

Corso: **ADDITIVE MANUFACTURING**

Docente: **PROF.SSA BIANCA MARIA COLOSIMO**
(contribution proff. B. PREVITALI and G. Moroni)

Semestre: **1°**

Lingua di erogazione: **INGLESE**

N° max studenti ammessi: **-**

Modalità d'esame per non frequentanti: **SI**

Note: **CORSO EROGATO DA ALTRA SCUOLA**

Prodotto	Interni	Comunicazione	Fashion	D&E	PSSD
X	X	X	X	✓	X

ADDITIVE MANUFACTURING

Additive Manufacturing (AM), often referred to as 3D Printing, is opening new opportunities for producing customized, light products characterized by highly complex geometries and functionalized surfaces.

The course provide an introduction to the AM processes and their applications, discussing their technical and business-oriented implications for designers, engineers, “makers” and other possible users of this advanced manufacturing technology.

The course specifically introduces AM processes for polymers and metals, discusses challenges and opportunities at the design stage and focuses on zero-defect AM solutions.

Laboratory activities will be held at AddMe.Lab of the Mechanical Engineering Department and allow students to develop hands-on knowledge on specific AM problems.

ADDITIVE MANUFACTURING

CRITERI DI VALUTAZIONE

Grading will be based on oral examination.
An optional team project is possible.

MODALITÀ D'ESAME

Oral exam

Aerospace



TRADITIONAL DESIGN

Source: SAVING project

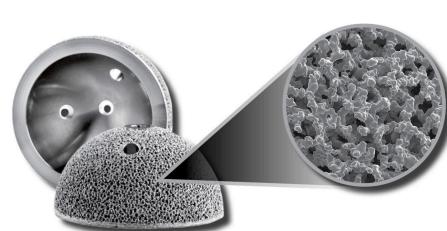


AM OPTIMIZED DESIGN

Source: SAVING project



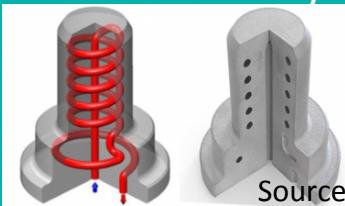
Bio-medical and dental implants



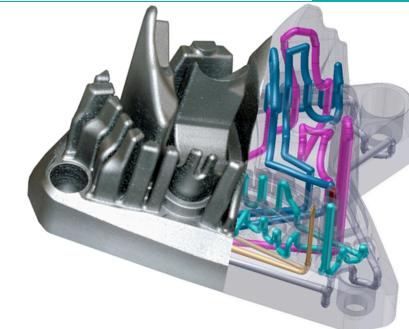
Source: EOS

Source: Invisaling

Tooling and Machinery



Source: EOS



Source: Renishaw.

Creative Industries



<https://www.pinterest.com/Printeresting3D/3d-printed-home-decor/>



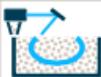
<http://www.rapidreadytech.com/2014/09/stratasys-collaborates-on-jewelry-line/>



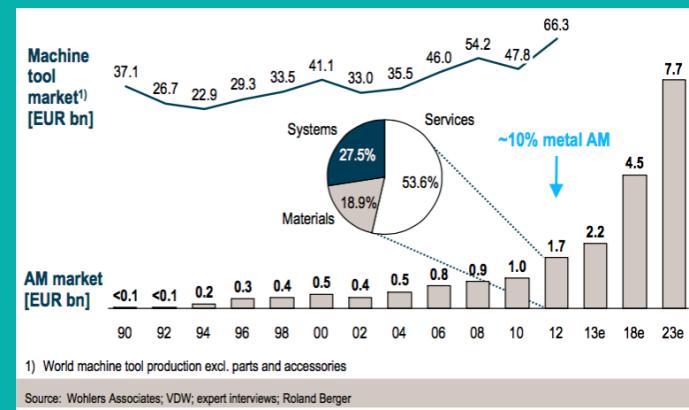
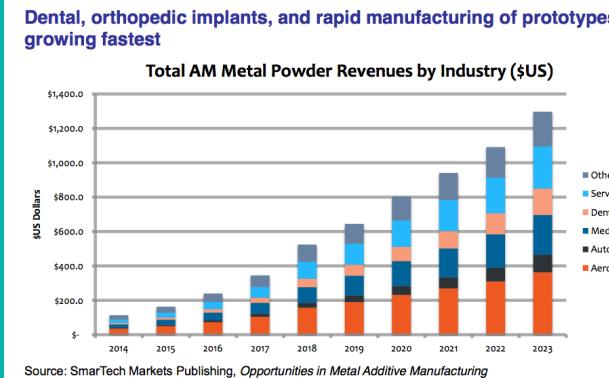
<http://www.wearable.com/>

Additive Manufacturing - Settori industriali interessati

Additive manufacturing technologies

TECHNOLOGY	MATERIALS	TYPICAL MARKETS	RELEVANCE FOR METAL	
	Powder bed fusion – Thermal energy selectively fuses regions of a powder bed	Metals, polymers	Prototyping, direct part	
	Directed energy deposition – Focused thermal energy is used to fuse materials by melting as the material is deposited	Metals	Direct part, repair	
	Sheet lamination – Sheets of material are bonded to form an object	Metals, paper	Prototyping, direct part	
	Binder jetting – Liquid bonding agent is selectively deposited to join powder material	Metals, polymers, foundry sand	Prototyping, direct part, casting molds	
	Material jetting – Droplets of build material are selectively deposited	Polymers, waxes	Prototyping, casting patterns	
	Material extrusion – Material are selectively dispensed through a nozzle or orifice	Polymers	Prototyping	
	Vat photopolymerization – Liquid photopolymer in a vat is selectively cured by light-activated polymerization	Photopolymers	Prototyping	

AM technologies for metal objects



AM – crescita mercato

AM – advantages:

- Customization
- Produce when and where needed
- Quick turnaround from design to part
 - Limited need for tooling
 - Design complexity has little impact on costs
- Design flexibility
 - Complex structure optimized for functionality, not producibility
 - Lightweight
 - Improved heat transfer
 - Reverse engineering

