



Education &
Communities

Public Schools NSW



AUSTRALIAN
DESIGN CENTRE



3D Printing

Exploring the possibilities

What we've covered so far...

Session 1:

Object: Australian Design Centre

Annette Mauer, Head of Learning

<http://www.object.com.au>

- *What is Object: Australian Design Centre?*
- *What Object offers teachers?*
- *The Ctrl[P] 2013 exhibition*
- *Links with practising designers*
- *Designers using 3D printing in their process*



What we've covered so far...



Session 2:

Industry representative

Angus Deveson, 3D Printing Studio

<http://www.3dprintingstudio.com.au>

What is 3D Printing?

- *Basic 3D printing process*
- *Different 3D printing technologies and materials*
- *3D printers from entry level to high-end industry standard*
- *CAD/CAM software*
- *3D scanning*
- *Outsourcing*

What is 3D printing?

Additive Manufacturing

Building up a 3D object Layer by Layer

Advantages:

- Less waste
- Mass customisation
- Takes .stl .obj VRML
3D Mesh Formats

Disadvantages:

- Does not have economies of scale
- Objects can be fragile or weak
- Slow



The 3D Printing Process



What we've covered so far...

Session 3:

Industrial Designer

Andrew Simpson, Vert Designs

<http://www.vertdesign.com.au>

- Evolution of work and the impact of technology on design and production processes and end products.
- 3D printing overview – comparison to paper printers.
- Utilisation of 3D printing as a design and production tool.
- Use of 3D printing at different stages of the development of a design - testing, modelling finished product.
- Advancements in technology → falling prices → cost effective option for more than just prototyping → shift in design thinking.
- Advantages of 3D printing – design modification, customised design.
- Appropriate use of 3D printing:
 - small parts/components
 - part of manufacturing process
 - low volume production
- Blending advancements in technology with traditional skills and techniques – the place of 3D printing in the design and production process.

3D printing a quick overview

One of the simplest ways to understand the 3D printing market place is that it closely resembles the paper printing market place of the early 90's.



Dot Matrix = FDM



Laser printing = SLS



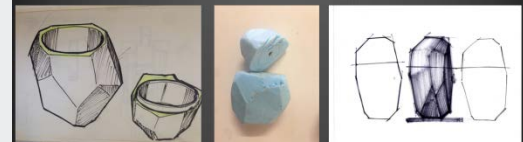
Inkjet = objet/projet

My work



www.thebalmmainboatcompany.com

An in house design project



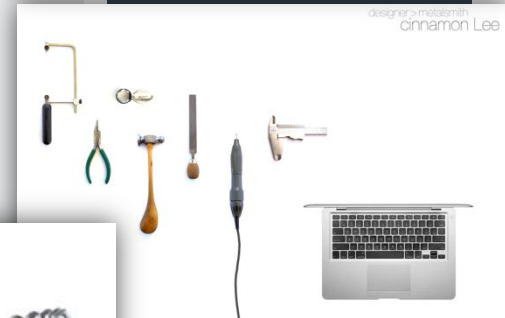
What we've covered so far...

Session 2:

Jewellery Designer/Metalsmith

Cinnamon Lee <http://www.cinnamonlee.com/>

- Evolution of work and the impact of technology on design and production processes and end products.
- Utilisation of 3D printing as a design and production tool.
- Use of 3D printing at different stages of the development of a design - testing, modelling finished product.
- Advantages and disadvantages of 3D printing.
- Blending advancements in technology with traditional hand fabrication skills and techniques.
- CAD software you used to create designs.
- Advancements in 3D printing processes that have incorporated into work.



What we've covered so far...

