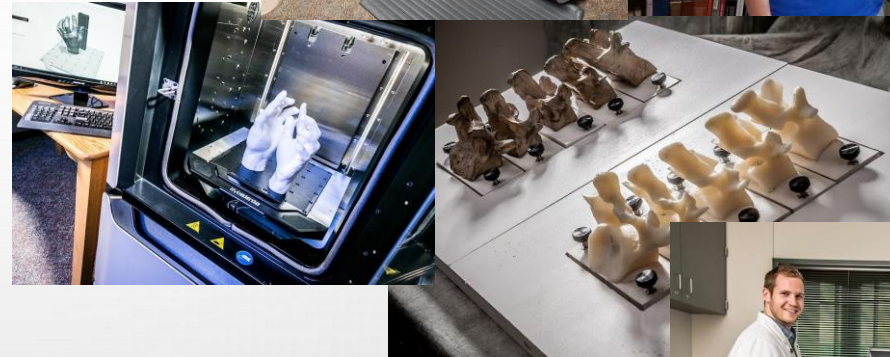
1. Please send requests to [dsummers@atsu.edu](mailto:dsummers@atsu.edu)
2. To request a model, please fill out the order form below and send the following information:
  1. Your contact information
  2. Your School and program affiliation
  3. If requesting a specific model not listed, please include the link to the STL file and any other information about your desired model -
    - **Note:** There is only one color available for objects in most cases; however, the plastic can be painted using model paints.
    - **Note:** For some projects, we will require an additional step - consultation with Academic Technology. This is often necessary when the model requires significant editing, clean-up, or different material.
3. The Library will require an STL or OBJ file to print your 3D object.
  - You may supply this via a USB drive or email.
  - If you cannot supply an STL or OBJ file, the Library will help you find one if possible.
4. The Library will contact you when your model is complete or if there is a problem.
  - **Note:** Printing a standard model typically requires between one to two weeks if all required files are of good quality; specific cases may take longer depending on the complexity and availability of materials.

• [REQUEST 3D MODELS FORM](#)

## Printed Object Requirements & Limitations

- Printing is for research or academic purposes only
- Requesters must be ATSU students, faculty, or staff

# QUESTIONS



Thank you for attending the presentation. If you have further questions please contact me at the emails listed below.

Debra “Deb” Loguda-Summers

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## REFERENCES:

- A.T. STILL MEMORIAL LIBRARY LIBGUIDE: <HTTPS://GUIDES.ATSU.EDU/3DPRINTING>
- ALL3DP: <HTTPS://ALL3DP.COM/>
- STRATASYS: <HTTPS://WWW.STRATASYS.COM/EN>
- JENNIFER J. HORTON (2017) AN ANALYSIS OF ACADEMIC LIBRARY 3D PRINTING LIBGUIDES, INTERNET REFERENCE SERVICES QUARTERLY, 22:2-3, 123-131, DOI: <10.1080/10875301.2017.1375059>

## THINGIVERSE:

- FOLDING DNA MODEL: <HTTPS://WWW.THINGIVERSE.COM/THING:714312>
- SMALL SKELETON: <HTTPS://WWW.THINGIVERSE.COM/THING:644370>
- DENTAL DEMONSTRATION MODEL: <HTTPS://WWW.THINGIVERSE.COM/THING:833034>
- PPE HEAD GEAR AND MONTANA MASK-CREATED BY ATSU (JAMIE CARROLL): <HTTPS://WWW.THINGIVERSE.COM/THING:4428256> AND <HTTPS://WWW.THINGIVERSE.COM/THING:4544861>
- REINDEER KIT: <HTTPS://WWW.THINGIVERSE.COM/THING:3213535>
- LED-LIT BRAIN: <HTTPS://WWW.THINGIVERSE.COM/THING:620846>
- REPRODUCTION OF GEORGE WASHINGTON'S DENTURES: SMITHSONIAN 3D DIGITIZATION: <HTTPS://3D.SI.EDU/>

## EMBODI3D:

- HUMAN HEART MODEL: <HTTPS://WWW.EMBODI3D.COM/FILES/FILE/16999-3D-PRINTABLE-HUMAN-HEART-MODEL-IMPROVED-WITH-STACKABLE-SLICES-STL-FORMAT/>

## OTHER IMAGES:

- 3D OPHTHALMOTROPE AND DYSFUNCTION DICE: ATSU-(KELLY ROGERS)
- ARTERIA LUSORIA HEART: DR. ROBERT SCHNEIDER-ATSU
- REPRODUCTION OF A.T. STILL HAND: MUSEUM OF OSTEOPATHIC MEDICINE (2022.01.01)
- BALLISTIC GEL MODELS- A.T. STILL MEMORIAL LIBRARY (PHOTOS: KELLY ROGERS)

