

Kick off Meeting

November 4/5, 2019

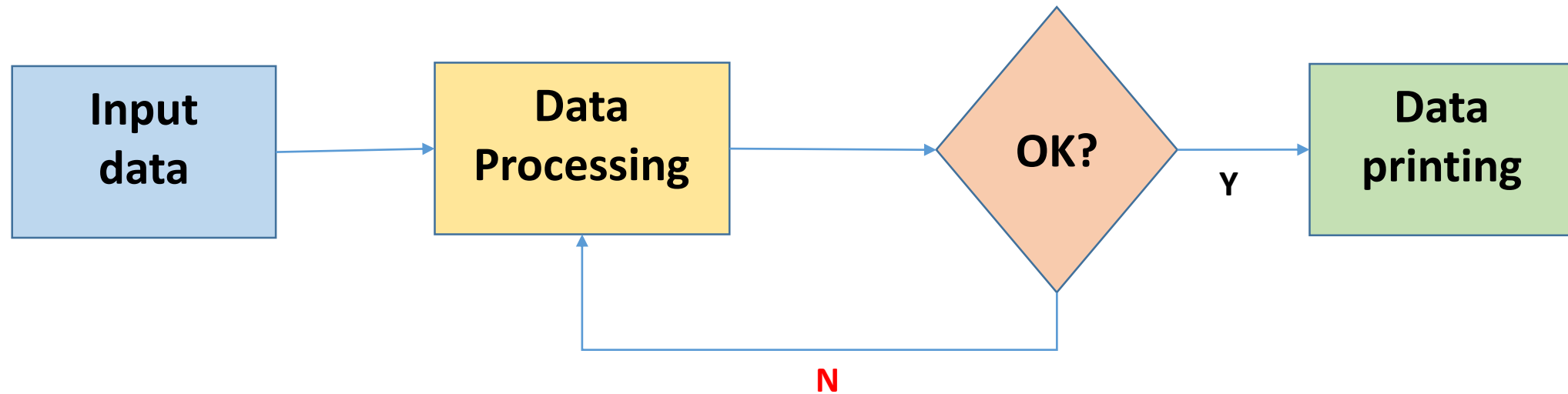
ID 01 - Framework for 3D printing in each EU partner Institution

OBJECT

- Perform a literature search and retrieve relevant documents from EU countries in the areas of 3D Printing
- Produce a summary of retrieved domains,
- Produce a summary of attached competencies and countries endorsement of 3D Printing on Libraries
- will produce a rating sheet with potential 3D Printing education domains, applications in libraries and rating scales for all partners to be rated.
- Produce the first 8 highest scored domains will be selected to develop 3D Printing competencies for education purposes