Session 2:

Highly experienced teacher

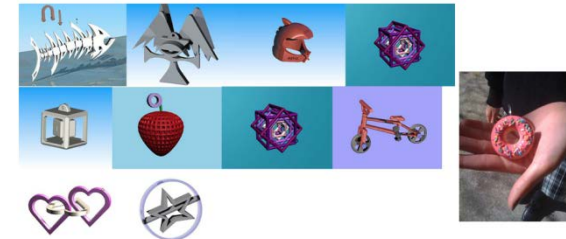
Ruth Thompson, Bossley Park High School

- *Why are schools buying 3D printers?*
- *How/where does 3D printing technology align with syllabus content?*
- *How can teachers program/develop a unit of learning incorporating 3D printing?*
- *Technology (Mandatory): Examples of design projects utilising 3D printing and where they fit within the syllabus (Area of Study, design specialisation/context).*
- *What should teachers be looking for when sourcing/buying a 3D printer?*
- *Functions and features of 3D printers we might use in a classroom situation.*
- *The process of 3D printing in the classroom.*
- *What problems might teachers encounter when using 3D printing with a class?*
- *Different 3D printing technologies - suitability to different processes.*
- *Suitable CAD/CAM software.*
- *Example of how CAD/CAM is taught within a unit of learning.*
- *Place/reason for outsourcing 3D printing?*
- *3D printing as a transition program tool to allow Stage 3- Stage 4 .*

3D printing in NSW schools

What some schools are already doing,

- Design a Bag Tag
- Design a Novelty USB stick
- Design a chocolate for the Japanese Tourist market.



Interesting Ideas

- Architecture
 - Model of Beijing Watercube



- Fashion



Interesting Ideas

- Lighting
- Furniture
- Medical



Extending your knowledge

<http://tv.adobe.com/channel/how-to>

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3D printing

Show: [Creative Cloud for Design](#)

See Photoshop Product Manager, Stephen Nielson, demonstrate the powerful and exciting new 3D printing features in Photoshop CC. Visualize your 3D designs in the real world thanks to new support that allows you to easily create, refine, preview, and print your 3D designs directly to a locally connected 3D printer or online service.



Photoshop CC Overview January 2014

Show: [Creative Cloud for Photographers](#)

Photoshop Product Manager, Stephen Nielson, shares a quick overview of a handful of the exciting features in Photoshop CC including Camera Shake Reduction, Perspective Warp, linked Smart Objects, 3D printing, Adobe Generator, and more.



Extending your knowledge

www.lynda.com

Up and Running with 3D Printing

Topics include:

- What is 3D printing?
- What can you make with a 3D printer?
- Understanding the different 3D printing technologies
- Designing with 3D modelling and scanning
- Creating watertight 3D designs
- Repairing a 3D file
- Exporting your file

Subjects:

