

WHAT'S NEXT FOR ADDITIVE MANUFACTURING?

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WHAT DID YOU DO WITH
YOUR LAST PHONE?



WE UPDATE
SOFTWARE...

...BUT NOT
HARDWARE



50 MILLION TONNES
GLOBAL E-WASTE GENERATED PER
YEAR



E-WASTE: SOMEONE ELSE'S PROBLEM?



WHAT IF...
WE COULD 3D PRINT
AN IPHONE?

CAN WE REUSE AND
RECONFIGURE MATTER?

TOUCHSCREEN

In

Sn

O

Al

Si

K

BATTERY

Li

Co

Al

C

O

ELECTRONICS

Ga

Au

Si

Cu

Ta

Ag

Gd

CASING

Ni

Br

C

Mg



WHERE ARE WE IN 2016?



Variety of 3D printing techniques

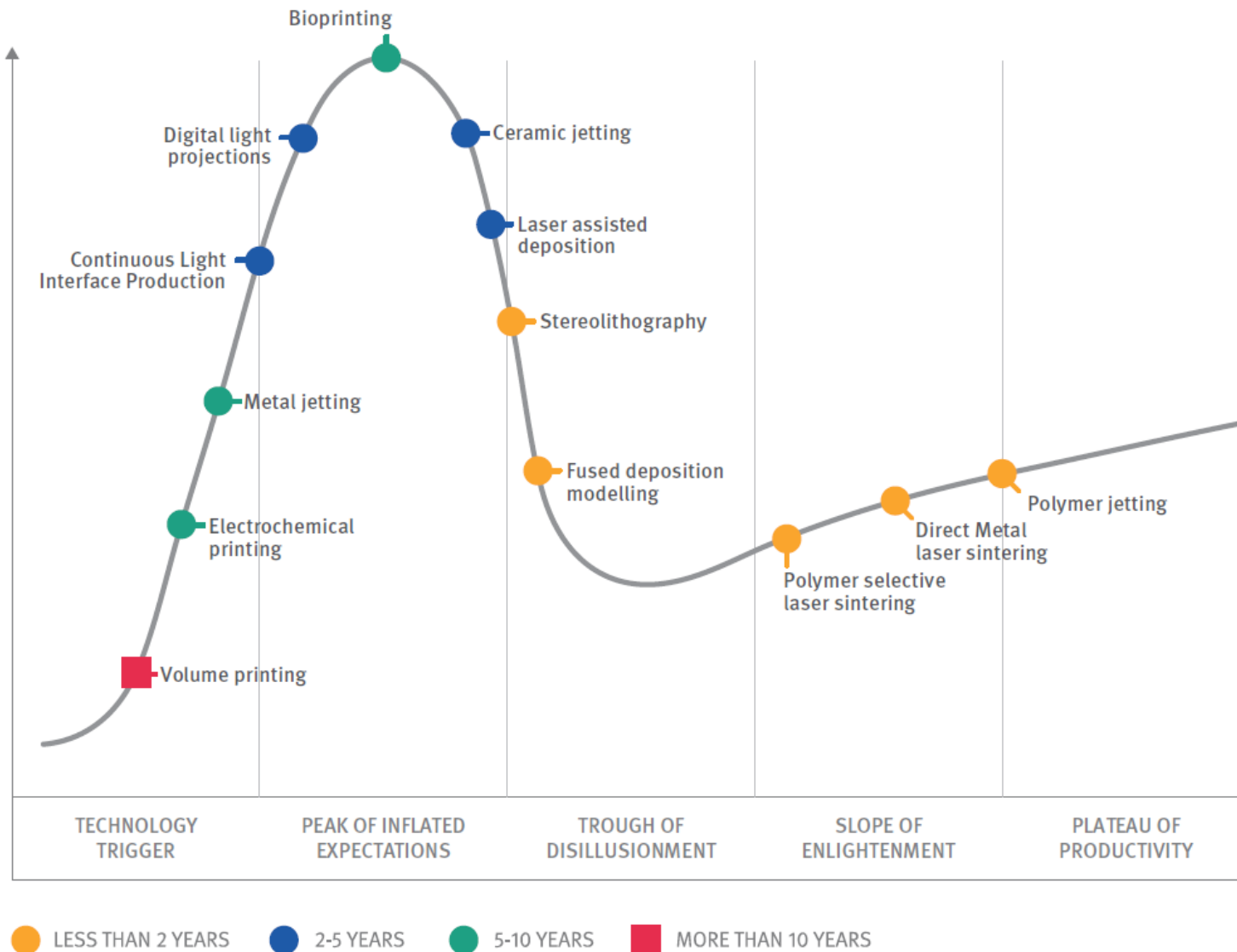


Over-hyped consumer space



Slowly maturing industrial uses

3D PRINTING TECHNIQUE HYPE CYCLE





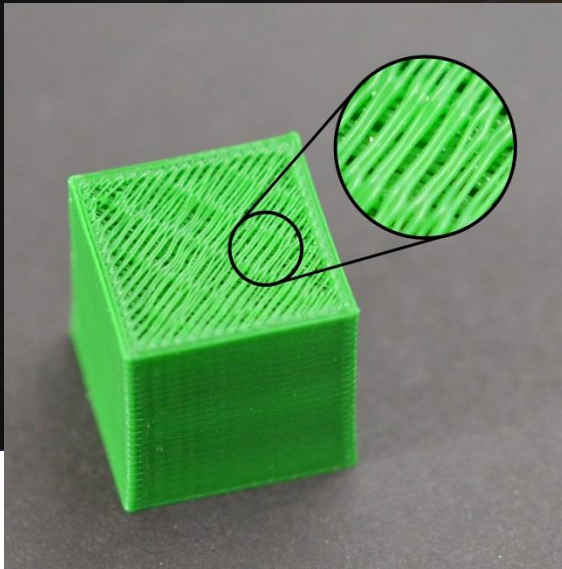
The diagram features a dark, textured background with a grid-like pattern. Two vertical teal lines extend from the bottom to the top of the image. At the base of each line is a white circle with a teal outline. A teal double-headed arrow spans the distance between these two circles. The text 'WHAT'S THE PROBLEM?' is centered in the space between the lines.