INTRODUCTION

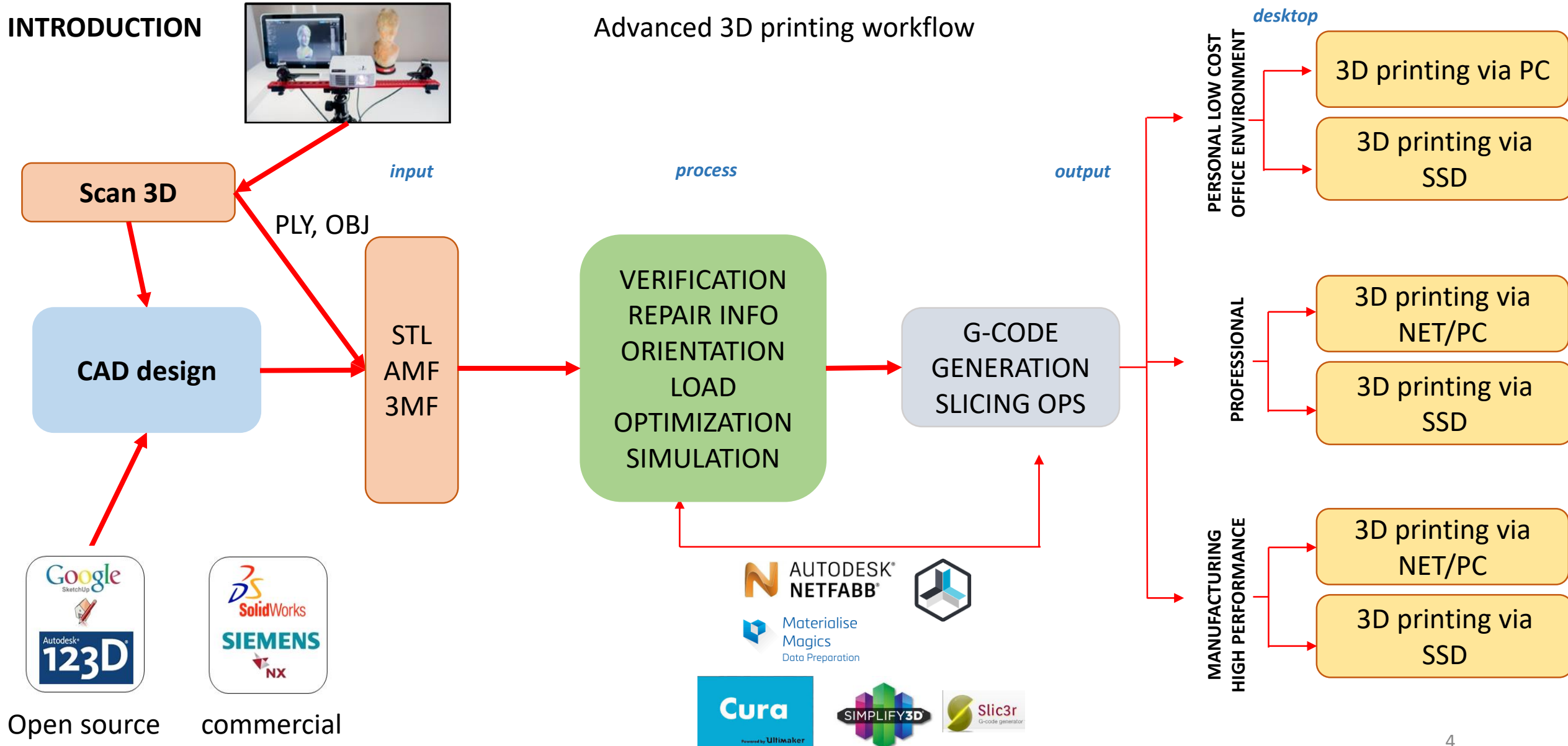
Basic 3D printing workflow



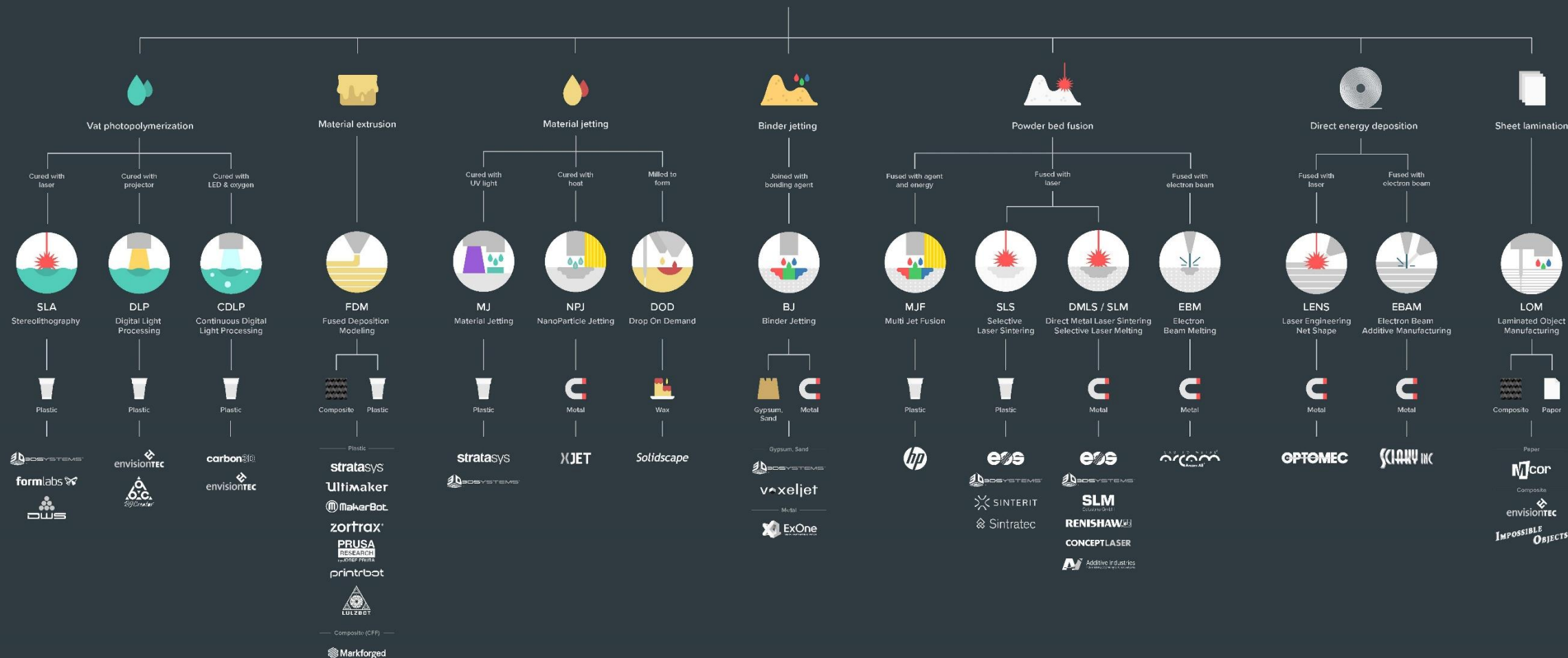
INTRODUCTION



Advanced 3D printing workflow



ADDITIVE MANUFACTURING TECHNOLOGIES



Competence, skills and attitudes

About the 3D printing technologies

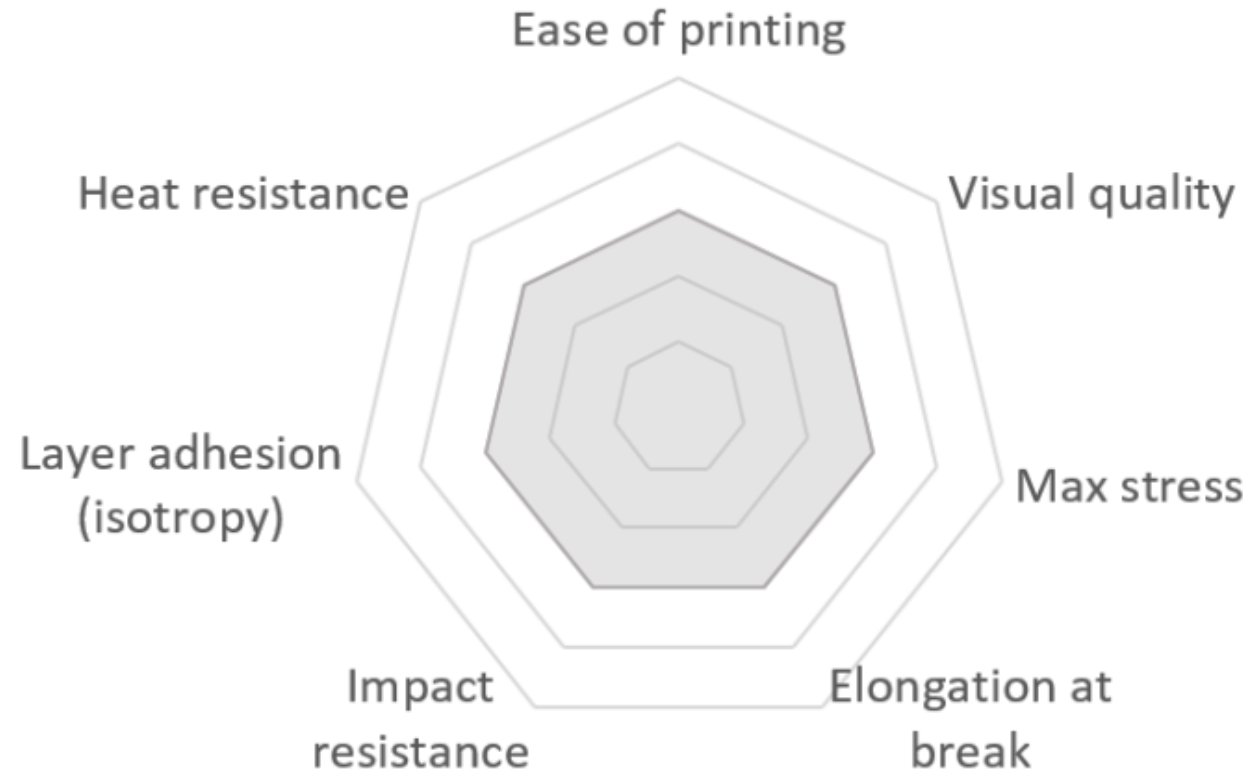
Ability to select 3d printing technologies (2)

Ability to recognize technologies build size

Skills to recognize dimensional Accuracy on 3D printing technologies

Capacity to select between conceptual design, embodiment design (form, fit and function) or detailed design (1)

About the 3D printing materials



Competence, skills and attitudes

About the 3D printing materials

Ability to select 3d printing materials (3)

Skill to recognize mechanical properties like ease of printing, Visual quality, Max stress, Elongation at break

Skill to recognize mechanical properties like Impact resistance, layer adhesion (isotropy), Heat resistance (4)