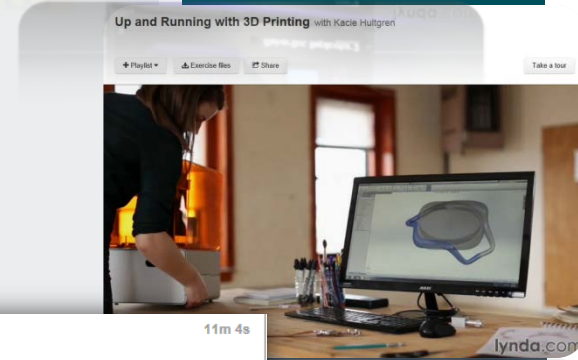
3D + Animation

Modeling

Prototyping

Product Design

CAD



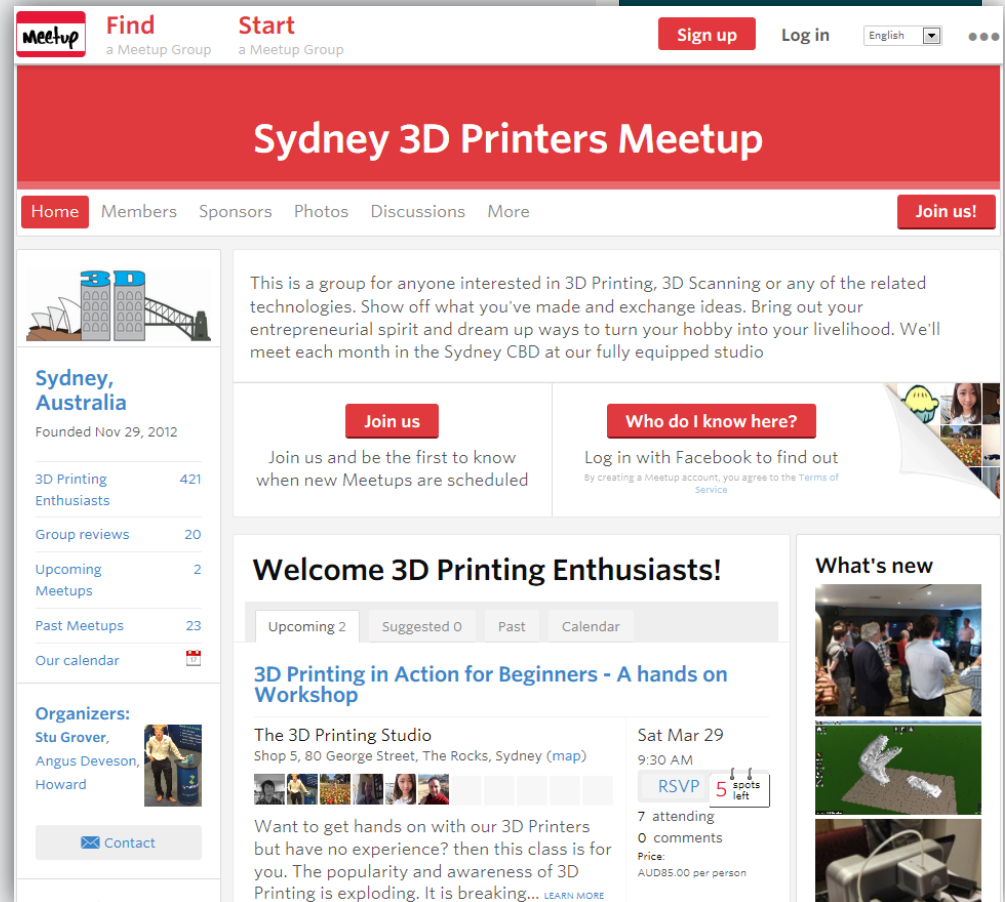
▼ 1. Discovering 3D Printing	11m 4s
▶ What is 3D printing?	54s
🔒 How 3D printing works	3m 45s
🔒 What you can make with 3D printing	3m 40s
🔒 History of 3D printing	2m 45s
▼ 2. Introducing 3D Printing Technology	15m 41s
🔒 3D printing options	1m 46s
▶ Introducing filament-based printers	4m 31s
🔒 Looking at stereolithography	2m 23s
🔒 Laser sintering	2m 18s
🔒 Jet technologies	2m 40s
🔒 Full-color prints	2m 3s

Extending your knowledge

<http://www.meetup.com/Sydney-3D-Printers-Meetup>

Sydney 3D Printers Meetup

- Organised by 3D Printing Studios
- Regular meetups to exchange ideas with other enthusiasts
- Workshop opportunities



The screenshot shows the homepage of the Sydney 3D Printers Meetup group on the Meetup platform. The header includes the Meetup logo, navigation links for 'Find' and 'Start' (both labeled 'a Meetup Group'), and buttons for 'Sign up' and 'Log in'. The main title 'Sydney 3D Printers Meetup' is prominently displayed in a red banner. Below this, a navigation bar offers links to 'Home', 'Members', 'Sponsors', 'Photos', 'Discussions', and 'More', along with a 'Join us!' button. The main content area features a description of the group: 'This is a group for anyone interested in 3D Printing, 3D Scanning or any of the related technologies. Show off what you've made and exchange ideas. Bring out your entrepreneurial spirit and dream up ways to turn your hobby into your livelihood. We'll meet each month in the Sydney CBD at our fully equipped studio'. Two call-to-action buttons are present: 'Join us' and 'Who do I know here?'. The 'Join us' button is accompanied by the text 'Join us and be the first to know when new Meetups are scheduled'. The 'Who do I know here?' button is accompanied by the text 'Log in with Facebook to find out By creating a Meetup account, you agree to the Terms of Service'. On the left side, there is a sidebar with a map of Sydney, Australia, and statistics: '3D Printing Enthusiasts' (421), 'Group reviews' (20), 'Upcoming Meetups' (2), 'Past Meetups' (23), and 'Our calendar'. Below these are the names of the organizers, 'Stu Grover' and 'Angus Deveson', and a 'Contact' button. The main content area also features a 'Welcome 3D Printing Enthusiasts!' section with tabs for 'Upcoming 2', 'Suggested 0', 'Past', and 'Calendar'. The first event listed is '3D Printing in Action for Beginners - A hands on Workshop' at 'The 3D Printing Studio' (Shop 5, 80 George Street, The Rocks, Sydney) on 'Sat Mar 29' at '9:30 AM'. It has '7 attending', '0 comments', and a price of 'AUD\$5.00 per person'. A 'RSVP' button shows '5 spots left'. A 'What's new' section on the right shows a photo of a workshop and a 3D printed object.

