

Australian 3D Manufacturing Association

AHHA Innovation Collaboration
Network

The **not-for-profit** organisation
that **connects** industry, governments and other
organisations
to assist all Australians
to reap the **benefits**
of this latest industrial revolution.

Today

- Another industrial revolution
- 3DM - Health and Medical applications
- Challenges
- Opportunities

Another Industrial Revolution

Another industrial revolution

3DM - Health and Medical applications

Challenges

Opportunities

Another Industrial Revolution

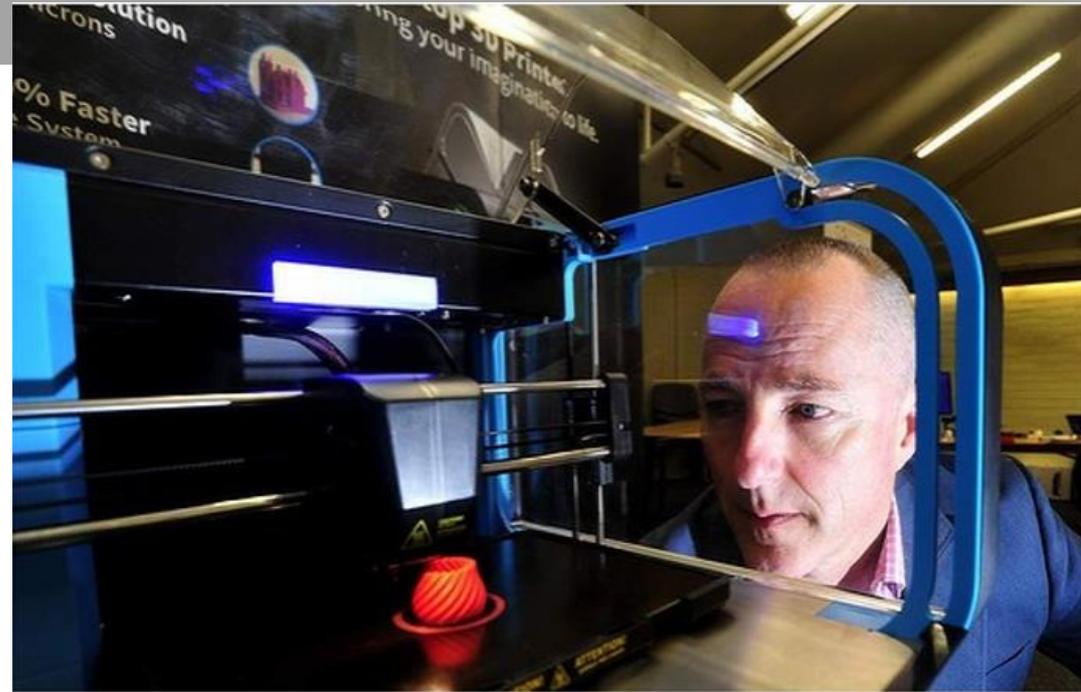
3D manufacturing encompasses: 3D printing, digital manufacturing or additive manufacturing and is the process of producing objects from digital files.

The alignment of this technology along with advances and novel applications in: new materials, virtual and augmented reality, nanobionics, robotics and nanotechnology, will deliver incredible benefits and opportunities.