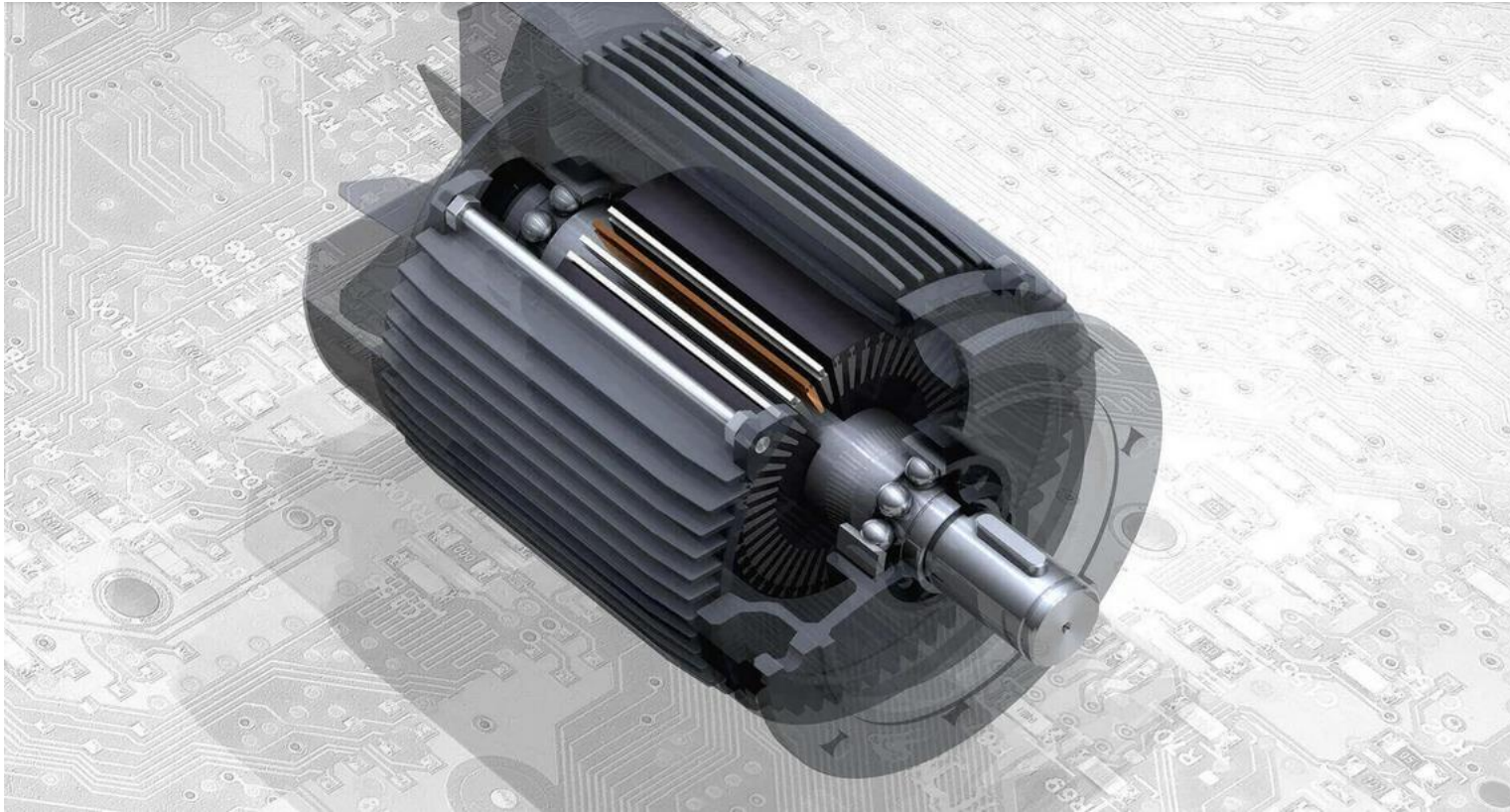
Ability to select Part accuracy

Skill to select Surface finish

Skill to select material post processing

Ability to select cold welding procedures

About the 3D printing process data



Get it printed!

2019 Best STL Repair Software



by Max von Ubel
Jan 15, 2019

Source: <https://all3dp.com/1/stl-repair-stl-file-online-checker-fix-3d-model/>

Competence, skills and attitudes

About the 3D printing process data

Demonstrated ability to recognise STL, AMF, 3MF, PLY, OBJ input files (6)

Ability to recognize technologies estimation built time

Ability to use STL repairing software, Netfabb, Cura, Simplify3D, Slic2r, Pronterface, Repetier Host, Meshmixer, Meshlab, Magics, Deskartes. (10)

Skill to use slicing software Netfabb, Cura, Simplify3D, Slic2r, Pronterface, Repetier Host, Meshmixer, Meshlab, Magics, Deskartes. (10)

Skill to manage Print Quality Troubleshooting Guide (5)

Ability to recognize 3d printing glossary and terminology (7,8)

Skill to manage closed surfaces/solids (9)

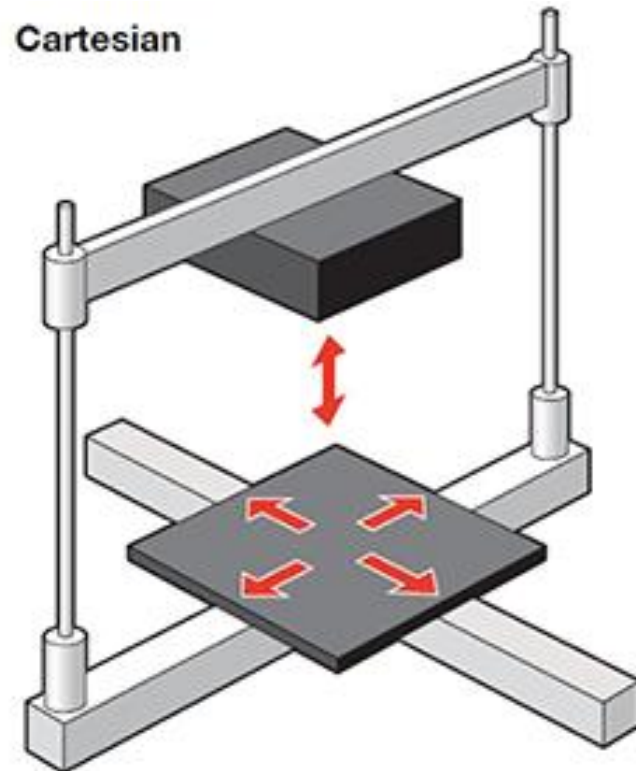
Ability to use platform built simulators

Skill to manage booleans operations, symmetry, scaled, duplicated parts with dedicated software