WHAT'S THE PROBLEM?

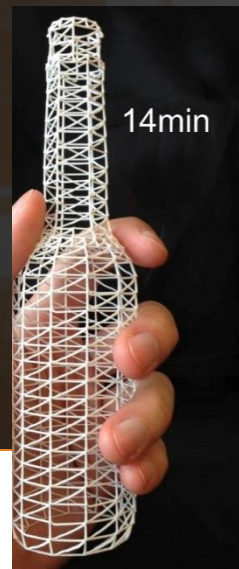
CAPABILITIES
TODAY

POTENTIAL

WHAT'S THE PROBLEM?



RESOLUTION



TIME



QUALITY



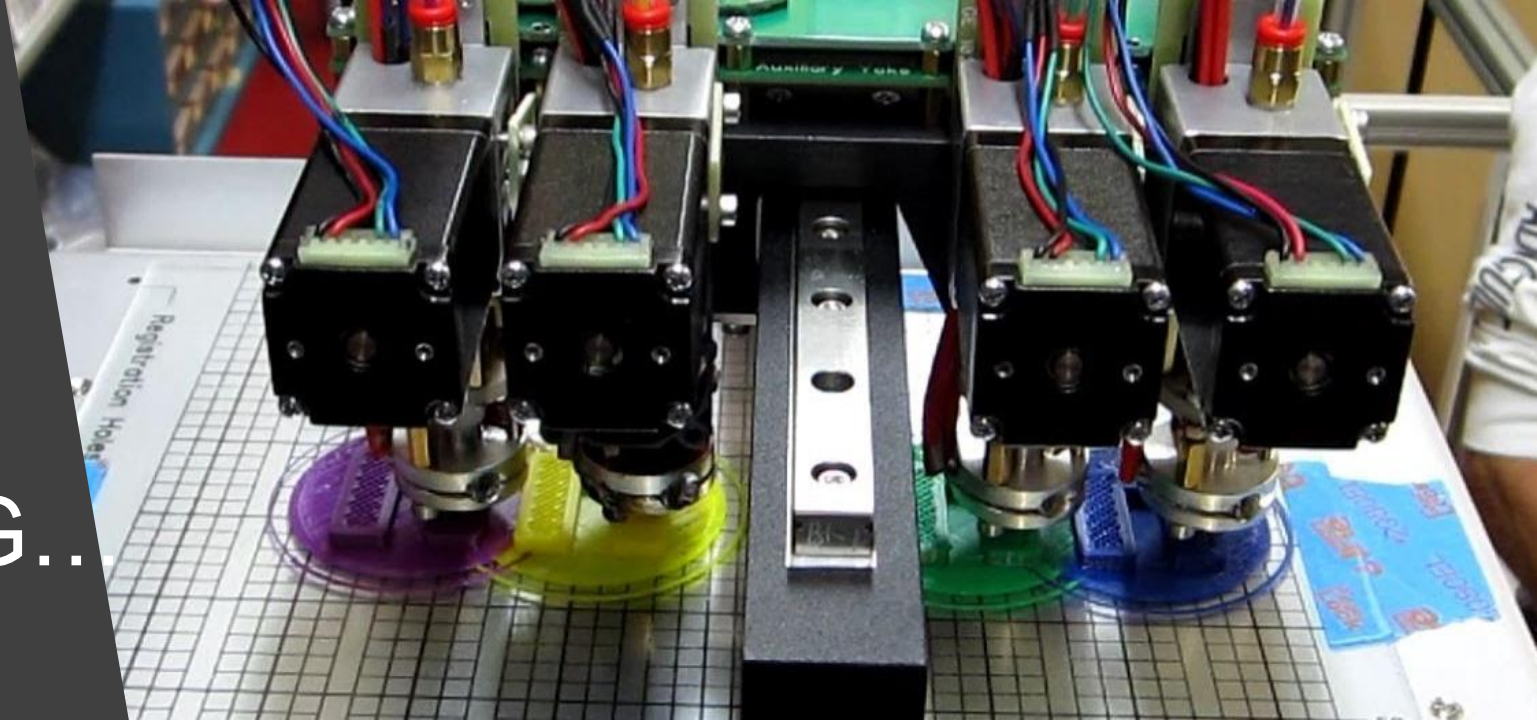
MATERIALS



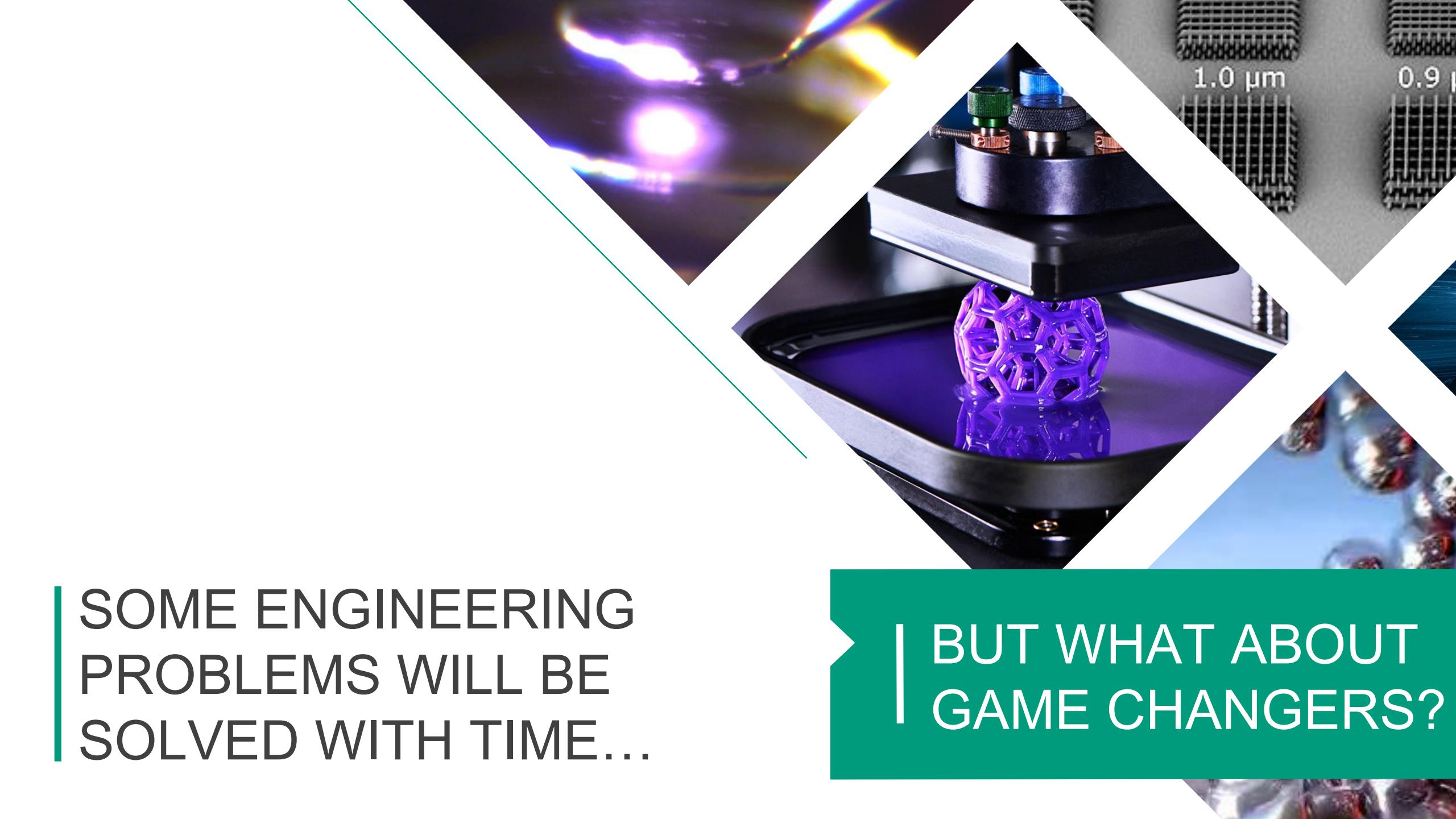
WILL IT
PRINT?

