



INNOVATION REDEFINED

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INNOVATIONS: how long do they take?



ZIPPER

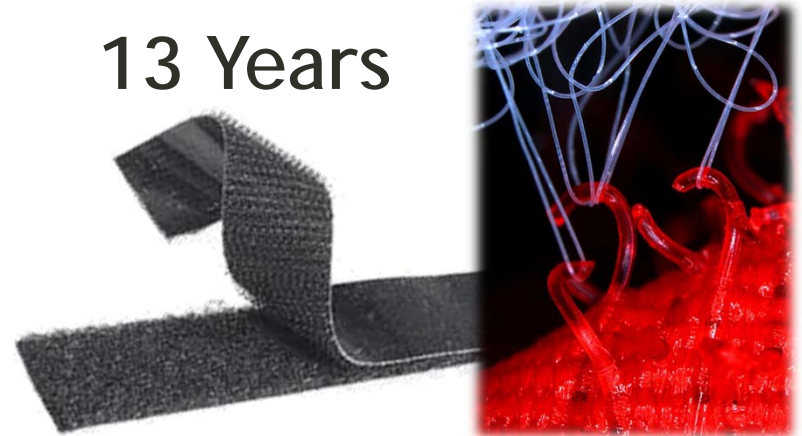
12 Years

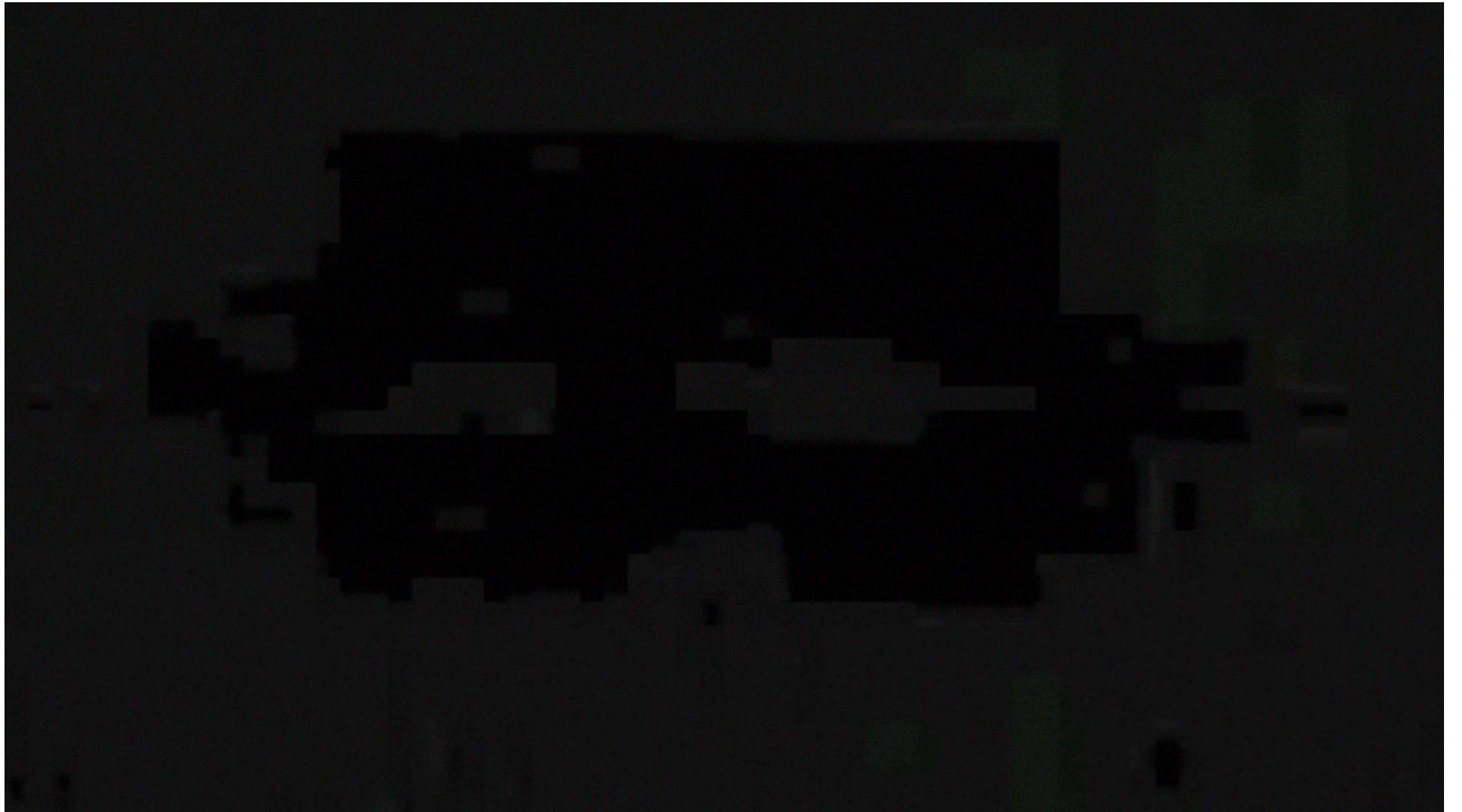
- 1851 1st Patent
- 1913 Modern Patent
- 1923 used in rubber boots
- 1925 first clothing application

