3D PRINTING AND SCANNING: New ways to engage with students and researchers

Oliver Bridle (Radcliffe Science Library, University of Oxford, UK) & Kelly Schultz (Koerner Library, University of British Columbia, Canada)
What do we do?
## Changing demands

<table>
<thead>
<tr>
<th>Driver</th>
<th>New Service</th>
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| Changes in information delivery and IT| • E-book & E-journal provision  
• Training in the use of databases  
• Supporting software applications   |
| Open Access                          | • Help with understanding publisher policies, funders rules etc.  
• Help managing and accessing publication funds |
| Data archiving needs                  | • Developing data repositories  
• Educating researchers on good data management practices |

We are **REACTIVE** to changes.
A proactive strategy

- What innovation can we bring to library services?
- Surprise readers and identify new roles for the library
What is 3D printing?

- Produce physical objects from computer generated 3D models
- Old but now cheap technology
- Variety of materials -
  - Plastics
  - Resins
  - Metals
  - Organic material
  - Chocolate…

- Used for making -
  - Replacement parts
  - Art works
  - Toys
  - Models
  - Prototypes
  - Medical prosthetics…
How does it work?

- **Fused Deposition Modelling (FDM)**
  - Melted plastic is extruded on to a flat build plate
  - The plastic sets almost instantly
  - Another layer of plastic is added on top of the first
  - Gradually the layers build up into a 3D shape

"FDM by Zureks" by Zureks - Own work. Licensed under Creative Commons Attribution-Share Alike 3.0-2.5-2.0-1.0 via Wikimedia Commons - http://commons.wikimedia.org/wiki/File:FDM_by_Zureks.png#mediaviewer/File:FDM_by_Zureks.png
Design an object

https://www.tinkercad.com/
Download an object

http://www.thingiverse.com/thing:330816
Scan an object
3D printing at Oxford

- Central 3D printing service available in the Physics department
- Printers in Departments and Labs
- CAD courses taught through IT Services
- Natural History Museum
- 3D Printing Society
Why at the library?

• Making new technology accessible
• Explaining new technology
• Strategic Plan Objectives - Engaging with readers and researchers
• Successful in other libraries
• We can staff a service at the RSL
• We can do it very cheaply!
Buying our printer

- Printers cost - £300 – £10,000+
- Grant of £4000 (from the Helen Roll Charity)
- MakerBot Replicator 2 - £1,450
- We bought –
  - 3D printer
  - 3D scanner
  - Spare parts
  - Consumables (e.g. plastic filament)
What kind of a service?

1. A self-service approach where readers can print off their own models

2. A service mediated by librarians who check models, process and manage the printing

3. A service that is part of a wider Makerspace or design studio
Cost

• As low as possible

• £2 for 1 hour + £1 for each additional hour
• PLA costs about £35 / Kg
Our team
Launching the service

- Launched 1\textsuperscript{st} December
- Accompanying LibGuide
- Demonstrations and talks
- ‘Bring a Design’ events throughout December
- Scanning people using the Sense scanner

http://ox.libguides.com/3dprintingscanning
# Service so far…

<table>
<thead>
<tr>
<th>The Good</th>
<th>The Bad</th>
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<tbody>
<tr>
<td>~100 models printed</td>
<td>Failed prints &amp; breakdowns</td>
</tr>
<tr>
<td>Very positive reaction</td>
<td>Lack of redundancy</td>
</tr>
<tr>
<td>Wide range of jobs</td>
<td>Demand on staff time</td>
</tr>
<tr>
<td>Engaging with users</td>
<td>Enforcing copyright and other limitations</td>
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MRI Scanner toy

Cohen Kadosh Lab – Experimental Psychology
Bronchi model

Ritchie Group – Physical Chemistry
Where next?

• We have now added another printer
• Training more staff at the RSL
• Use in teaching –
  • We are working with a summer school group of engineering students in July to deliver part of a session on 3D printing
Adopting a proactive strategy

- Think about non-traditional library services when planning for the library
- Does not have to be based on new technology
  - Changing library spaces
  - Partnering with others to provide new services through the library
- Can involve taking a risk, but pays dividends in terms of reader engagement
Acknowledgements

• Thank you to Kelly Schultz and the 3D Printing team at the RSL
• Helen Roll Charity for funding the project
• John Couper & Luca Ciaffoni (Physical Chemistry)
• Charlotte Hartwright (Experimental Psychology)
• Thank you to everybody who has used the printer!