YES, JUST GIVE IT
A GOOD SQUEEZE

IF 3D PRINTING IS
JUST 1D³ PRINTING..



ADD MORE LASERS!



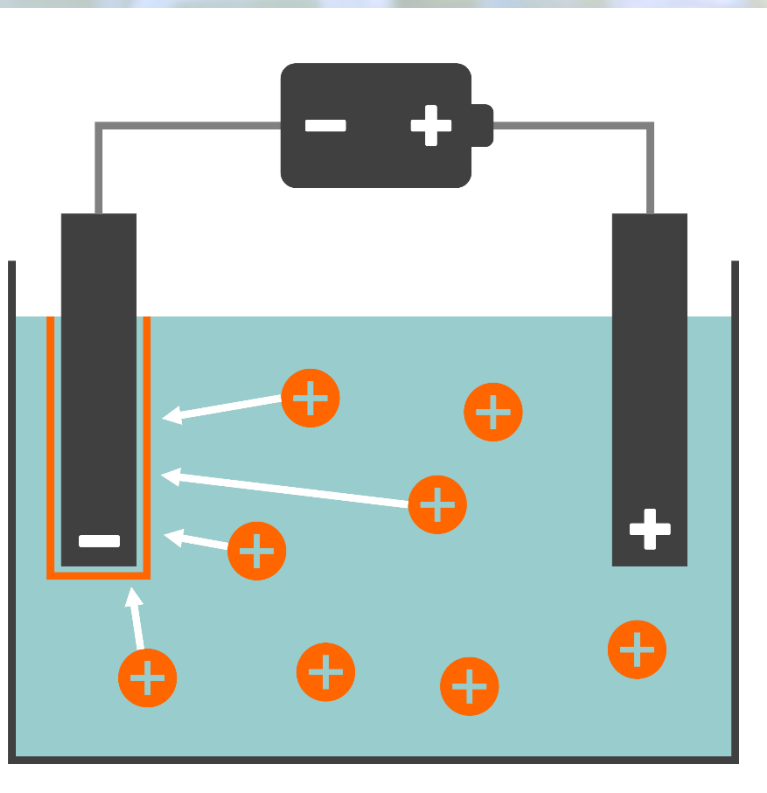
SOME ENGINEERING
PROBLEMS WILL BE
SOLVED WITH TIME...

BUT WHAT ABOUT
GAME CHANGERS?

HOW WILL WE GET TO A 3D PRINTED IPHONE?