VELCRO

- 1948 George de Mestral goes hiking with his dog and is inspired by thorns sticking to fur
- 1955 1st Patent
- 1960s Apollo astronauts use Velcro in space
- 1968 first shoe application

13 Years





INNOVATIONS: how long do they take?

Organic LEDs (OLEDs)

- 1953 First observation of organic film electroluminescence (EL) under AC field
- 1963 Demonstration of EL under DC field and high voltage
- 1987 Organic thin film diode published by Tang & van Slyke (Patented in 1982)
- 2007 First OLED display (11" Sony XEL-1) in low volume
- 2010 Samsung launched Galaxy phones with AMOLEDs – (>\$10B market in 2014)



Samsung Flexible OLED

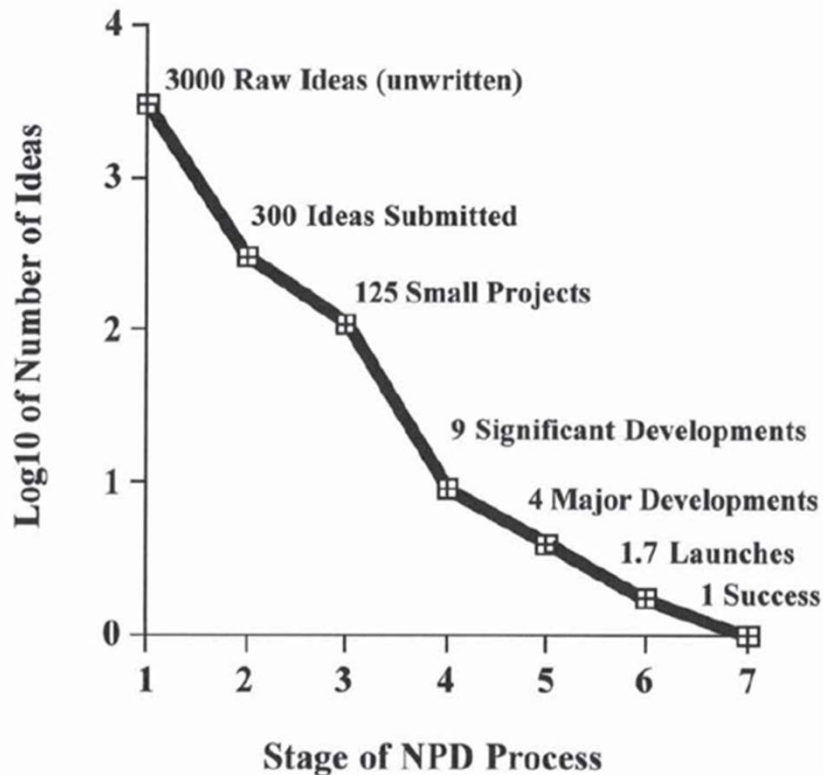


65-inch LG Display
curved UHD OLED TV

3,000 Raw Ideas = 1 Commercial Success!