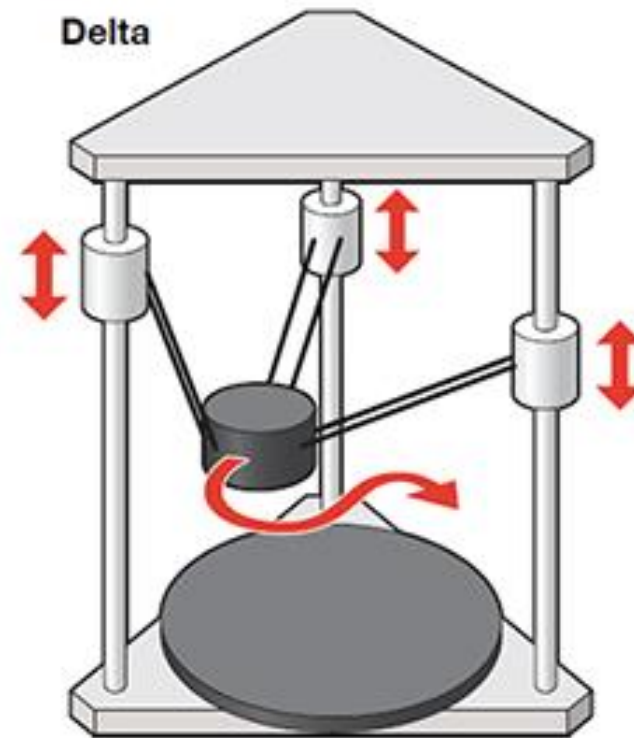
Ability to programming printing parameters (Hotend diameter, slicing layer, skirt, dual printing, Hotend material selection, supports orientation, infill and form density)(11)

Competence, skills and attitudes

About the 3D printing layout



Each element moves only
in one direction.



Printer head can move in any
direction quickly.

Competence, skills and attitudes

About the 3D printing desktop layout

Ability to recognize technologies build size

Ability to recognize dimensional

Accuracy on 3D printing technologies

Ability to work with network printers or standalone 3d printer

Skill to make 3d printer configurations

Skill to make 3d printer calibration

Attitude to built 3d printed part cost estimation

Attitude to solve print Quality troubleshooting (12)(13)