Resources



Dr Martin Leary from the School of Aerospace, mechanical and manufacturing Engineering at RMIT University gives an introductory level explanation of 3D printing and it's many applications. (2:08 minutes)

What is 3D printing and how does it work?

Excellent high speed demonstrations, great examples of output. Examines outsourcing and links 3D printing to industry as a scalable option for designers. Explores intellectual property and the challenge designers face from this emerging technology. What does the future hold? (7:22 minutes)



Don't underestimate the value of YouTube

Resources



Ideas to Prototypes to Production. Stratasys is the industry leader in 3D printing technology. This presentation shows the possibilities from student use through medical technologies to high end manufacturing. (2:08 minutes)

Autodesk 123D Design is a free, powerful yet simple 3D creation and editing tool which supports many new 3D printers.

3 Ways to use 123D Design:

Launch the web app

Use the 123D Design web app on any computer with access to the internet.

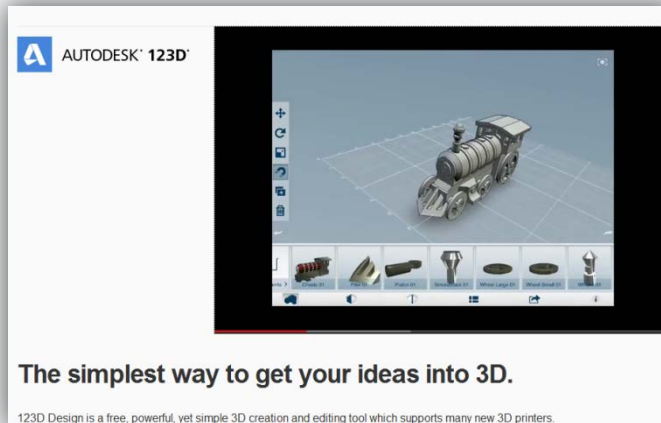
Launch 123D Design online

Free for iPhone and iPad

Enjoy creating designs and playing around with shapes right on your iPad.

Available on the App Store

Free for your PC or Mac



The simplest way to get your ideas into 3D.

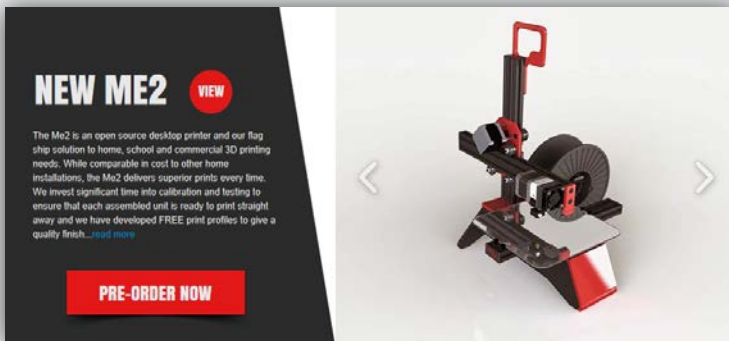
123D Design is a free, powerful, yet simple 3D creation and editing tool which supports many new 3D printers.

Resources



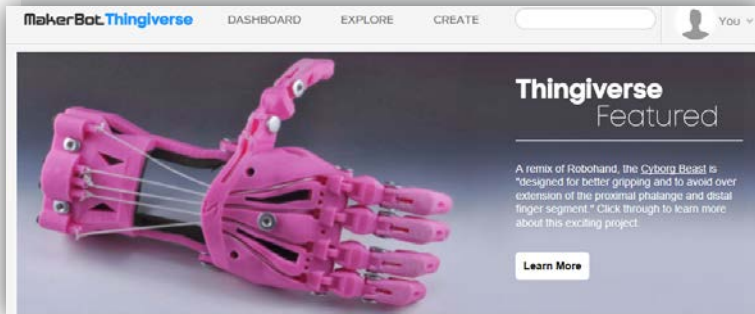
Makerbot: the 3D Printing Robot. This one was uploaded way back in 2009 – the original 3D printers in kit form - how things have progressed since then! Worth watching to show advancement in technology and change in thinking in the last 5 years.