G.A. Stevens & J. Burley, *Research-Technology Management* 40:3, p.16-27 (1997)



Less than 1% of patent disclosures represent 'crown jewels' with major commercial significance

Table 1—Survival Rates from Patent Activity

Patent Process	Stage of Patent Process	Best Est.	% Surviving Prior Stage
Raw ideas	1	3,000	100
Patent disclosures	2	300	10
Patent applications	3	150	50
Issued U.S. patents	4	112	75
Patents with some value	5	9	8
Crown jewel patents	6	≤1	≤10

Educational pathways from idea to impact



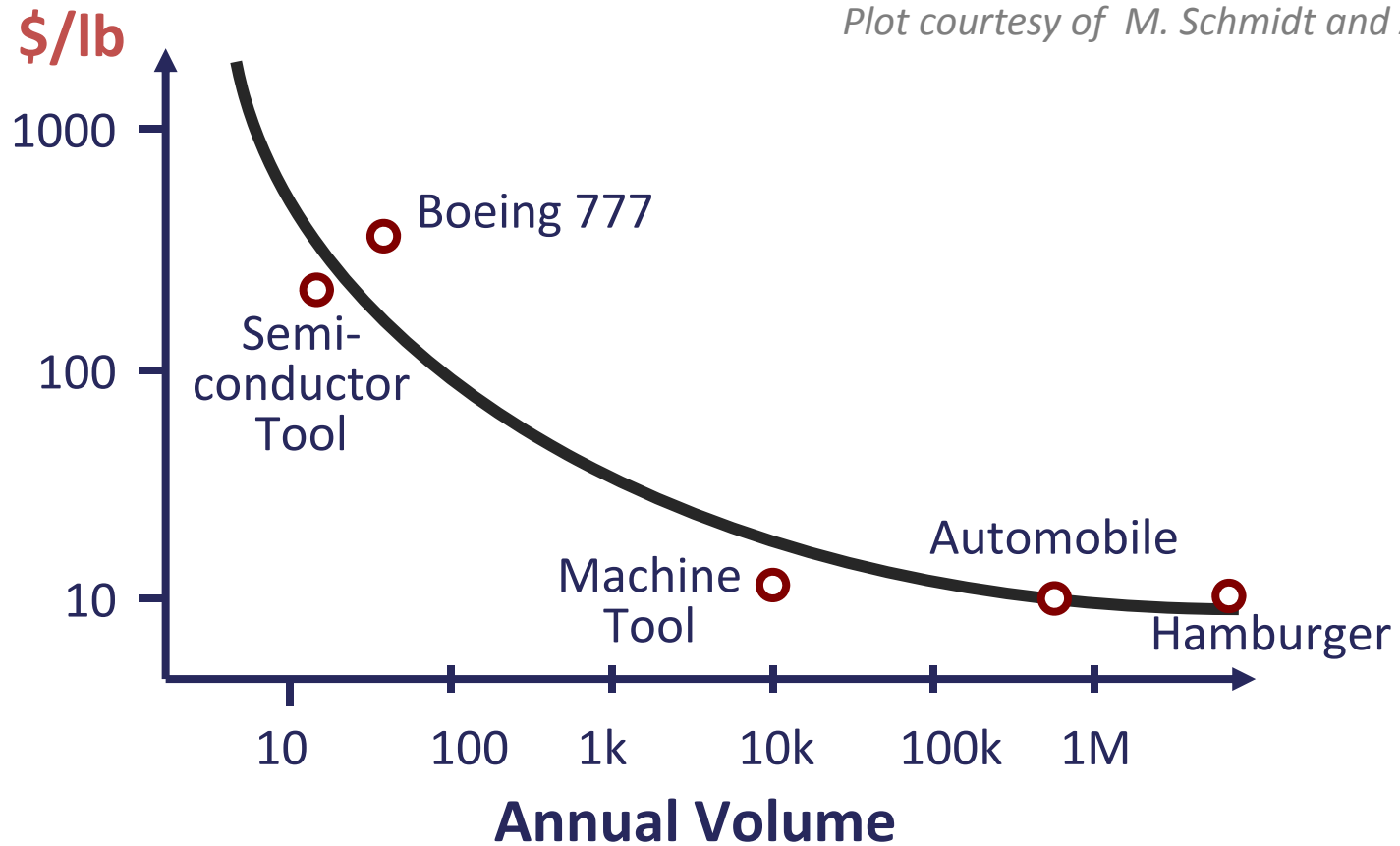
PRACTICE of Innovation



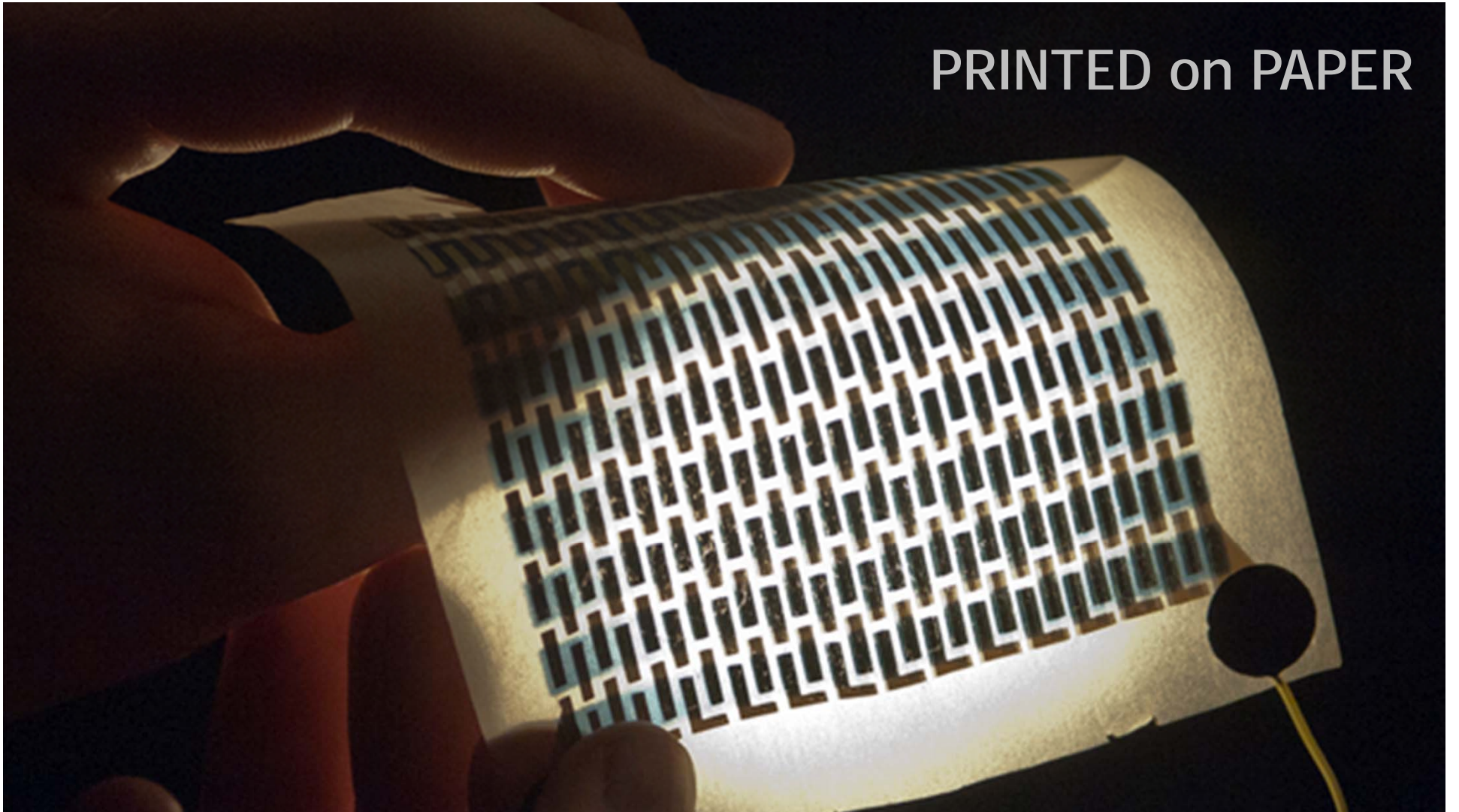
SCIENCE of Innovation



Cost of Manufactured Goods



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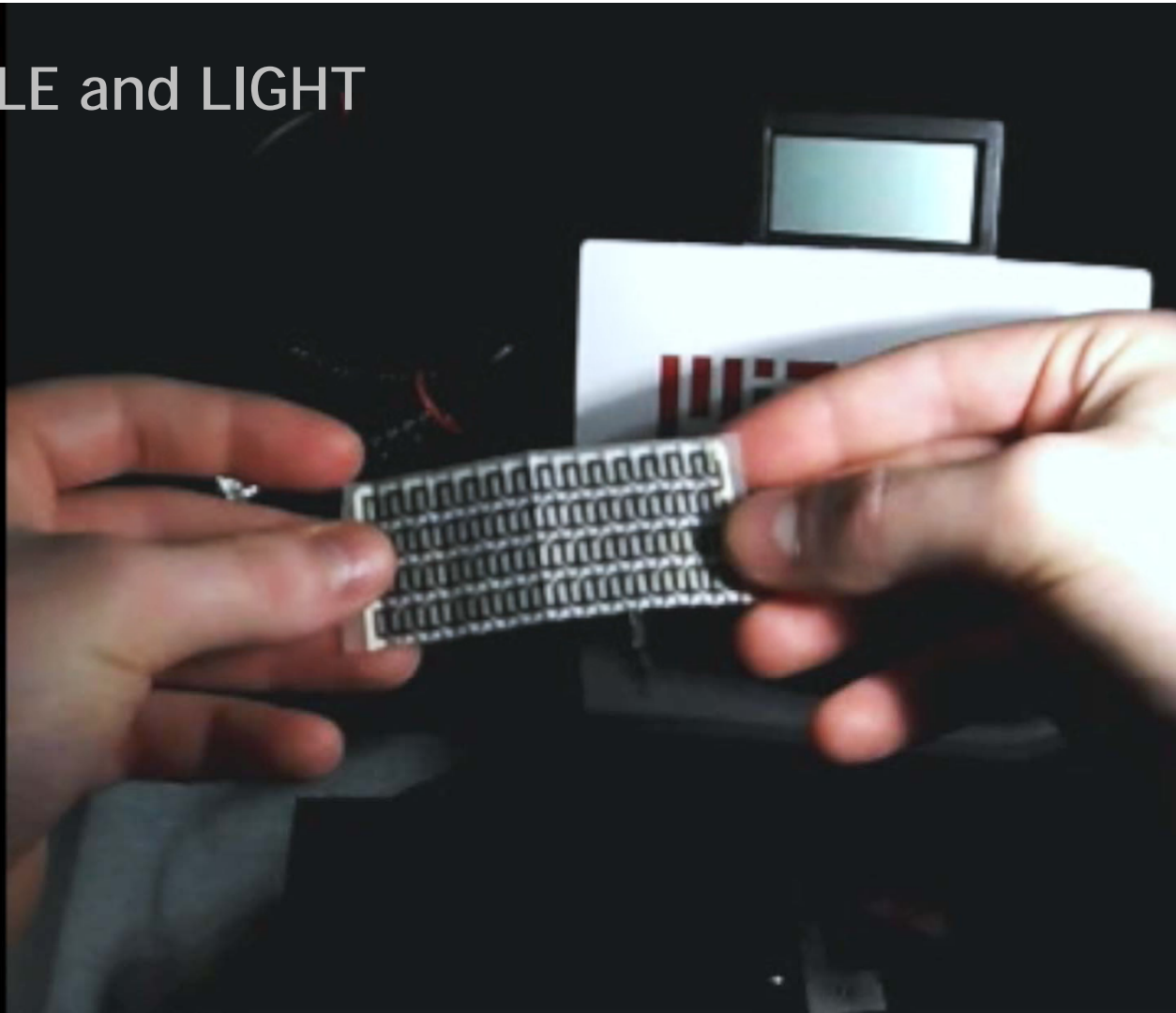