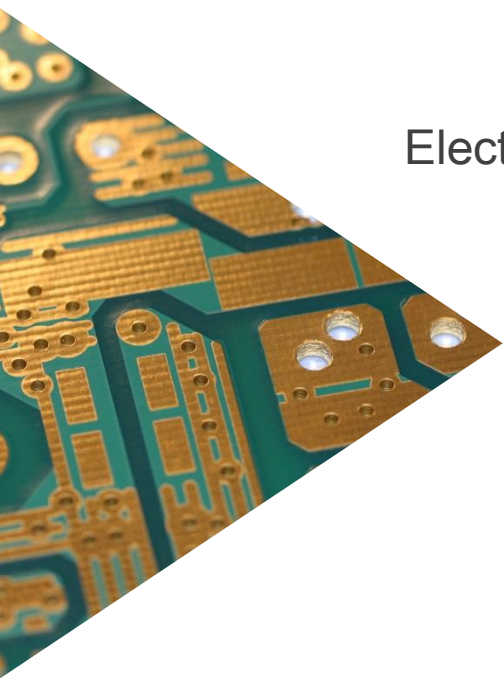
Today





ELECTROPLATING





CIRCUITS

Electroless copper plating for PCBs

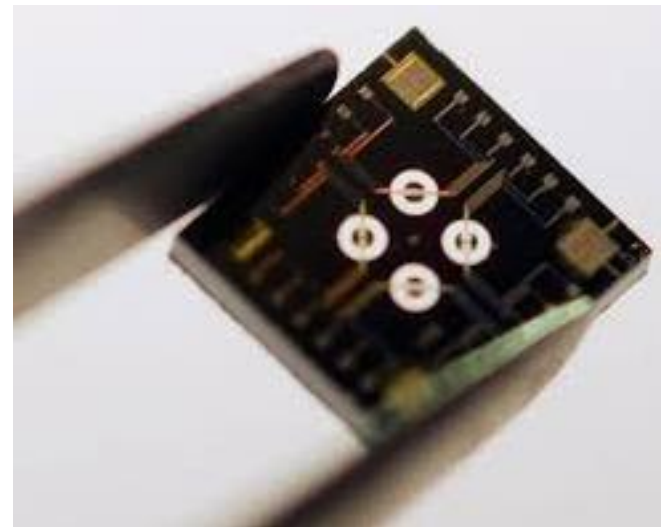
SMART 3D PRINTING

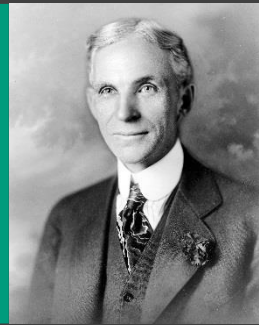
Smart devices sense the environment around them



SENSORS

Let's start controlling where wires go more finely...





HENRY FORD

“YOU CAN HAVE IT ANY COLOUR
(AS LONG AS IT’S BLACK.)”

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	57-71	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	89-103	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Uuq	Uup	Uuh	Uus	Uuo

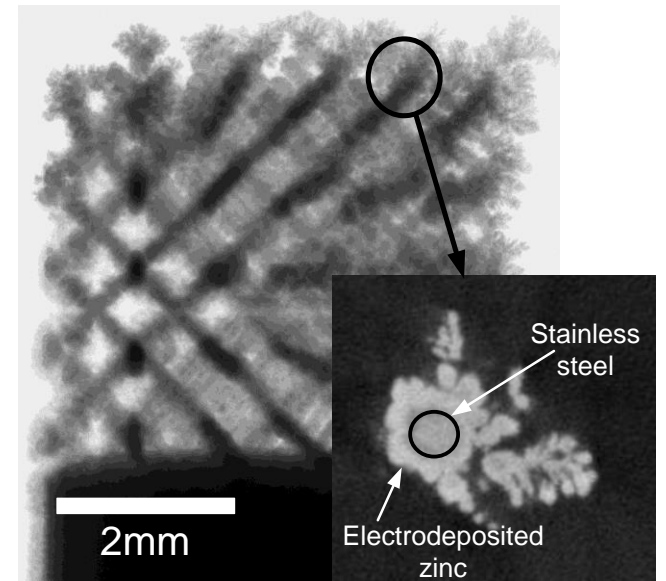
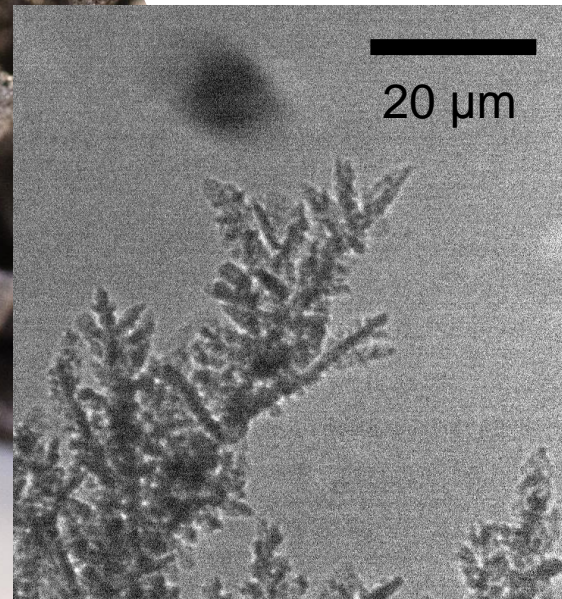
MULTIPLE MATERIALS

CAN WE 3D PRINT A BATTERY?



STAINLESS
STEEL

Zn





3D PRINTED BATTERY

3.5D PRINTING

Combining form and
function

⚠ Authorized Service Provider Only

Potential for fire or burning. Do not disassemble, puncture, crush, heat, or burn. Assembled in China

Li-ion Polymer Battery
3.80V --- 7.13Whr 1877mAh

美国苹果公司监制 中国制造 锂电池
1ICP4/55/81 型号/型号/型号: A1617
充电限制电压: 4.3Vdc 二次锂电池组
标称电压和额定容量/额定电压和额定容量/
정격: 3.80Vdc, 1877mAh 전화: 080-333-4000
制造商: 顺达科技股份有限公司 020-00165
製造商: 順達科技股份有限公司 제조국: 중국
제조업체: Dynapack Electronic Technology
(Suzhou) Co., Ltd. 警告: 请勿拆解, 刺破, 挤压,
加热或投入火中, 严重鼓胀或浸水后禁止使用
警告: 請勿拆解, 刺破, 擠壓, 加熱或投入火中
제품명: 전지(리튬폴리머전지)