Next check out the new **Makerbot Mini Replicator**



And now for the latest – Brand new, Australian designed and made, the **Me2** will be released in April 2014. it's slightly bigger than the UP Plus. Very affordable but may be safer to wait for reviews of V1. More information at <http://www.me3d.com.au>

Resources



Will 3D Printing Change Everything? This one explores interesting future possibilities of 3D printing in medical and health care fields.



3D Print Food The Foodini is a 3D printer which eliminated the need to cook. The printer is set to go on sale in Britain for £835 next year. The video in this article shows 3D printing of ravioli, pizza and burgers. May need work – they don't look very appetising!

Jewellery casting and CAD/CAM services (Sydney):

Palloys

<http://palloys.com.au>
8-10 Meeks Road
Marrickville
NSW 2204
P: (02) 9212 1222
Email: info@palloys.com.au

Chemgold

<http://www.chemgold.com>
Unit 37 / 34-36 Ralph St
Alexandria NSW 2015
P: (02) 9698 8500
Email: sales@chemgold.com

EBS & Associates

<http://ebsrefinery.com/contact-ebs>
PO Box 268
Marrickville 1475
NSW Australia
P:1300 889 063 (Australia)
+61 2 9550 5499 (International)
Email: service@ebsrefinery.com

Rapid Prototyping Services

<http://www.rapidprototype.com.au>
36 Albert Street
St.Peters NSW 2044
P: (02) 9557 9468
Email: info@rapidprototype.com.au

3D Printing Studio

<http://www.3dprintingstudio.com.au>
Shop 5, 80-84 George St
The Rocks, Sydney
P: 61 2 8007 6107
Email: info@3dprintingstudio.com.au

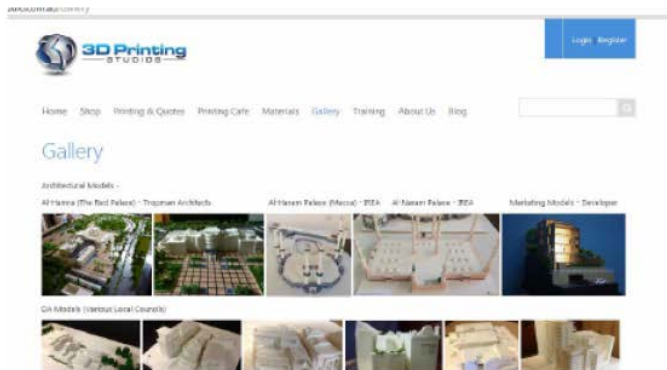
Palloys Passionate about
Casting & CAD/CAM
SINCE 1951



Resources

3D Printing Services

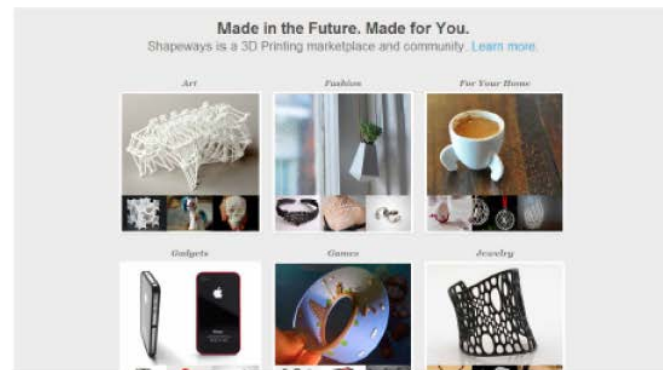
3D Printing Studio



Sydney CBD

<http://www.3dprintingstudio.com.au/>

Shapeways



New York

<http://www.shapeways.com/>

Contact:

Sandra McKee

TAS Advisor

Secondary Education

Learning and Leadership Directorate

NSW Department of Education and Communities

Level 3, 1 Oxford Street

Darlinghurst, Sydney, 2010

T: (02) 9266 8514 F: (02) 9266 8918

Email: Sandra.McKee4@det.nsw.edu.au