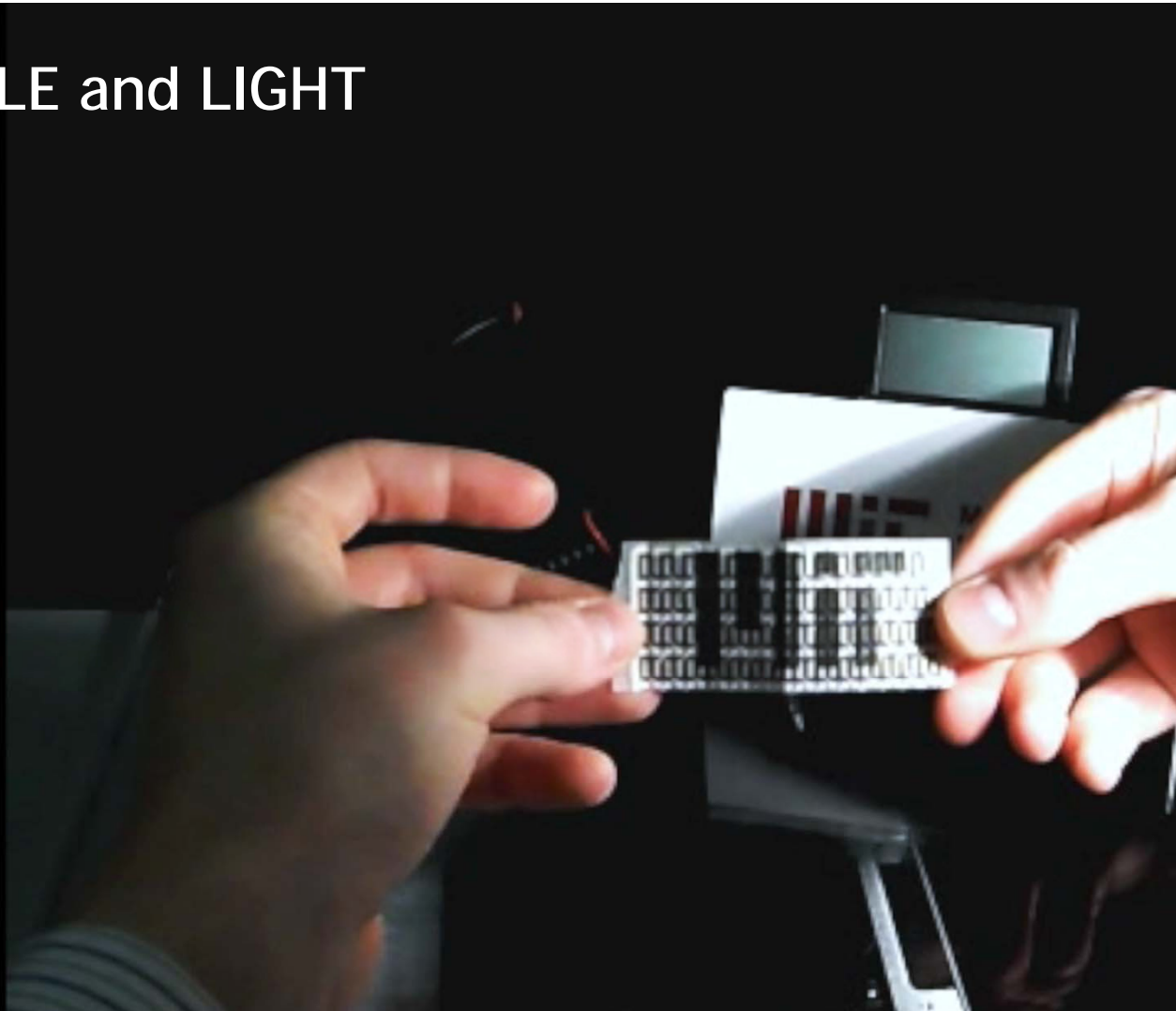
Watts/kg

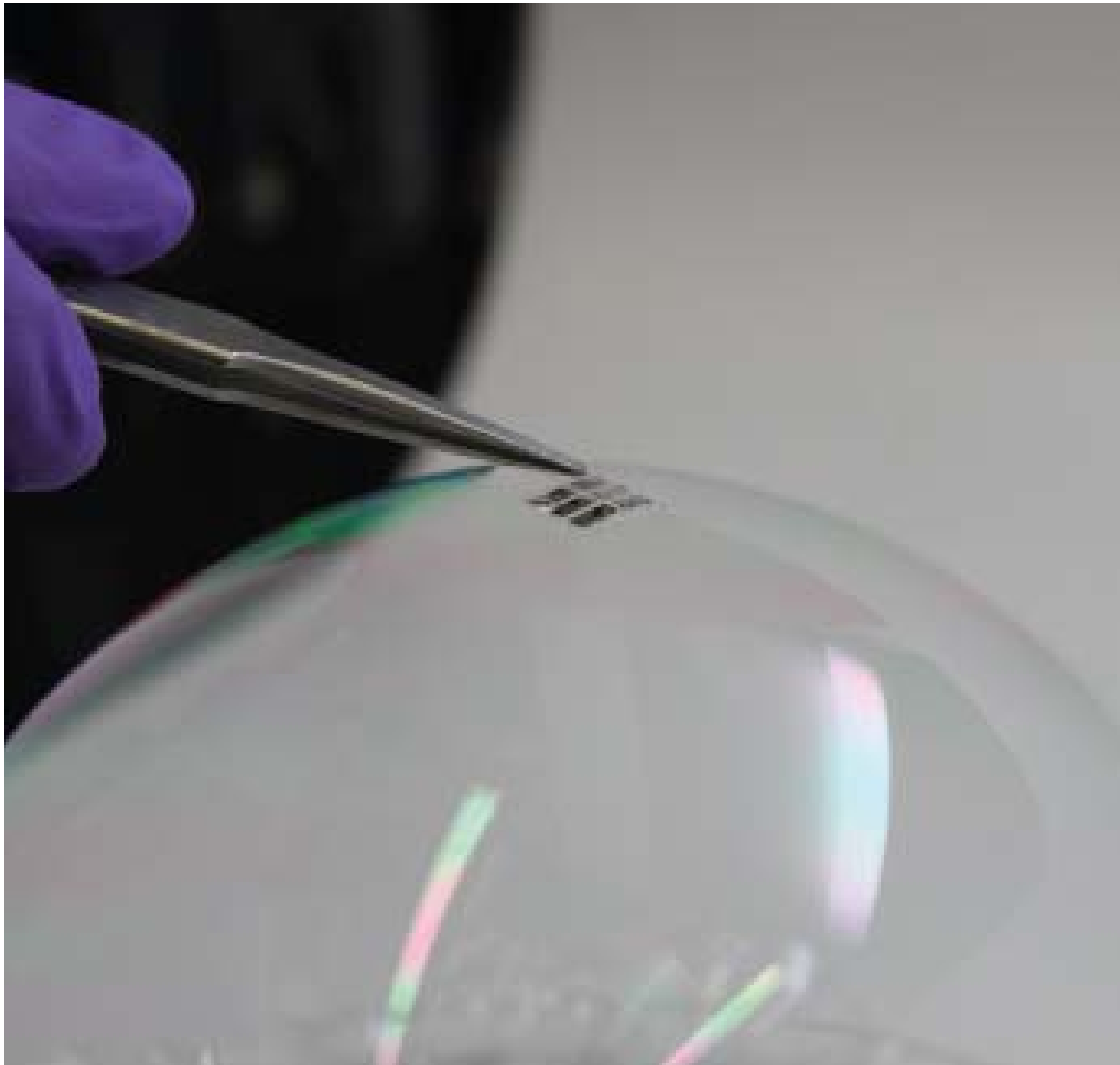
**TRANSFORMATIVE METRIC
FOR DEVELOPING WORLD**

FLEXIBLE and LIGHT



FLEXIBLE and LIGHT





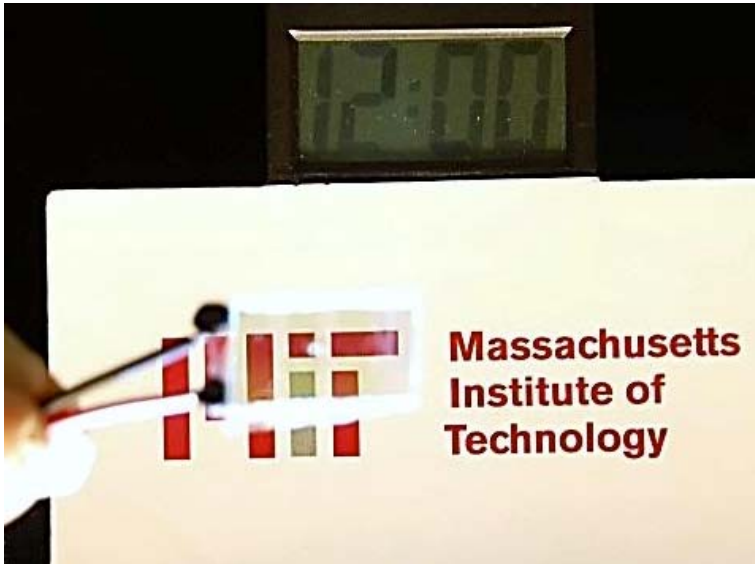
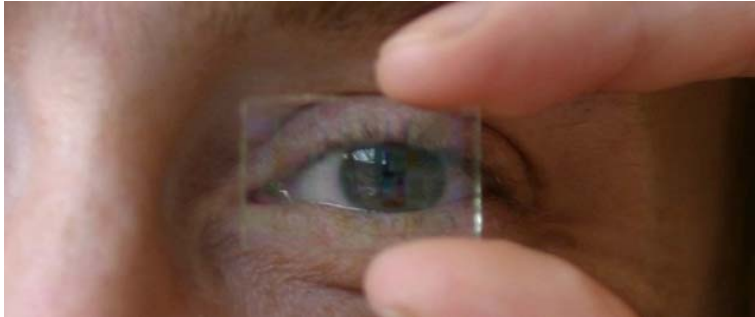
NEARLY WEIGHTLESS



NEARLY INVISIBLE



SOLAR for any scale

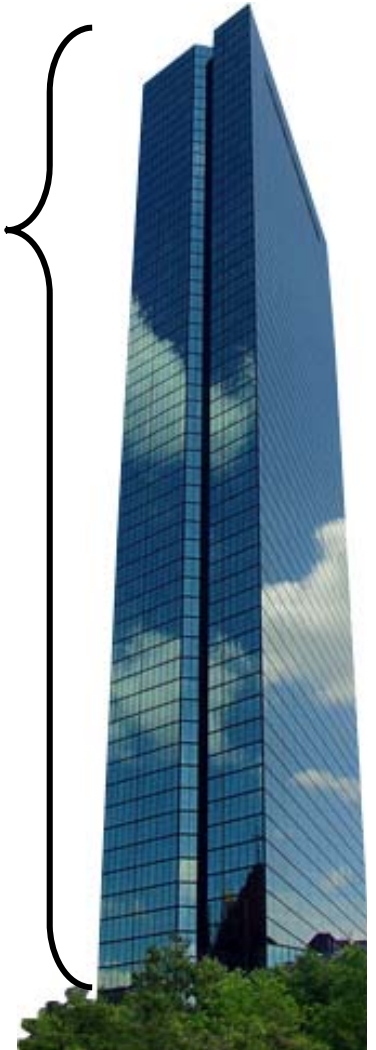


Skyscraper

> 50,000 m²

Portable

< 0.1 m²



What Fills MIT's Biggest Auditorium?



"When the RSVP for 2.009 (Product Engineering Processes) opened, it took ~ 20 minutes to fill the 1226 seats ..." — Professor David Wallace

Innovation & Entrepreneurship



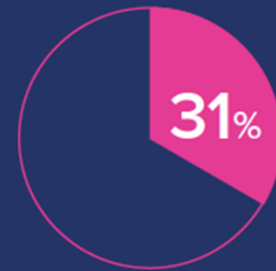
36

student groups at MIT are focused on Innovation and entrepreneurship

45



makerspaces on campus



of MIT alumni are named as an inventor on a patent

As a whole, MIT alumni-founded companies exhibit strong performance in comparison with baseline US statistics. While roughly 50% of US newly formed businesses survive for five years or more and 35% last for 10 years, approximately 80% of new companies founded by MIT alumni survive for five years or more and 70% last for 10 years, according to our results.

40%

of MIT alumni have launched 2+ companies

23%

of MIT alumni founded firms outside the US

15%

of MIT students join startup companies (10 years ago it was 6%)

30,000

currently active companies
founded by MIT alumni



4.6 million
employees

+



\$1.9 trillion
in annual revenue

=

the GDP of the 10th
largest economy in the world



MIT

innovation

initiative