Skill to change 3d print materials

About the 3D printing post- processing



Effort Goes In, 3D Prints Stand Out

FDM 3D Printing Post Processing – An Overview for Beginners



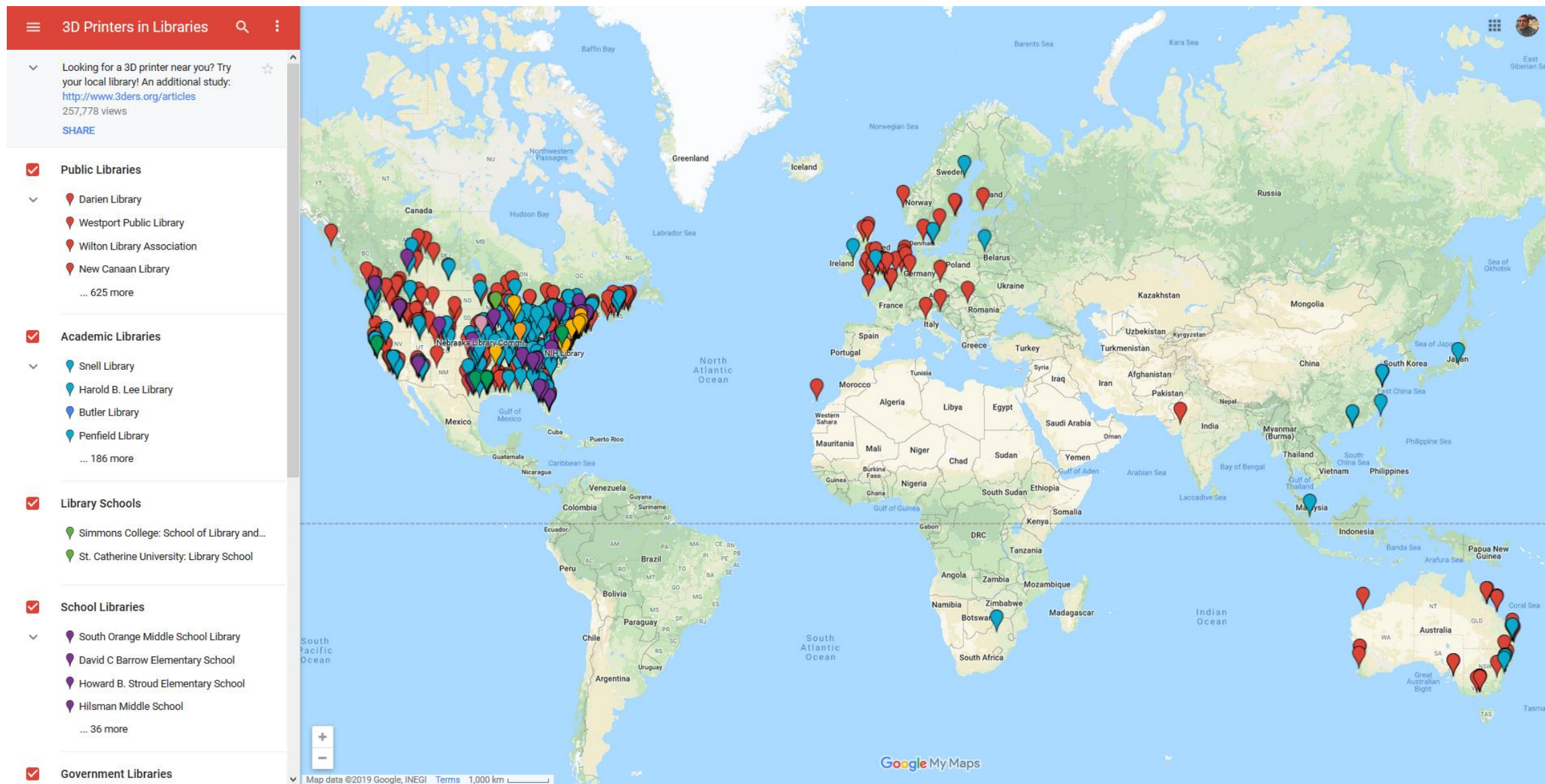
by Abhimanyu Chavan

Competence, skills and attitudes

About the 3D printing post- Processing

- Ability to remove supports on printed parts (14)
- Ability to clean printed parts
- Skill to use electric cutting, cleaning parts
- Skill to use soluble supports filaments (PVA, HIPS)
- Ability to use sanding post Processing
- Ability to use painting technique
- Ability to use welding technique
- Ability to use gluing technique

3D printers in libraries





← Bettendorf Public Library ↗

name

Bettendorf Public Library

description

http://qctimes.com/news/local/library-s-new-creation-studio-aims-to-inspire/article_781b0046-0ecd-5e30-be24-63c13e715fdf.html

Details from Google Maps

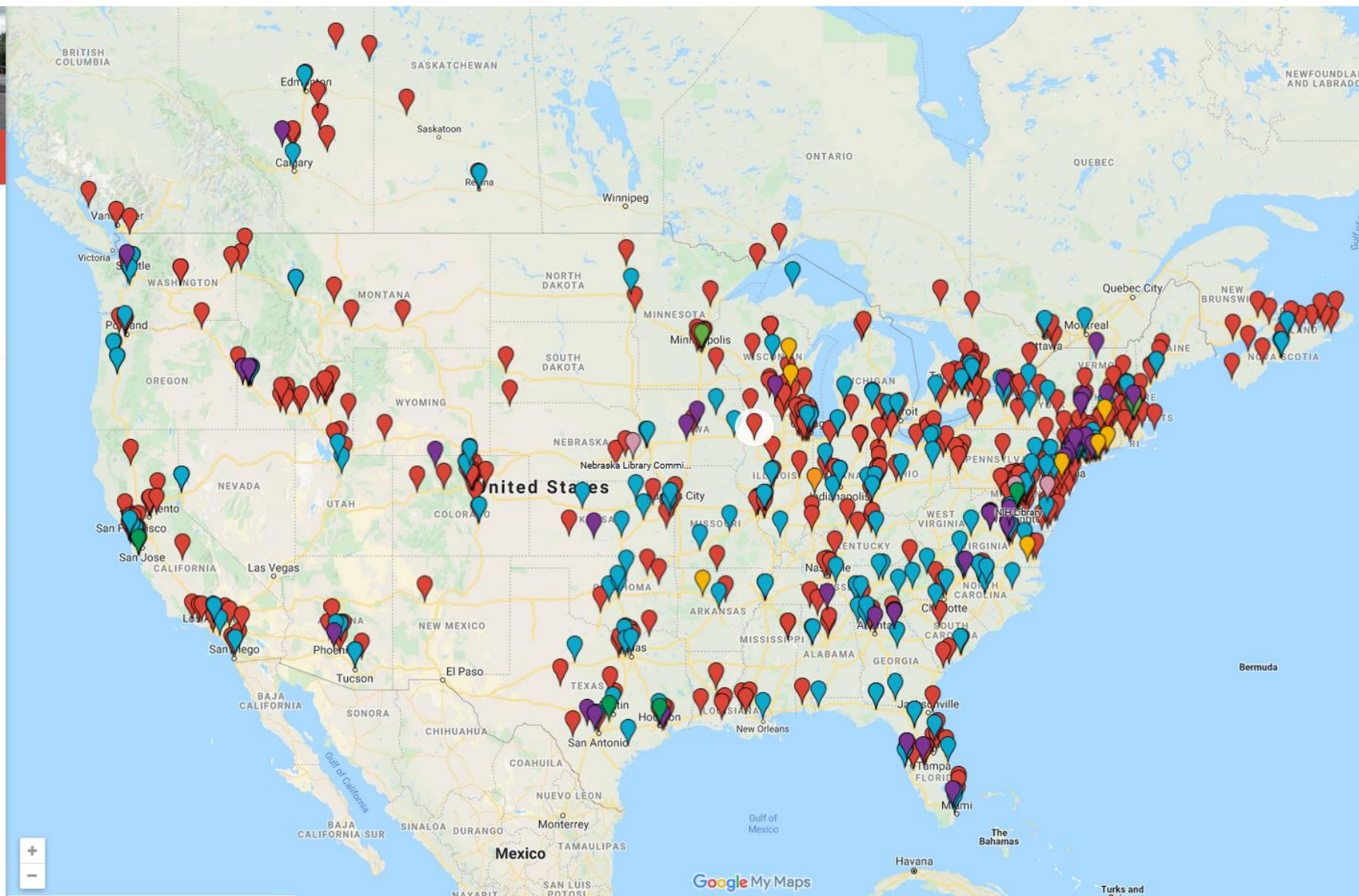
2950 Learning Campus Dr, Bettendorf, IA 52722