RA5093

UL E330128

ZU10215-15001

3.80Vdc
1877mAh
Apple Japan



Li-ion



- +

TIS 2217-2548
Apple South Asia
(Thailand) Limited

3.5D
PRINTING



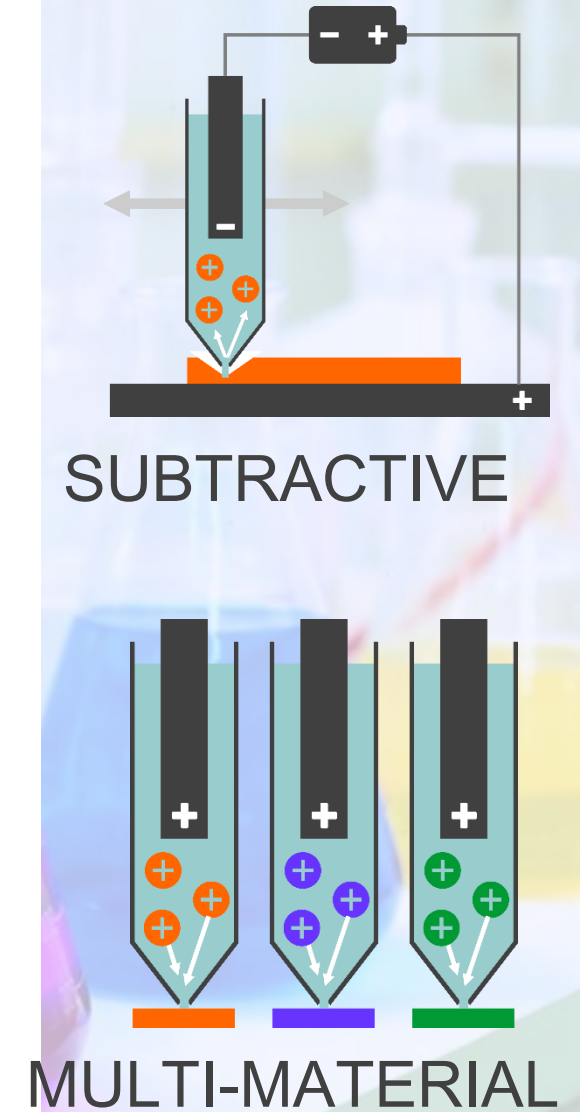
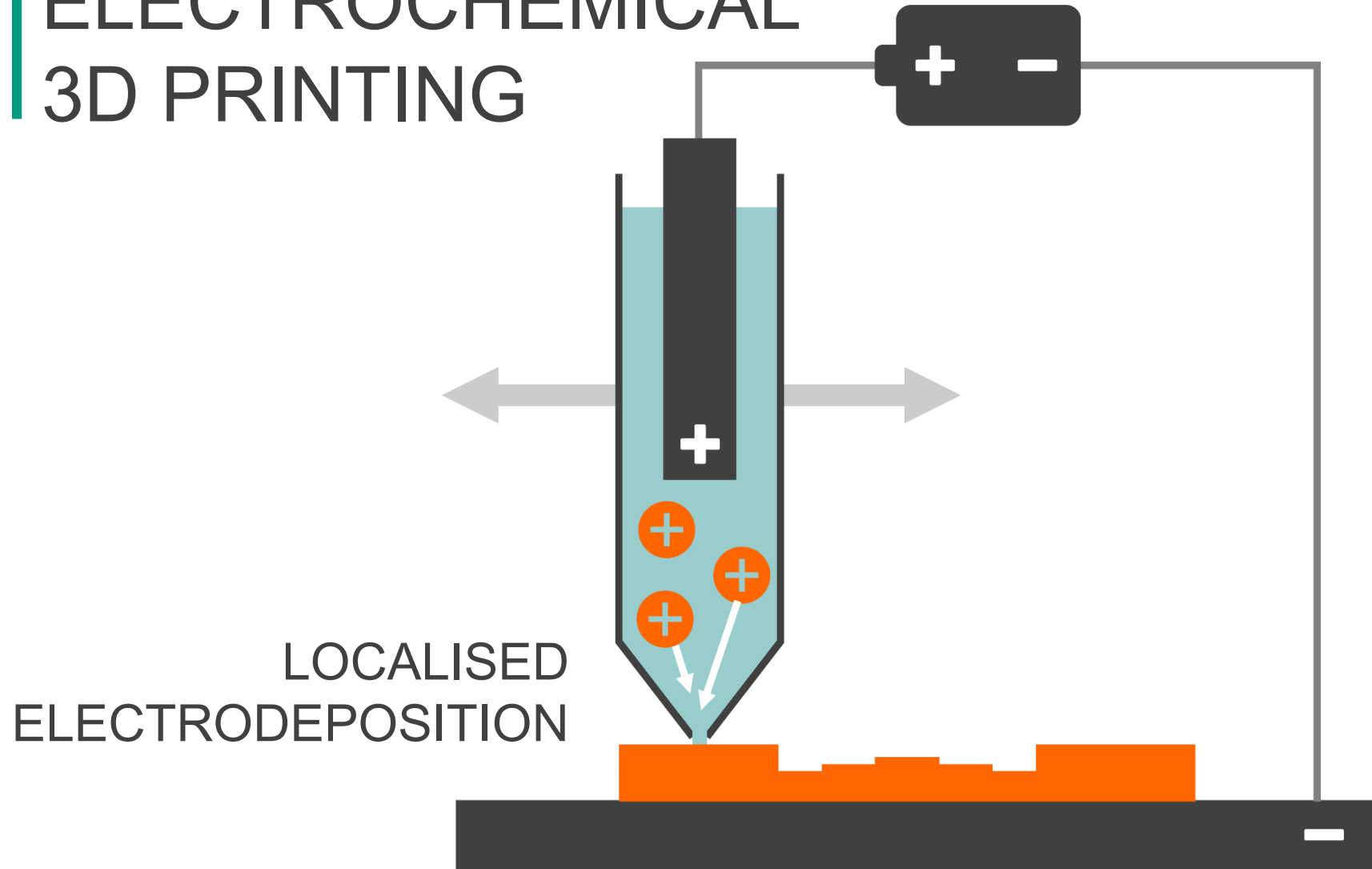
TRUE CUSTOMISATION