Another Industrial Revolution

The technology that changes everything

New Scientist



A mini industrial revolution on the way with 3D printing

canberratimes.com.au
The Canberra Times

Source: Fleeta Page - The Canberra Times, 24 June 2014

3D printing: A second industrial revolution is underway

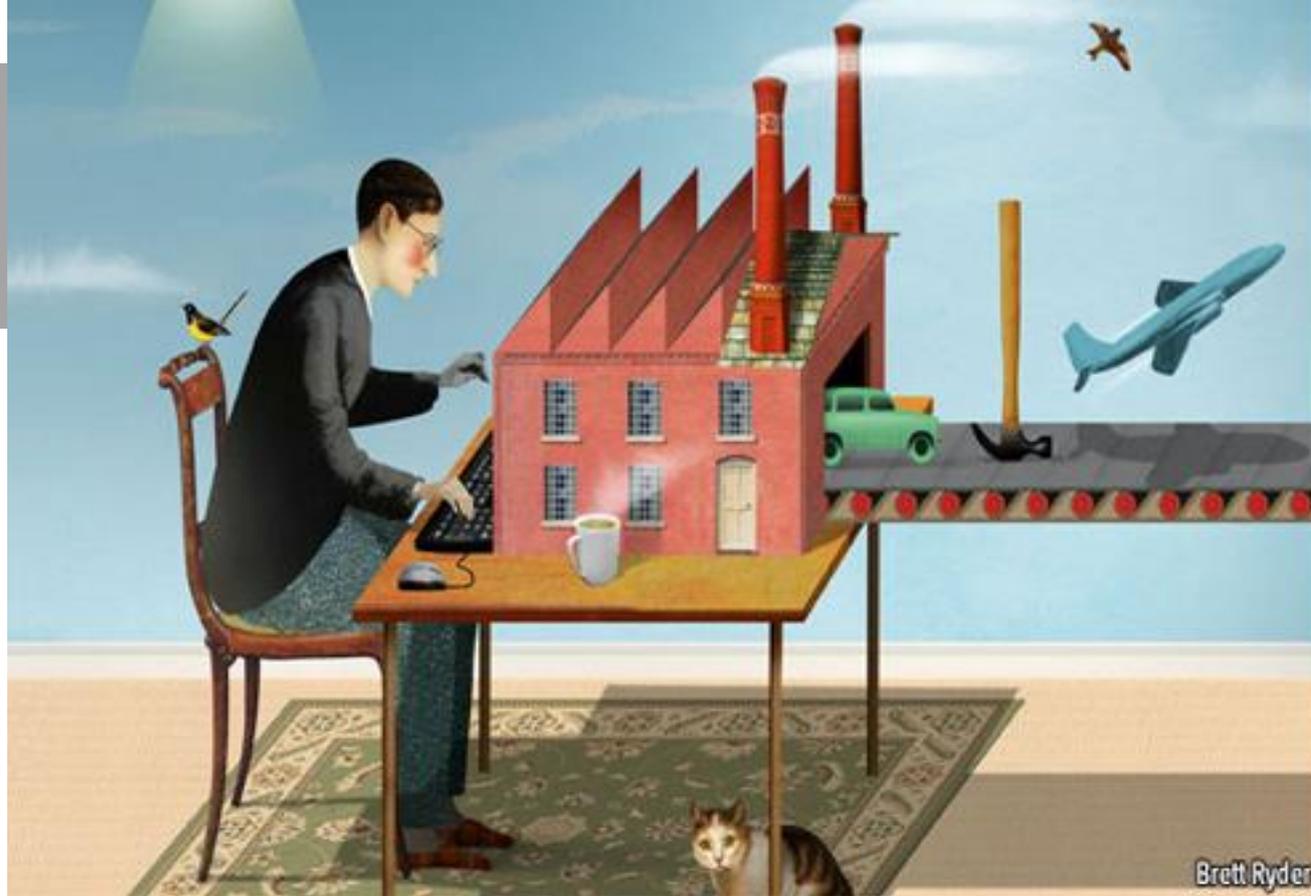
NewScientist

Source: Hod Lipson – New Scientist, July 2014

Revolution

The factory of the future will focus on mass customisation

The Economist



Manufacturing

The third industrial revolution

The digitisation of manufacturing will transform the way goods are made-and change the politics of jobs too

The
Economist

Source: The Economist, 21 April 2012

Another Industrial Revolution

- 3D manufacturing is either the second, third or fourth industrial revolution
- The definition according to Wikipedia –
“**transition to new manufacturing processes** in the period from about 1760 to sometime between 1820 and 1840.”

Another Industrial Revolution

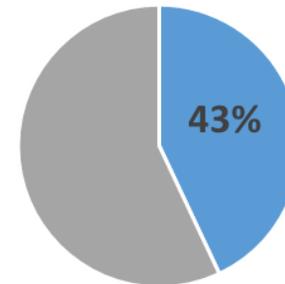
Whereas cars today are made by just a few hundred factories around the world, they might one day be made in every metropolitan area.

The Harvard Business Review

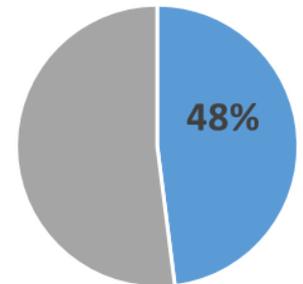


3D manufacturing in satellite manufacture

Time savings of



Reduced cost by



Lockheed Martin

3-D Printing Will Change the World

Harvard Business Review

Source: Richard A. D'Aveni – HBR, March 2013



A3DMA

Manufacturing Value for Australia



PROJECT
**3D-Printed
Motorcycle**

Stratasys
Nino Caldarola

OVERVIEW
Designer Nino Caldarola used 3D modeling software to design the more than 300 components for this full-sized motorcycle. What's more, this 3D-printed prototype includes some components that are fully functional. Created with high-strength ABS thermoplastics, this is the first motorcycle ever printed in 3D and assembled in this way, using a Fused Deposition Modeling (FDM) 3D printer at the Stratasys RedEye facility in Minneapolis, Minnesota.

KEY TAKEAWAYS
Full scale 3D print of motorcycle
DESIGN AND ENGINEERING SOFTWARE
Inventor



A3DMA

Manufacturing Value for Australia



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Manufacturing Value for Australia



The 11,000 sqm villa costs around \$161,000 to build

Another Industrial Revolution

World's first 3D-printed apartment building constructed in China

CNET 20 Jan 2015

Reduce construction waste 30 - 60%
Decrease production times 50 – 70%
Labour costs down 50 – 80%



Another Industrial Revolution

Coming soon to Singapore: 3D printed houses

GovInsider 10 Feb 2016

Dubai to Build World's First 3D Printed Office

including 3D Printed Furniture & Interior

2 July 2015



3DM - Themes

1. Many items will not require assembly
2. Much manufacturing moves closer to the point of sale
3. So does recycling and production of materials
4. Reduced, shipping storage and handling
5. Better products more often
6. New materials and new products
7. Less waste
8. Reproduction improves and becomes more affordable
9. Complex and unique is no harder to produce
10. We all get greater access to manufacturing capability



3DM - Health and Medical

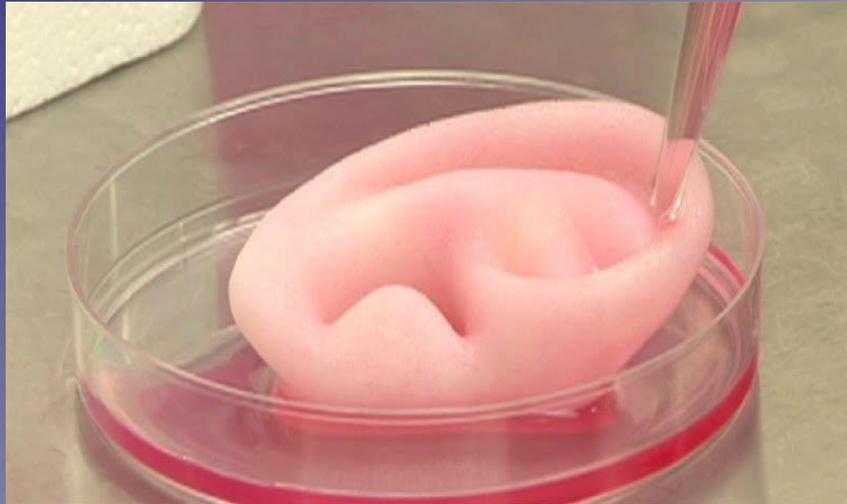
3DM - Health and Medical applications

Challenges

Opportunities

Call to Action

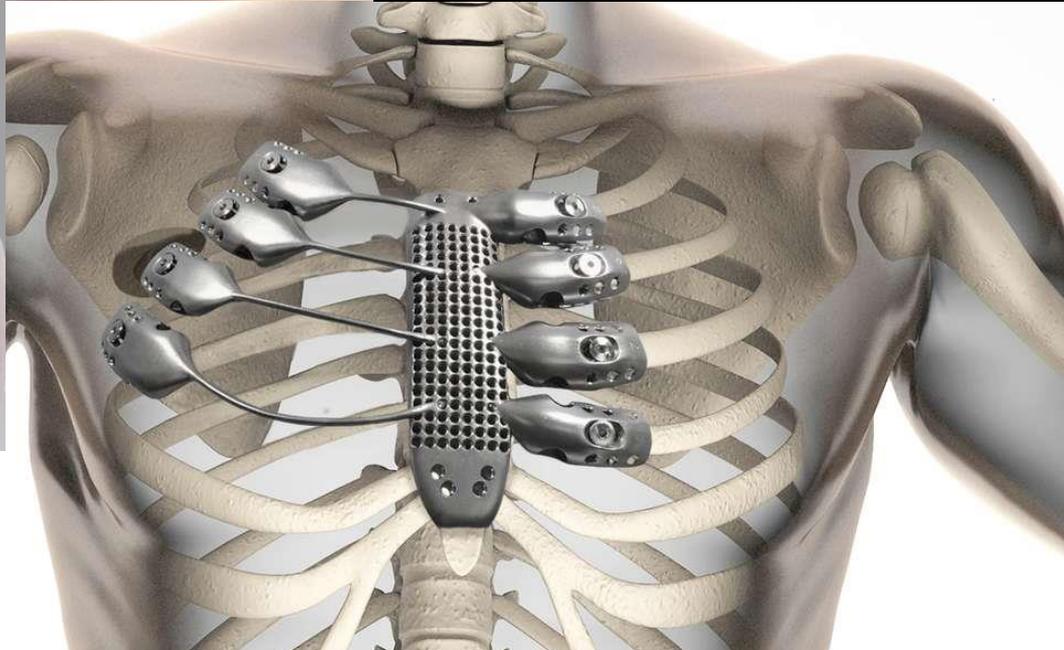
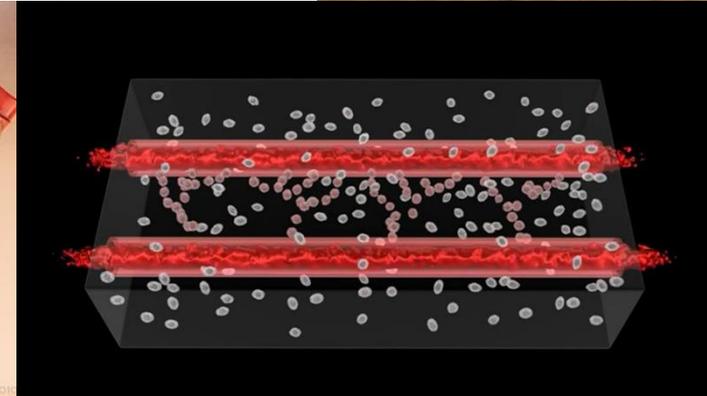
Medical applications



3DM - Health and Medical

Biomedical

anatomical education
low cost prosthetics
printed blood vessels
bone replacement
plastic surgery preview



3DM - Health and Medical

- ◆ Medical equipment
- ◆ Drugs
- ◆ Sensors
- ◆ Synthetic skin





Masters degree in Biofabrication

ACES at the University of Wollongong (UOW) has joined forces with three leading research universities ([Queensland University of Technology](#) in Australia, [University Medical Center](#) Utrecht in the Netherlands and [University of Würzburg](#) in Germany, to offer a Masters degree in BioFabrication commencing in March 2015.

On completion, graduates will have a qualification recognised in both Australia and Europe, opening up international career opportunities in future manufacturing and biomedical engineering.

How and when should I apply for the course at UOW?

Now! Please submit an Expression of Interest (a 2-3 page CV outlining your personal details, education, research experience and extra-curricular activities, along with a one page letter outlining why you are interested in the degree and what contribution you think you can make in biofabrication) to [Professor Gordon Wallace](#) with the subject BioFab Expression of Interest.

FAQs

In this section...

Lab to Industry
Partnerships

> Study Opportunities

PhD Scholarships

Synthesis and characterisation

Chemopropelled cargo-carrying
vehicles

PhD on-line electrical
characterisation

On-line spectroscopic
characterisation

New Materials

As
light
as a
feather



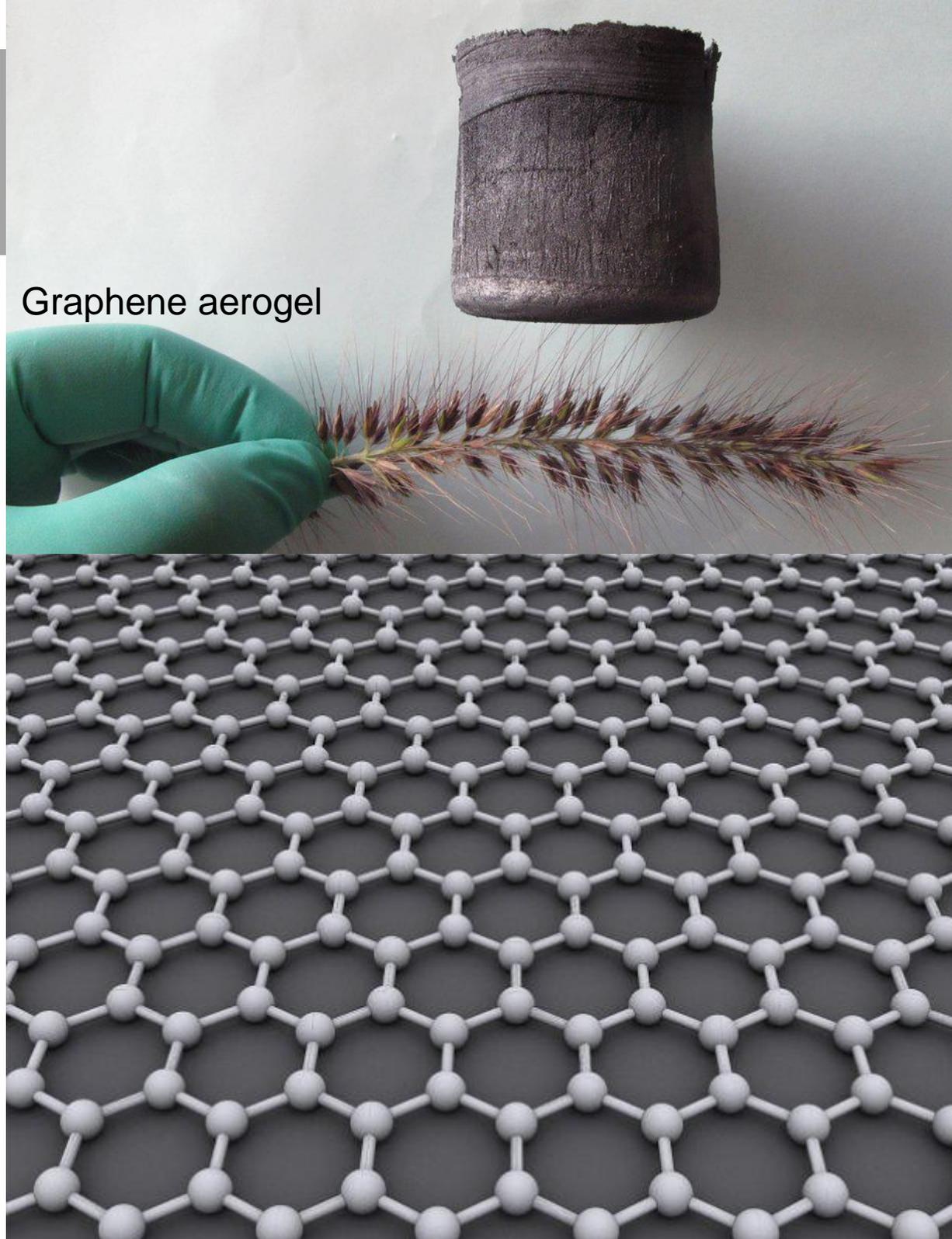
Boeing's micro-lattice metal

New Materials

Stronger than steel

Atomic chickenwire:
a two-dimensional crystal of pure carbon atoms
arranged in a honeycomb lattice.
That makes it the thinnest material ever made,
yet 200 times stronger than steel

Graphene aerogel



New Materials

Heat
resistant



Challenges

Challenges
Opportunities



Challenges

- Resistance to change
- Skills and where they are coming from
- Race to the mainstream

Opportunities

Opportunities



A3DMA

Manufacturing Value for Australia

Opportunities

- Stay up to date with the trends and technology
- Training and Education
- Engage with 3D manufacturing experts and industry
- Be an early adopter and gain competitive advantage

Thank you