+1 563-344-4175

www.bettendorflibrary.com

4.6 ★★★★★

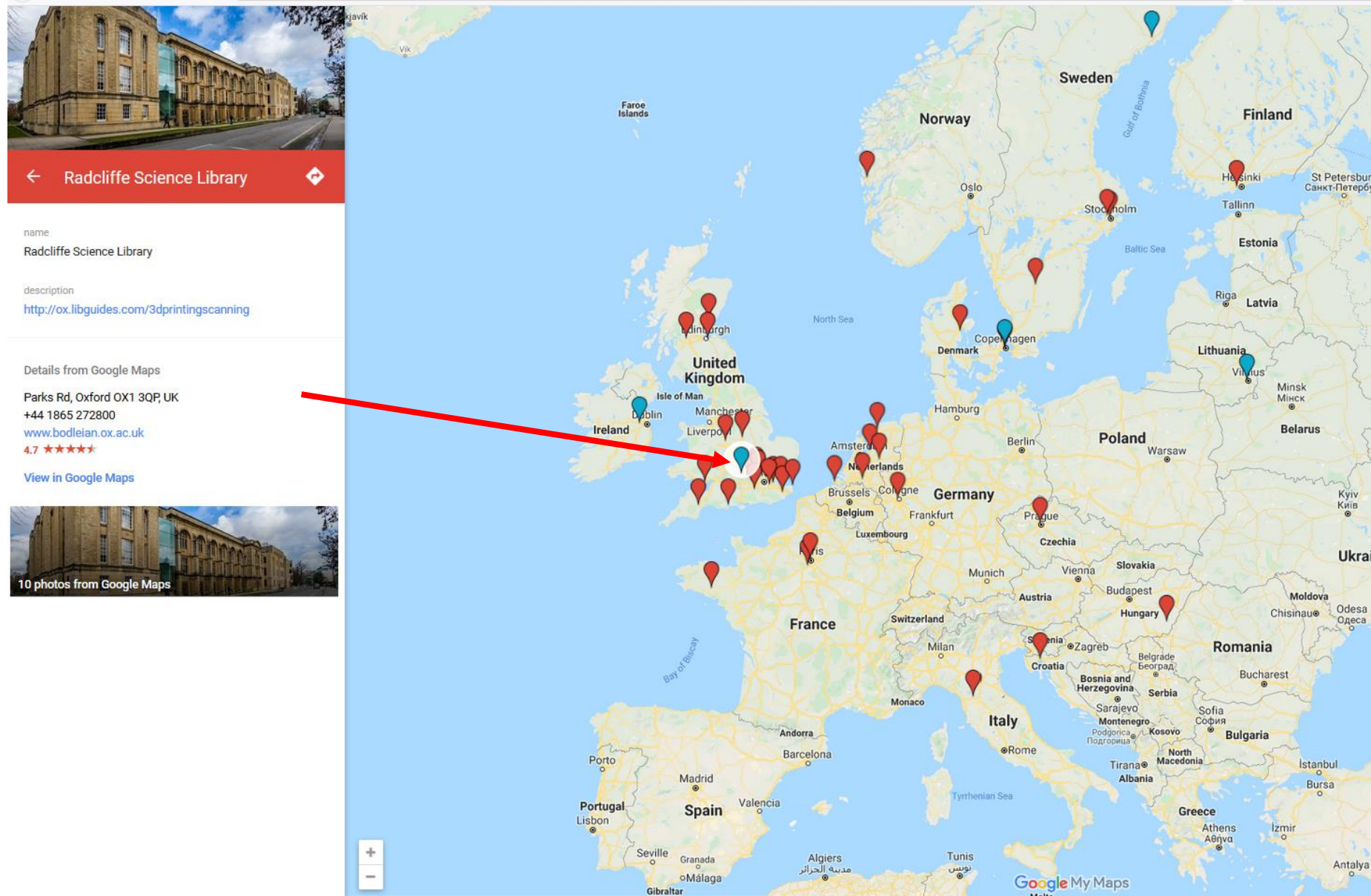
[View in Google Maps](#)





<https://www.3dprintingmedia.network/800-registered-3d-printers-in-libraries/>





Source:
<https://www.3dprintingmedia.network/800-registered-3d-printers-in-libraries/>

Technological and 3d printing librarians references

Technological references:

- (1) <https://engineeringproductdesign.com/rapid-prototyping-process-selection-key-factors/>
- (2) <https://www.3dhubs.com/guides/3d-printing/#basics>
- (3) <https://www.simplify3d.com/support/materials-guide/properties-table/>
- (4) <https://www.3dhubs.com/knowledge-base/fdm-3d-printing-materials-compared/#methodology>
- (5) <https://www.simplify3d.com/support/print-quality-troubleshooting/>
- (6) <https://www.simplify3d.com/support/articles/working-with-file-types/>
- (7) <https://rigid.ink/blogs/news/the-ultimate-3d-printing-glossary>
- (8) <https://www.3dhubs.com/knowledge-base/definitive-3d-printing-glossary/>
- (9) <https://all3dp.com/3d-printing-file-formats/>
- (10) <https://all3dp.com/1/stl-repair-stl-file-online-checker-fix-3d-model/>
- (11) <https://rigid.ink/blogs/news/optimum-infill>
- (12) <https://www.simplify3d.com/support/print-quality-troubleshooting/>
- (13) <https://rigid.ink/pages/ultimate-troubleshooting-guide>
- (14) <https://all3dp.com/2/fdm-3d-printing-post-processing-an-overview-for-beginners/>