FULLY ASSEMBLED
ITEMS

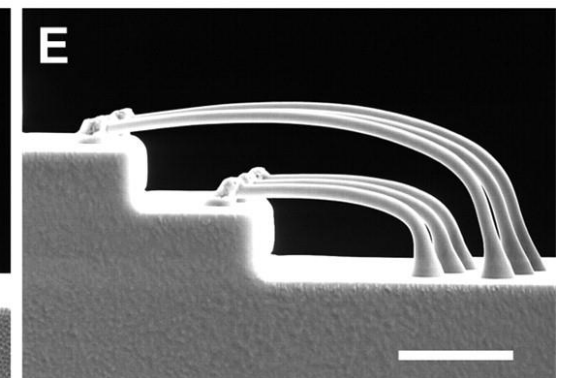
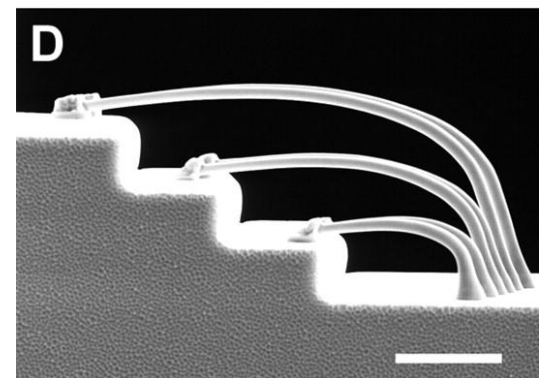
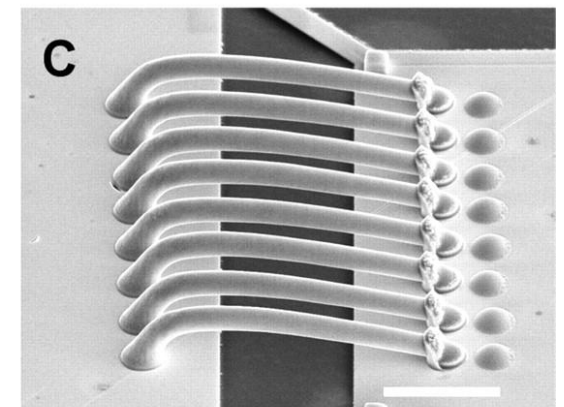
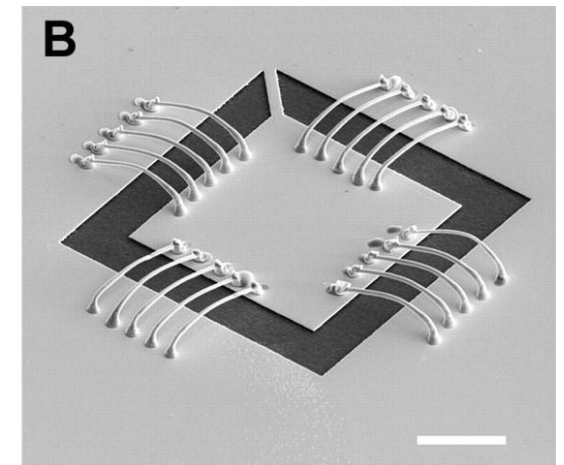
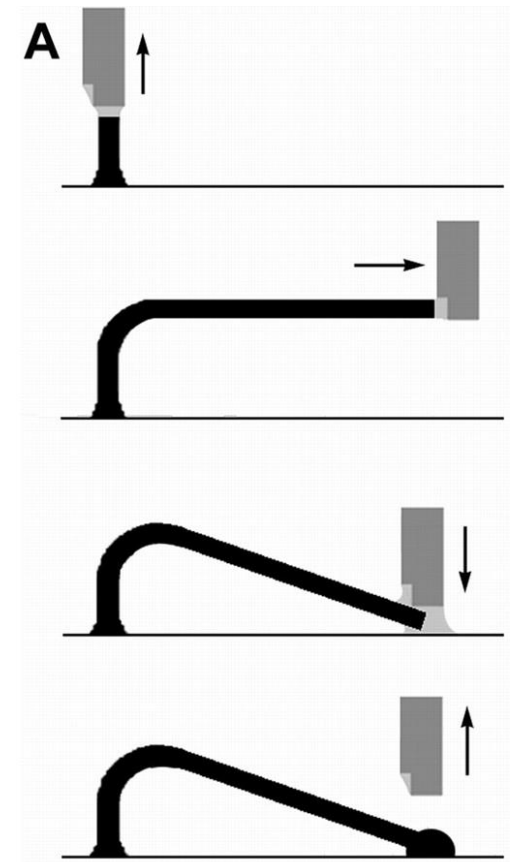


2036

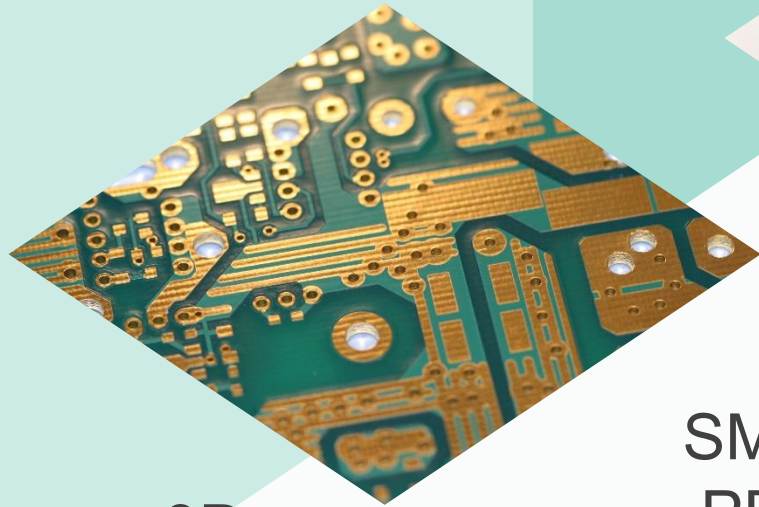
ELECTROCHEMICAL 3D PRINTING



E-3D POTENTIAL: ULTRAFINE STRUCTURES



TECHNOLOGY TRANSFORMATION



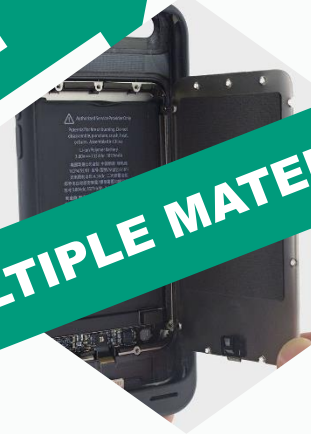
3D
PRINTING



SMART 3D
PRINTING

BETTER RESOLUTION

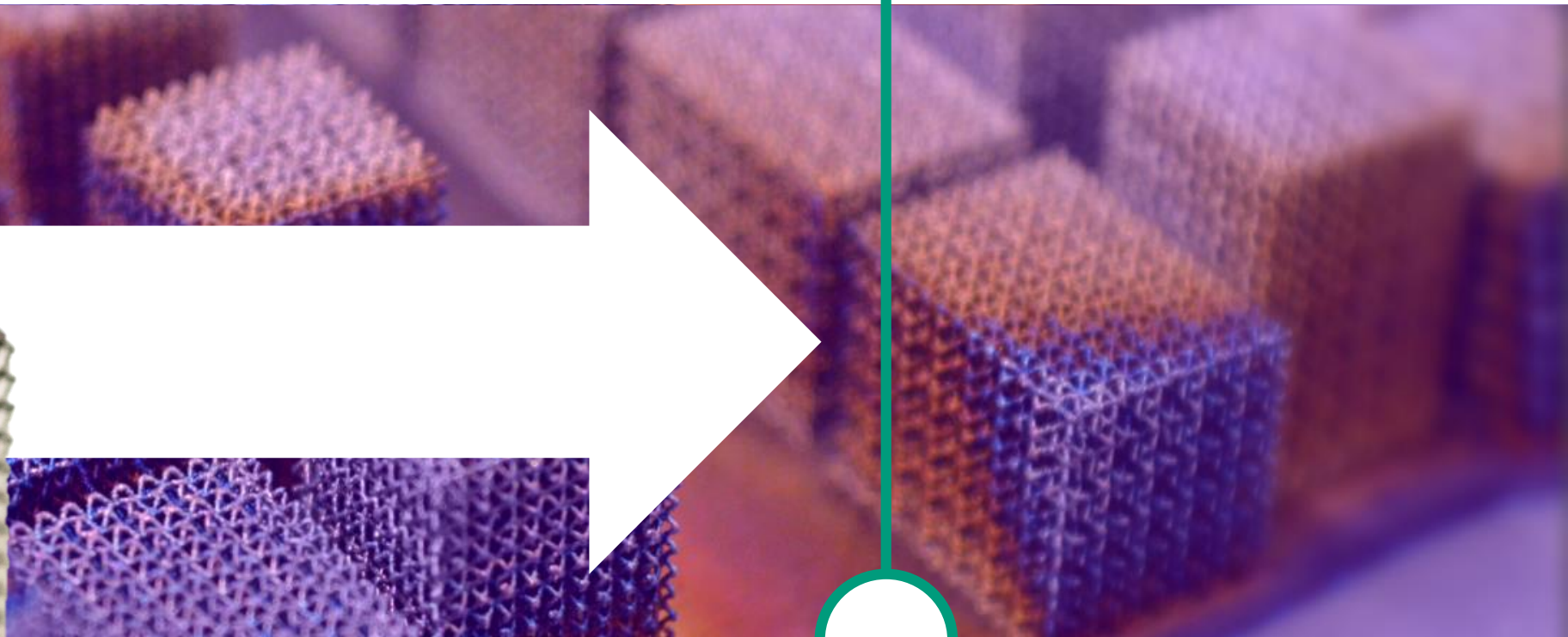
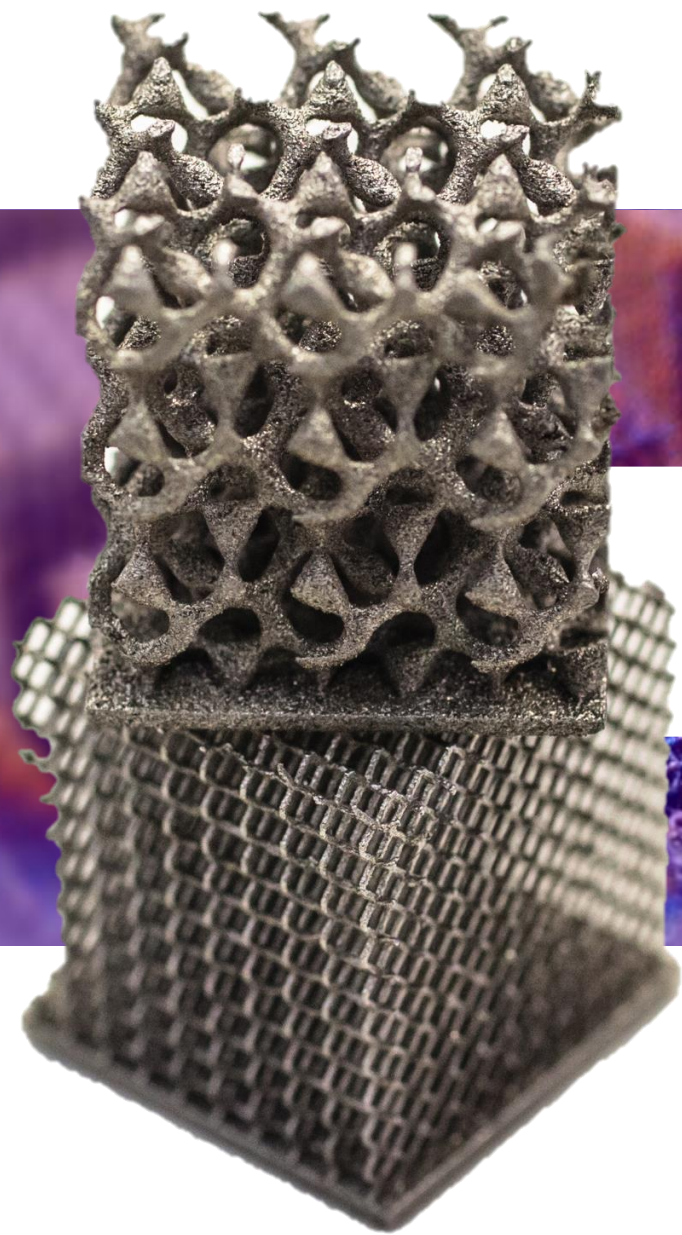
MULTIPLE MATERIALS



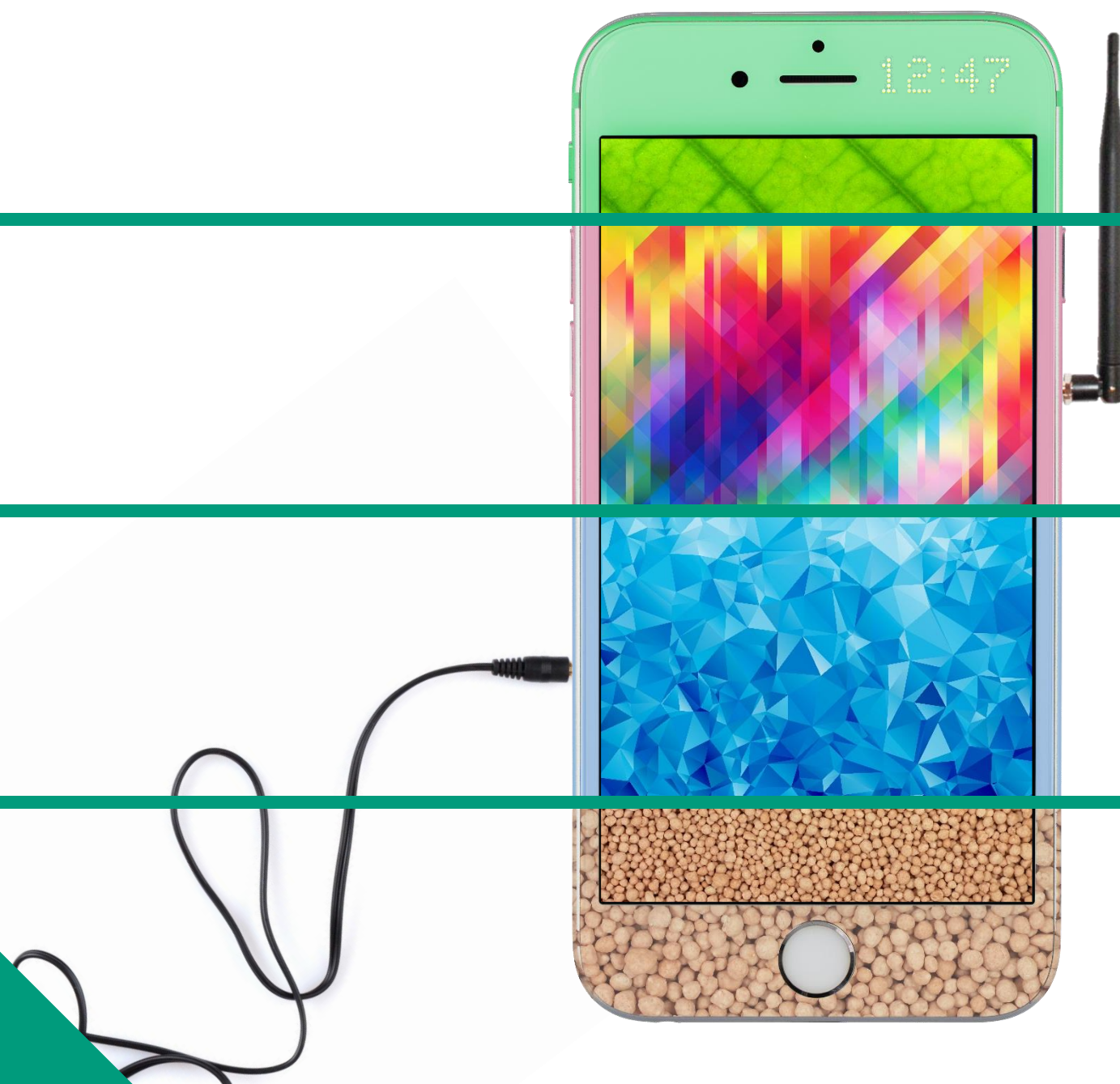
3.5D
PRINTING



4D
PRINTING



POTENTIAL



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