Librarians references:

- (20) https://www.webjunction.org/news/webjunction/3D_Printer_Revolution.html
- (21) <https://new.library.arizona.edu/visit/print/3D>
- (22) <https://americanlibrariesmagazine.org/blogs/the-scoop/3d-printing-and-libraries/>
- (23) <https://all3dp.com/2/3d-print-in-a-library-what-to-consider-how-to-find-them/>
- (24) http://www.ala.org/advocacy/intfreedom/3d_printer_policy
- (25) <https://www.3dprintingmedia.network/800-registered-3d-printers-in-libraries/>
- (26) <http://hq.yalsa.net/programs/3724/3d-printer-clubs-and-student-leadership-opportunities>
- (27) Progress in the Making, 3D Printing Policy Considerations through the Library Lens, Charlie Wapner, Oitp Perspectives, nº 3, January 2015.
- (28) <https://www.thingiverse.com/groups/3d-printers-in-libraries>
- (29) 3D Printing in Libraries Is Not About 3D Printing, Jeffrey Lancaster, Strategic Library, Issue 3, March 2014
- (30) Library 3.0: How 3D Printing is Helping Reshape the Library to a Lab, By Lizabeth Arum, October, 2017
- (31) Time to Adopt: Librarians' New Skills and Competency Profiles, Birgit Schmidt, Pascal Calarco, Iryna Kuchma, Kathleen Shearer, Positioning and Power in Academic Publishing: Players, Agents and Agendas, Conference Paper June 2016, DOI: 10.3233/978-1-61499-649-1-1
- (32) 21st Century Competencies, Winter 2016 Edition, foundation document for discussion.

- (33) Maker Competencies and the Undergraduate Curriculum, LG-97-17-0010-17 - University of Texas at Arlington Libraries, 2017
- (34) Tinkering with Teachers: The Case for 3D Printing in the Education Library, Rachael Elrod, University of Florida, Gainesville, FL, Education Libraries, 39:1, 2016
- (35) https://www.webjunction.org/news/webjunction/3D_Printer_Revolution.html
- (36) Progress in the Making Librarians' Practical 3D Printing. Questions Answered, Zach Lichaa and Charlie Wapner, May 2016. American Library Association
- (37) <https://er.educause.edu/articles/2014/10/making-it-real-3d-printing-as-a-library-service>
- (38) Librarians as Makers, Beth Filar Williams & Michelle Folkman, Pages Journal of Library Administration Volume 57, 2016 - Issue 1
- (39) Competencies for Information Professionals in Learning Labs and Makerspaces, Kyungwon Koh, June Abbas , <https://doi.org/10.3138/jelis.56.2.114>, Journal of Education for Library and Information Science, Vol. 56, No. 2
- (40) Digital Design and 3D Printing in Technology Teacher Education, Igor Venera, Amir Merksamer, Procedia CIRP, Volume 36, 2015, Pages 182-186.
- (41) ABC and 3D: opportunities and obstacles to 3D printing in special education environment, Erin Buehler Shaun K. Kane, Amy Hurst, Proceeding ASSETS '14 Proceedings of the 16th international ACM SIGACCESS conference on Computers & accessibility, Pages 107-114, 2014. doi>10.1145/2661334.2661365

- (42) <https://www.torontopubliclibrary.ca/using-the-library/computer-services/innovation-spaces/3D-design-print.jsp>
- (43) <https://www.rplmn.org/services/computers-equipment/3d-printer/3d-printing-procedure>
- (44) Job and Skills, https://study.com/articles/3d_printing_technician_salary_training_job_description.html
- (45) Materilice Skills, <https://i.materialise.com/blog/en/5-skills-to-help-you-begin-3d-printing-today/>
- (46) <https://grabcad.com/groups/3d-printing-group/discussions/what-skills-are-needed-to-be-a-3d-printing-technician>
- (47) Developing a Pre-engineering Curriculum for 3D Printing Skills for High School Technology Education. Yu-Hung Chien National Taiwan Normal University, TAIWAN. EURASIA Journal of Mathematics Science and Technology Education, 2017, 13(7):2941-2958. DOI 10.12973/eurasia.2017.00729a
- (48) Making It Real: 3D Printing as a Library Service, Tod Colegrove , 2014, EDUCAUSE Review.
<https://er.educause.edu/articles/2014/10/making-it-real-3d-printing-as-a-library-service>
- (49) 3D Printing: A Practical Guide for Librarians, Sara Russell Gonzalez, Denise Beaubien Bennett, Rowman & Littlefield, 2016. ISBN 9781442255494.
- (50) 3-D Printers for Libraries, Jason Griffey, Chicago American Library Association, 2014, ISBN 9780838959305
- (51) Survey of 3D Printing in the Library, Primary Research Group. ISBN 9781574402803
- (52) 3D Printing in Medical Libraries. A Crash Course in Supporting Innovation in Health Care. Jennifer Herron. 2019. ISBN 9781538118795

Notes: