사단법인 유엔미래포럼
The Millennium Project

- 이화여대 디자인대학원 미래예측 겸임교수
  대구사이버대학교 평생교육원 미래예측담임교수
- 세계기후변화상황실 CEO
- 세계미래회의 / (사)유엔미래포럼 대표
- (사)한국수양부모협회장/자원봉사진흥위원회 위원
- 전 호주대사관 수석보좌관/영국대사관공보관 29년
- 성균관대 사회복지학 박사과정수료
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  경북대학교 외국어교육과 불어전공 학사

- 저서

1) "미래예측 리포트" 랜덤하우스 중앙출판 2005
2) "NEXT JOB-미래직업 대예측" 매경출판 2005
3) "2020 트랜스휴먼과 미래경제" 교보출판 2006
4) "전략적 사고를 위한 미래예측" 교보출판 2007
5) "당신의 성공을 위한 미래뉴스" 도솔출판2007
6) "새로운 미래가 온다" 경향미디어출판 2008
7) "유엔미래보고서1: 미리가본 2018" 교보출판 2008
8) "어린이 리더를 위한 미래뉴스" 서울문화사 2009
9) "2020 유엔미래보고서2-도전과 기회의 미래 2009
10) "2020 미래교육보고서"경향미디어 출판 2010.
11) "유엔미래보고서3: 기후와 에너지" 교보출판 2010
12) "미래예측보고서", 2011년 11월 경향미디어
13) "유엔미래보고서 2025", 2011년 12월 교보출판
14) "알지 그린골드, 기후변화대안", 2012.4. 남보사연출판
15) "유엔미래보고서 2030" 2012.12. 교보출판
16) "유엔미래보고서 2040" 2013년 12 교보출판
17) "미래는 어떻게 변해가는가 2014. 10. 교보문고
18) "유엔미래보고서 2045" 2015. 1.5. 교보문고

U.S. state and county boundaries have cha nged a lot since 1629. This wonderfully si mple animation shows how they've been drawn and redrawn over almost 400 years.

The Millennium Project

Futures Research Methodology

Version 3.0

Editors Jerome C. Glenn and Theodore J. Gordon

With support from the Rockefeller Foundation

ISBN-978-0-9818941-1-9

Futures Research Methodology Version 3.0 (2009.4)

1. Introduction to the Futures Research
1.5 Evaluation and organization of Methods
2. Environmental Scanning
3. The Delphi Method
4. Real-Time Delphi
5. The Futures Wheel
6. The Futures Polygon
i7. Trend Impact Analysis
8. Cross-Impact Analysis
9. Wild Cards
10. Structural Analysis
11. The Systems Perspectives
12. Decision Modeling
l13. Substitution Analysis
14. Statistical Modeling
l15. Technology Sequence
16. Morphological Analysis
17. Relevance Trees
18. Scenarios
19. Interactive Scenarios (software)
20. Robust Decisionmaking
21. Participatory Methods
22. Simulation and Games
23. Genius Forecasting and Intuition
24. Visioning for Strategic Planning
25. Normative Forecasting
26. TRIZ
27. S&T Road Mapping
28. Field Anomaly Relaxation (FAR)
29. Text Mining for Technology Foresight
30. Agent Modeling (demo software)
31. Prediction Markets
32. Forecasting By Artificial Neural Networks
33. State of the Future Index
34. SOFI Software System
35. Multiple Perspective Concept
36. A Toolbox for Scenario Planning
37. Heuristics Modeling
38. Personal Futures
39. Causal Layered Analysis
40. Linking Methods
41. Integration, Comparisons, and Frontiers

빌 할랄 조지워싱턴대 학교 테크 케스트 창시자 유엔미래포럼이사 방한 2010년 “미래예측방법론웍숍”

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Shaping Tomorrow is possibly the most popular website devoted to future studies. It offers a wealth of scanning information on trends, strategies, and articles, and has recently started a Foresight Network of more than 1 thousand futurists.

World Future Society is the premier organization dedicated to the study of the future. Their flagship magazine, The Futurist, has published TechCast's work, and Bill Halal served on the Board of Directors for many years.

Unifusion offers custom web design services for small to medium sized companies throughout the US, specializing in high quality websites and scalable eCommerce solutions. This is TechCast's web design company, and we recommend them highly.

Greensense is a green social networking community that stimulates and nurtures the creation of green goods, expanding the availability of alternatives for growth and ingenuity.

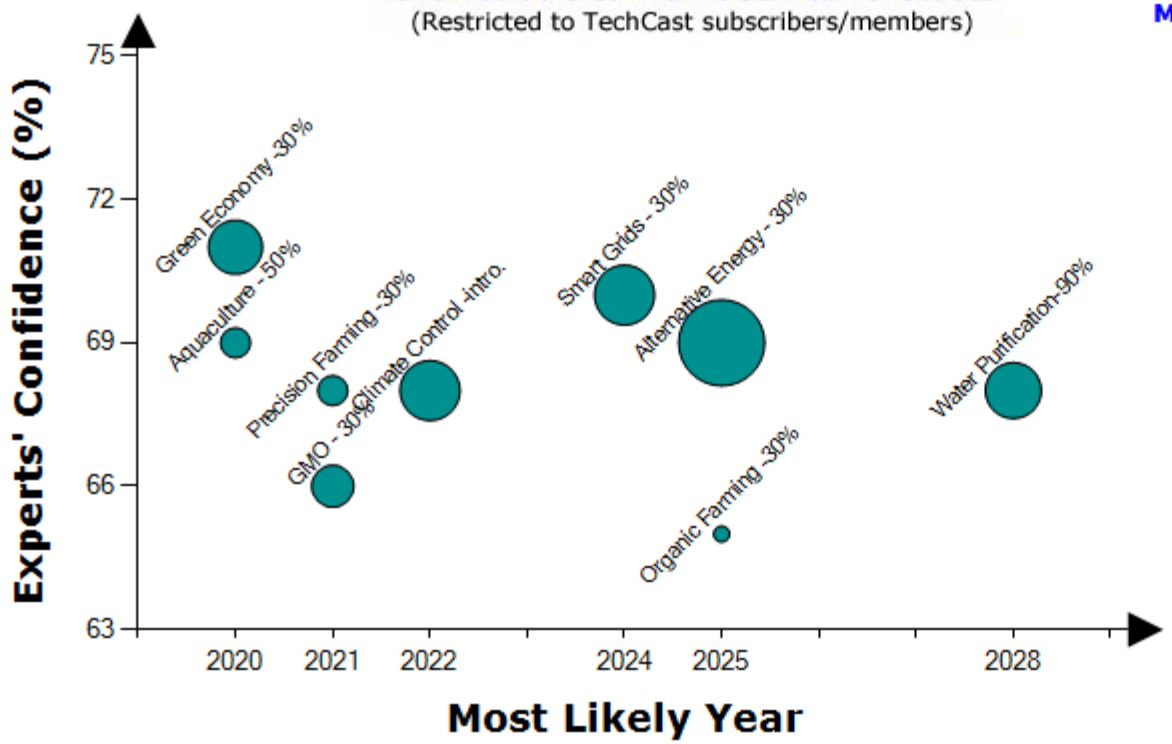
UN Futures is the South Korean website for the UN Millenium Project. It is inspired by Mrs. Youngsook Park, one of Korea's most influential futurists, and is designed to inform Koreans about future trends and strategies.

ICASIT is the International Center for Applied Studies in Information Technology, George Mason University. The director, Steve Ruth, is one of the founders of TechCast and remains active on the Expert Panel.

Bubble Charts Of TechCast's Latest Results

ENERGY & ENVIRONMENT

Click bubble to view detailed forecasts
(Restricted to TechCast subscribers/members)



More Bubble Charts by Fields of Study

- Energy & Environment
- Information Technology
- Digital Economy
- Manufacturing & Robotics
- Medicine & Biogenetics
- Transportation
- Space
- Strategic Breakthroughs

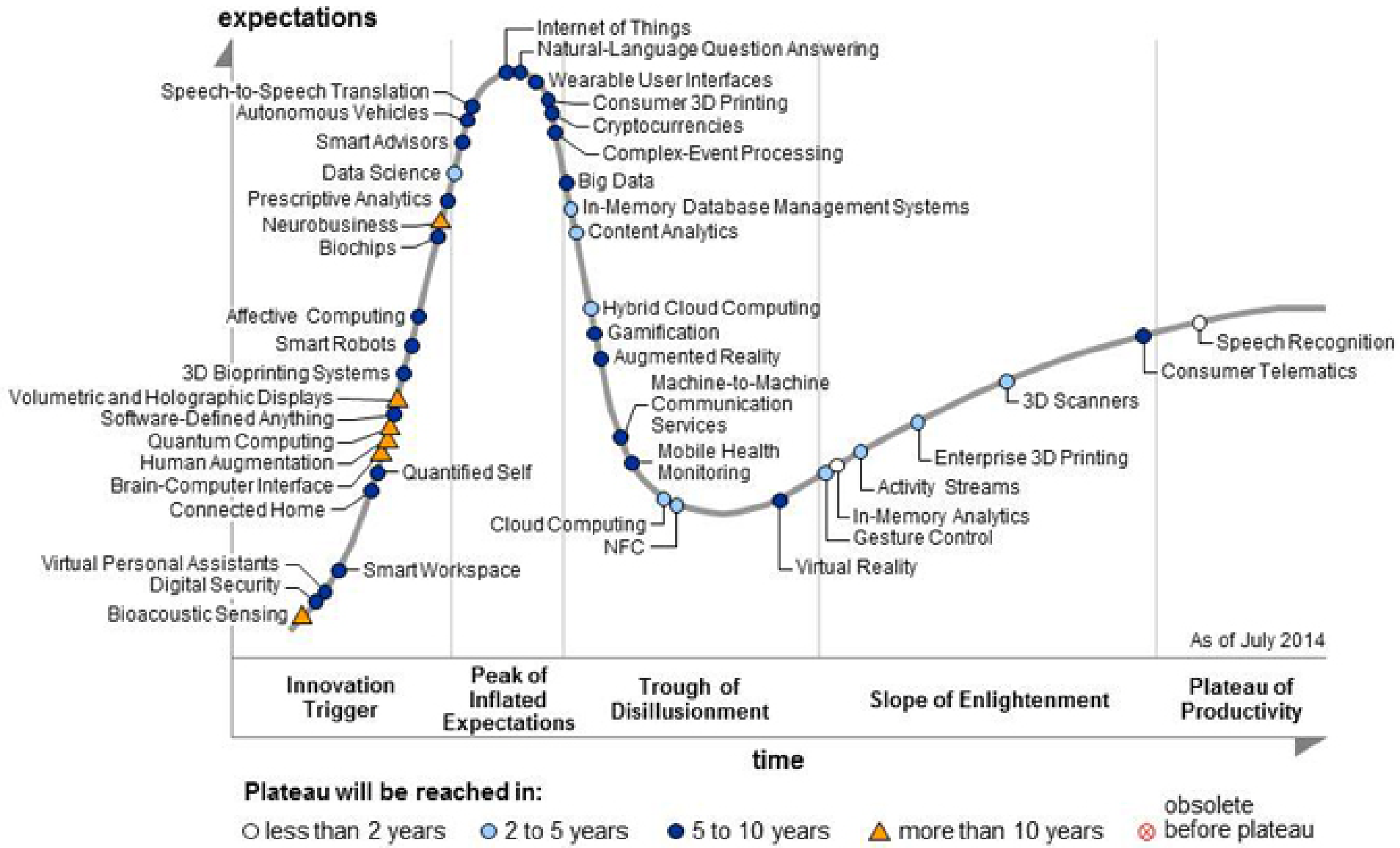
Market size

This crucial field should see major breakthroughs as the energy/environment challenge reaches critical levels over the coming decades.

Field of Study ▲	Social Trend Following each name is the next significant adoption level in the forecast's life cycle. Our experts estimate when this level is most likely to be reached.	Most Likely Year Year Social Trend is likely to reach this adoption level	Impact General impact on society (-10 to +10)
Business & Economics	Market Concentration - 51%	2025	-2.6
Business & Economics	Old Nations Grow - 3%	2019	3.8
Business & Economics	New Nations Dominate - 50%	2023	3.5
Business & Economics	Consumerism Triumphant - 67%	2023	3.0
Business & Economics	Travel Soars - US$10 Trillion	2020	2.9
Business & Economics	Jobs Failure - 10%	2022	-3.4
Business & Economics	Services Dominate - 50%	2021	2.6
Demographics & Lifestyles	Global Graying - 25%	2032	.1
Demographics & Lifestyles	Mass Migration - 20%	2025	2.8
Demographics & Lifestyles	Generation Change - 50%	2021	3.1
Demographics & Lifestyles	Urbanization - 60%	2021	.8
Demographics & Lifestyles	Fertility Falls - 1%	2028	1.7
Demographics & Lifestyles	Diversity Accepted – 51%	2026	5.2
Demographics & Lifestyles	Working Women – 70%	2027	4.5
Government & Politics	Privacy Dying - 50%	2018	-.8
Government & Politics	Environmental Demands - 33%	2022	5.2
Government & Politics	Transparency - 51%	2022	4.8
Government & Politics	Extremism Growing - +1	2018	-2.9
Nature & Science	Fragile Systems – 33%	2020	-1.9
Values & Spirituality	Legal Pot - 33%	2022	2.0

Manufacturing & Robotics	Nanotechnology - 30%	2024	750	65
Manufacturing & Robotics	Smart Robots - 30%	2026	520	64
Manufacturing & Robotics	Modular Buildings - 30%	2026	2100	60
Manufacturing & Robotics	Power Storage - 30%	2023	734	64
Manufacturing & Robotics	3-D Printing - 15%	2018	401	64
Medicine & Biogenetics	Child Traits - 30%	2035	254	51
Medicine & Biogenetics	Gene Therapy - 30%	2030	666	58
Medicine & Biogenetics	Replacement Parts - >0%	2025	698	60
Medicine & Biogenetics	Life Extension - 100 years	2039	1635	61
Medicine & Biogenetics	Personal Medicine - 30%	2026	858	61
Medicine & Biogenetics	E-Medicine - 30%	2021	676	66
Medicine & Biogenetics	Cancer Cure - >0%	2029	861	58
Medicine & Biogenetics	Synthetic Biology - >0%	2021	714	62
Medicine & Biogenetics	Neurotechnology - 30%	2034	455	56
Space	Moon Base - >0%	2034	373	57
Space	Space Tourism - >0%	2019	92	67
Space	Humans On Mars - >0%	2034	509	54
Space	Star Travel - >0%	2059	1714	52
Space	Commercial Space - >0%	2023	599	59
Space	Solar Satellites - >0%	2031	433	57
Transportation	Hybrid Cars - 30%	2021	893	67
Transportation	Hypersonic Planes - >0	2032	113	58
Transportation	Fuel Cell Cars - >0%	2019	581	61
Transportation	Intelligent Cars - >0%	2023	1131	67
Transportation	High-Speed Rail - 30%	2030	417	61
Transportation	Electric Cars - 30%	2027	1190	63

가트너의 하이퍼사이클 2014



공유경제 non-ownership economy

컴퓨터/전화
먼 곳에서
신체가까이

-전화컴퓨터
무료

Cicret is looking to take things a step farther an d turn your arm into a smartphone. « Back to C icret wristband turns your arm into a touch scre en *December 8, 2014*

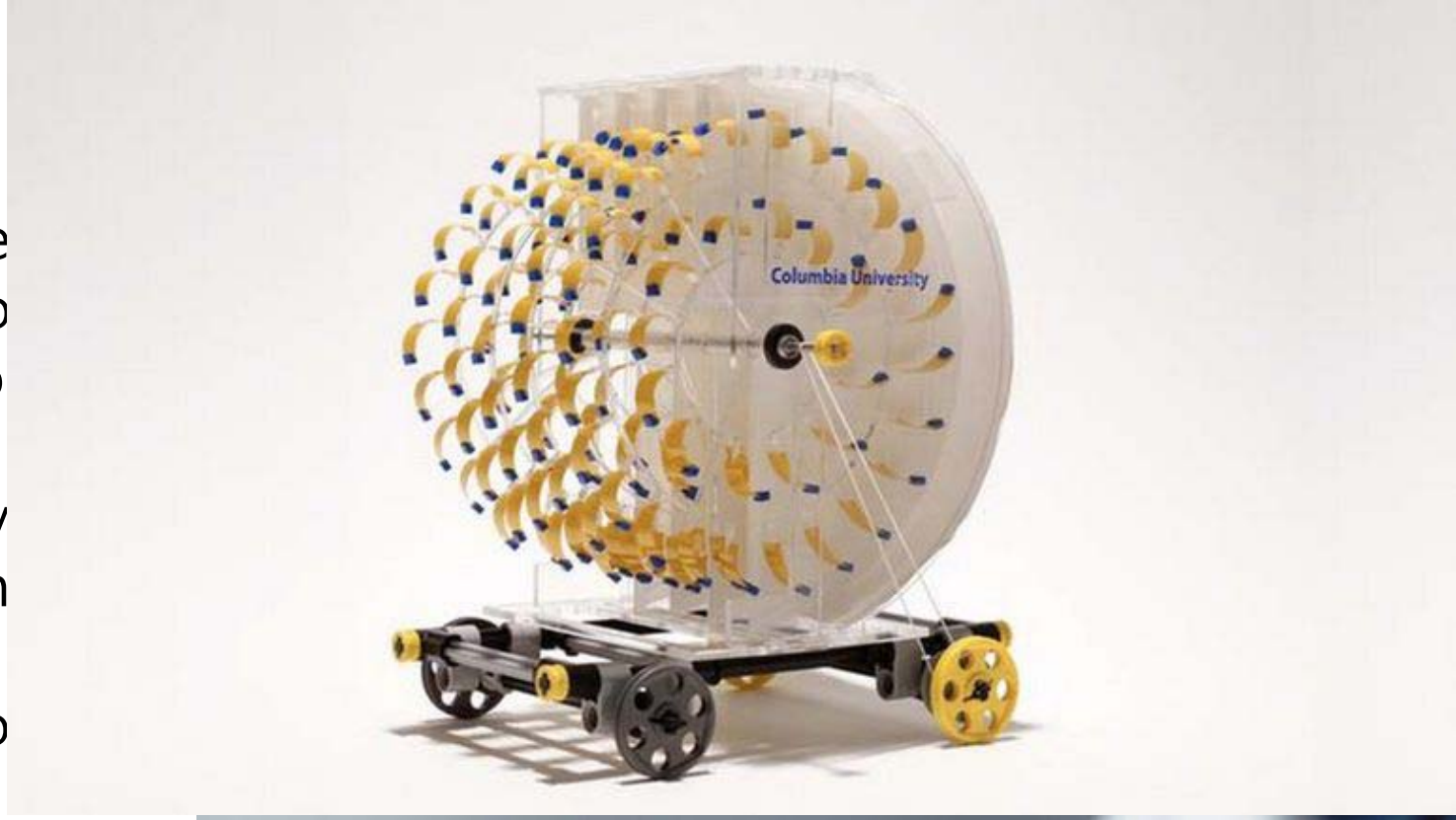
팔을 터치스크린으로 만들어주는 팔찌

프랑스 스타트업 시크릿(Cicret)이 팔을 터치스크린으로 만들어주는 팔찌를 개발했다고 호주 IT전문매체 기즈맥 등이 보도했다. 팔찌가 팔에다 빔을 쏘게 되는데 팔에 터치스크린이 생기는 셈이다. 팔에 켜진 터치스크린은 손가락을 이용해 작동할 수 있다. 이 팔찌는 스마트폰 등과 연동해 사용이 가능하다. 제품은 이르면 내년 상반기 출시될 예정이다. 가격은 16GB 기준, 400달러(약 44만원)정도로 예상된다.

어제, 1주일 전 나온 신기술

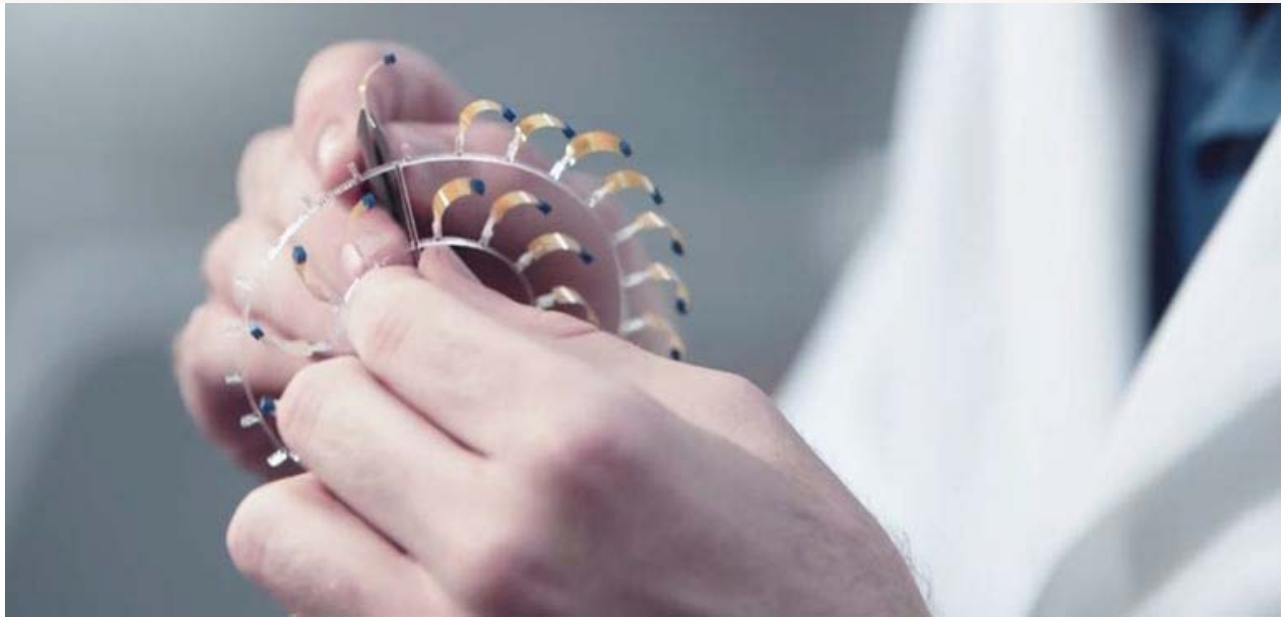
If there's one thing a plastic resin 3D printer is good at, it's mak ing custom toys. And Michael Sng's Machination Studio has cre ated the ultimate example of what 3D-printed toys can be with the HMC Boudicca; a 20-inch tall walking mechanized tank with more detailed animated features than even R2-D2 has. 2015.7.4

Scientists at New York's Columbia University replicated this process in the laboratory and harnessed its energy to power tiny machines, one of which was a moving, miniature car.



Miniature car runs only on the power of evaporating water

2015. 6. 18



HP has announced a free software update for its all-in-one dual-workspace Sprout computer that adds 3D capture capabilities. Sprout could already scan objects placed on its horizontal workspace when it was first released last year, but it was limited to generating two-dimensional images. Now it can generate full 3D models of any objects positioned beneath its cameras. 2015.6.18

Lenovo's Smart Cast concept would see a phone equipped with a laser projector and an infrared motion detector to offer an interactive projection space 2-15. 5. 31

Concept Kitchen 2025

Concept Kitchen 2025 hopes to answer. Developed in collaboration wi
th design firm IDEO London and students from Lund and Eindhoven
universities, the Concept Kitchen is designed to make people more cr
eative about food while nudging them toward a more eco-friendly

www.whitehouse.gov/makerfaire

Maker world

메이커운동-창업

Maker faire

백악관행사

메이커데이 6.18

www.whitehouse.gov/makerfaire

6월 18일 US National Day of Making

- **Chevron's Fab Result from the US' National Day of Making**
- *By Davide Sher On Fri, June 20, 2014 ·*
  In case you blinked and missed it, June 18th was proclaimed National Day of Making and the White House held its first ever Maker Faire. Among the many activities and announcements, the Fab Foundation said it is going to open 10 new Fab Labs around the US by 2015, with support from Chevron Corporation.
- The project will be funded by Chevron as part of the energy industry leader's recently announced 30 million commitment to support STEM (Science, Technology Engineering and Mathematics) education and project based learning methods. When complete the laboratories will provide close to 20,000 students and adults hands-on science and technology experiences.
- Generally Fab Labs are laboratories that offer their members access to consumer-prosumer digital manufacturing tools, such as CNC mills, laser cutters and, of course, 3D printers, both RepRap and assembled. As well as Arduino and Raberry Pi control boards. Courses teach how to use and even build these machines to make anything one can imagine (most people I've talked to tend to imagine drones and robots).
- The trend has been growing worldwide and there are now more than 350 Fab Labs operating today with another 350 in development in over 40 different countries. Some Fab Labs are set up as for-profit companies and others are non-profit foundations and associations but the spirit is similar: promoting open source culture and shared creativity to help build new generations of makers — young and old — that are familiar with the modern means for digital production.
- "Along with launching new fab labs, Chevron's grant will help build the Fab Foundation's capacity to provide access to digital fabrication across the country and around the world," commented Neil Gershenfeld, Chairman of the Fab Foundation's Board. "At the White House Maker Faire [we celebrated] how makers are using these tools to innovate for the future."
- The Fab Lab Foundation was formed by MIT professor Neil Gershenfeld in 2009 as US non-profit organization to facilitate and support the growth of the international Fab Lab network. Its primary beneficiaries are community organizations, educational institutions and non-profit concerns.
- "Few things are more important to our nation's future than student interest and proficiency in STEM. Through our partnership with The Fab Foundation, we are proud to increase the numbers of students across the country that have access to develop project-based, critical thinking skills," said Blair Blackwell, manager of education and corporate programs at Chevron. "This partnership underscores our commitment to ensuring that students have the foundation they need to succeed."

해상도시화
기후변화대안

해수면상승

With global sea levels predicted to rise significantly over the next century due to climate change, a lot of people living in low lying areas are expected to be displaced from their homes. Architect Vincent Callebaut has come up with a possible relocation destination for these climate change refugees in the form of the "Lilypad" concept – a completely self-sufficient floating city that would accommodate up to 50,000. 5만명이 살 수 있는 떠다니는 도시, 해수면 상승 기후난민 대비책

Future Map of Europe

Future Map of Asia

패트리 프리드만, 시스테딩 창업자
밀턴 프리드만 노벨경제학상 손자

디지털통화화
Fintech

은행/주식거래소 소멸
세계단일통화

With Android Pay, you won't need the app. You won't need to enter a pin.

- This week, Google announced Android Pay—a way to pay from your phone. No need for credit cards; just tap your handset against any supported card terminal. Sounds gr eat—but also kind of familiar. Didn't Google Wallet already do that? I just tried Androi d Pay, and here's the deal.
- Basically, Android Pay is the same tap-to-pay feature of Google Wallet, except way les s of a pain to use. With Google Wallet, you had to launch an app, then type in a pin s o Google could unlock your credit cards. The whole idea of "Google Wallet" was also a little confusing, since the app doubled as a peer-to-peer payment system which cou ld funnel money to a real, physical Google Wallet card too.
- With Android Pay, you won't need the app. You won't need to enter a pin. It's built rig ht into the operating system. If you've unlocked your phone, you just place it up agai nst the credit card terminal, and boom, you're done. It'll even automatically prompt y ou to use a loyalty card or gift card if you have one. I tried a demo here in person at Google I/O with a Coke machine, and it sure seemed to work!
- It'll also be able to make use of the native fingerprint scanner recognition coming in Android M,though Android Pay should work with NFC-equipped devices sporting And roid 4.3 and above.
- Where does that leave Google Wallet? A Googler tells us that Wallet will continue as a peer-to-peer payment system, and the physical Google Wallet card will stick around too. Android Pay is for tap to pay, and Wallet is for transferring money between frien ds and over the internet.

은행의 소멸과 크라우드펀딩, 비트코인 중앙은행 탄생 작업 중

IOT의 시대

모든 것이 연결되는 1조개 센서 박힌다.

전 우주에 인터넷 연결

- **Musk, Branson, Zuckerberg, Brin, and Page** all j oined together to create the future of internet infr astructure on Earth and beyond. Imagine if five fil thy rich white men controlled how we all commu nicate. Imagine.
- For the Facebook and Google crew, the incentive is simple. **Space internet** means more customers but not necessarily more profit. That makes Brans on and Musk's recent investment in the Herculea n task of sending hundreds of satellites into orbit a bit more capitalistic. If either OneWeb or Space X manages to build a space internet, those two bi llionaires stand to profit directly from selling inter net service to the entire planet.

Elon Musk Details $10 Billion Plan for Space Internet

Intelsat (I) and SES; SpaceX and OneWeb

- For decades, companies like Intelsat (I) and SES have operated school bus-size satellites that float above a particular area of the Earth in geosynchronous orbit. They're far away -- just over 22,000 miles above the ground -- so a single satellite shoots back a wide beam that can cover an entire continent.
- But they violate the rules of space economics 101. The satellites are large and heavy, so it's extremely expensive to launch one. As a result, companies build them to last 10 to 15 years and rarely replace them. That's why their hardware and Internet signals are so slow. To those on the ground, it feels like dial-up.
- The tech industry is now championing a new way of delivering the Internet from the sky. O3B launches four satellites at once and keeps them closer to the ground, orbiting at "just" 5,000 miles. That allows for tighter light beams and faster Internet. The downside is a smaller coverage area, about the size of New Mexico.
- SpaceX and OneWeb are aiming even closer. They want to launch many rockets -- each with lots of smaller, cheaper satellites inside -- and keep them circling at a relatively low 750 miles above the Earth. The coverage area will be tiny, but the goal is to sprinkle the atmosphere with hundreds of satellites. The extra gravity means they'll run out of fuel faster. But they need to be replaced often anyway to keep up with ever-faster Internet-connected devices down on the ground.

이제 드론의 시대가 온다.

드론=
기후변화대안

드론, 사고현장 신속촬영 및 보도

네델란드 쿠컨호프정원 드론 촬영

The colors are breathtaking, the rows are perfectly manicured and it feels like it totally shouldn't exist. Here is drone footage of the Ke ukenhof Gardens in The Netherlands.

제조업 소멸
자동차 이렇게 변한다.

전기자동차
무인자동차
솔라화

Tesla opened up all of its patents last year, and now it looks like this apparent altruism is inspiring others to follow suit. Ford, like Tesla, has now opened up its EV patents to its competitors, though unlike Tesla's they won't come free of charge. Ford made the announcement on Thursday. Ford says it has more than 650 EV patents and around 1,000 that are currently pending. It is offering access to all of these through either the company's own licensing office or AutoHarvest, a non-profit licensing marketplace designed to engender collaboration within the automotive industry.

2015. 5. 31

5th Ave New York City, April 15, 1900

Carriage chariot
Mesopotamia, 3000 BC.
warfare by Egyptians

1900: Where is THE CAR?

현대?

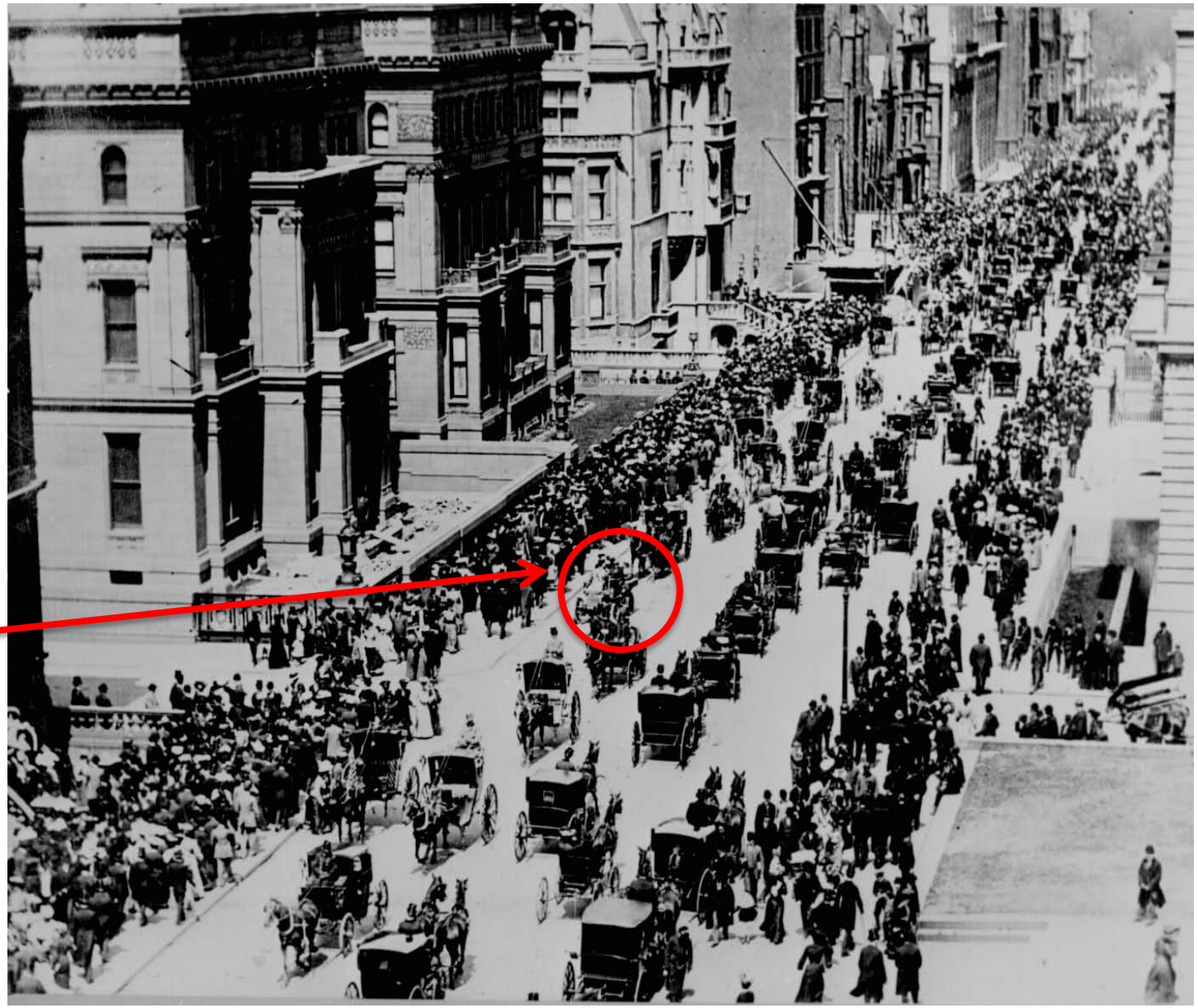


Photo: Fifth Ave NYC on Easter Morning 1900

Source: US National Archives

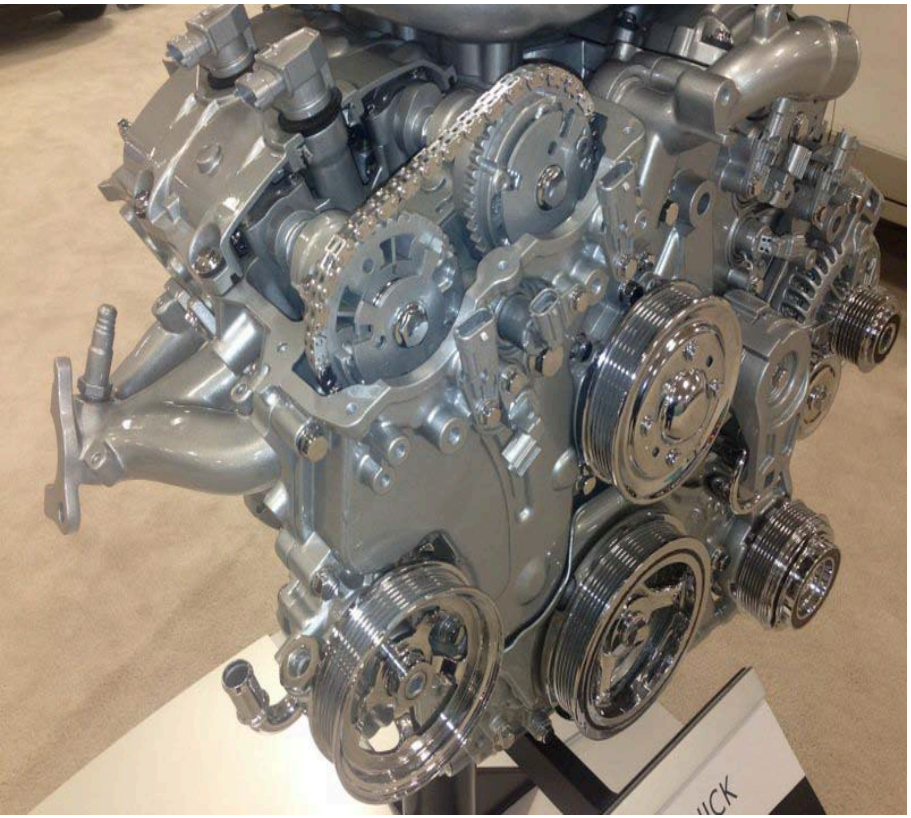
5th Ave New York City, March 23, 1913

1913: Where is THE **HORSE**?

Photo: Easter 1913, New York. Fifth Avenue looking north. George Grantham Bain Collection

Source: shorpy.com

Electric Motor – 5X more Energy Efficient



Internal Combustion Engine - 17%- 21% efficiency

Electric Motor – 85%- 95% efficiency

테슬라 자동차 수퍼충전기 30분 충전

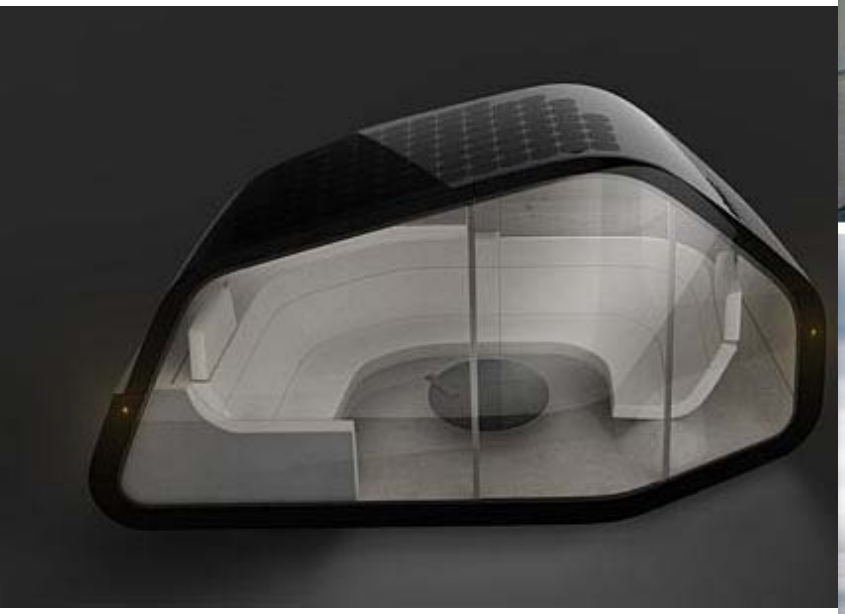
2017 release date with Tesla, the company's CEO Elon Musk, Tesla Model 3 will be for around US$35,000.

무인차=
기후변화대안

구글 무인차
Mercedes
니싼

아우디 무인 스포츠카 2015. 5. 31

미래의 자동차모습, 거실 의자



무인(전기)자동차
2020년 보편화

- 2012년 10월 30일 캘리포니아 주지사 제리 브라운이 무인자동차 허용법을 통과. 구글의 공동 설립자 세르게이 브린은 캘리포니아 주 구글 본사에서 이 법안을 작성한 법안 SB1298은 무인자동차 도로주행 허용법
- 구글의 무인자동차 프리우스 차 전면에 레이더 센서, 주변 지역을 관찰하는 비디오카메라, 각종 센서와 자동차를 조종 할 수 있는 인공지능 소프트웨어, 를 포함한 다양한 기술조합기기, 무인항법장치. 구글 네바다 주 무인자동차의 도로 주행실험 성공, 2011년에 무인차량 도로주행법 통과
- 교통혼잡 소멸, 교통순경, 교통카메라, 교통신호등, 과속단속경찰, 과속단속카메라 기기, 과속위반티켓, 급정거로 도로 손실 소멸, 브레이크 장기 사용, 교통체계 솔루션, 교통방송, 교통혼잡 설명 방송인, 안전띠, 에어백 소멸, 각종 안전의자 소멸, 자동차 디자이너 완전 변화,
- 주차장소멸, 주차장 공회전, 주차장 코인 주입기, 주차권, 주차관련산업,
- 사고소멸로 중앙선가드레일, 주행선 표시 페인트, 16차선 등 도로 확장공사,
- 무인자동차로 현금소멸, 고속도로 아가씨, 톨게이트, 주유소, 자동차 세일즈맨 , 자동차대리점 소멸
- 음주운전 소멸, 음주운전 대리운전사 소멸, 스마트도로로 눈 치우는 염화칼슘 소멸, 도로 인프라 소멸, 자동차제조업체 소멸, 자동차렌탈 회사로 변화, 자동차 면허증 소멸, 자동차 면허시험장 소멸
- 무인자동차관리인, 무인자동차 렌탈서비스산업, 무인자동차수리공, 무인자동차용 청정에너지산업, 무인택배서비스, 무인자동차용 기기 및 장비산업. 무인자동차 콜센터, 무인자동차를 부를 때 개인정보를 처리하는 솔루션, 무인자동차 교통체계 운행 솔루션 프로그램. 무인자동차와 사람을 연결시켜주는 네트워크 시스템 모바일 어플 들, 무인자동차 사용 지불시스템

Flying car

Moller Int’l

Terrafusia

독일
나르는 자동차
2015. 4. 27

꿈의 신소재 그래핀

생명공학의 발전

Researchers from the University of Manchester and University of She ffield have developed a new prototype semi-transparent, graphene-b ased LED device. 2015. 2.3

그래핀

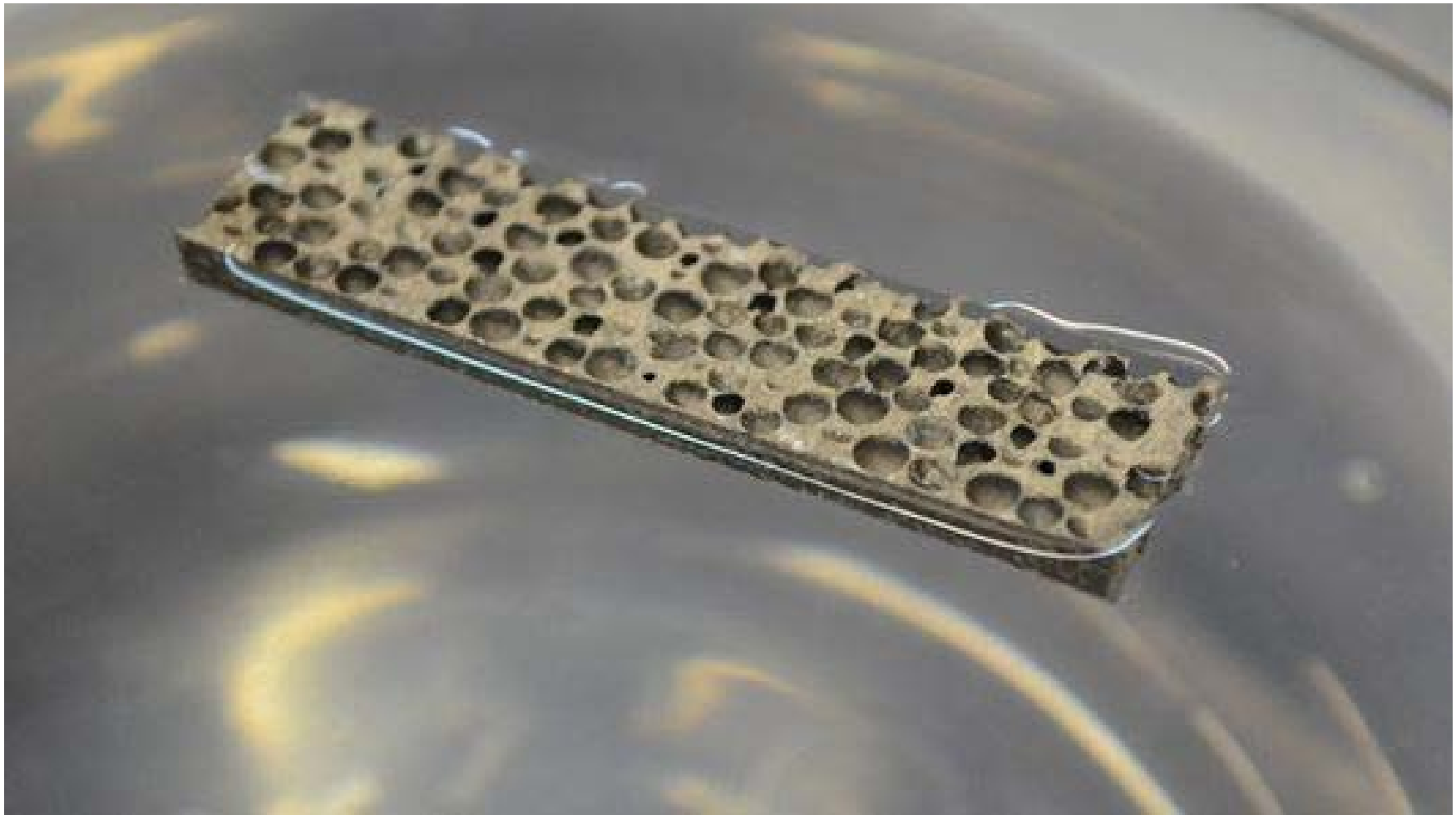
Researchers from the University of Manchester and University of Sheffield have developed a new prototype semi-transparent, graphene-based LED device that could form the basis of flexible screens for use in the next-generation of mobile phones, tablets and televisions. The incredibly thin display was created using sandwiched "heterostructures", is only 10-40 atoms thick and emits a sheet of light across its entire surface.

- **University of Manchester in the UK has been at the forefront of graphene research ever since Andre Geim and Konstantin Novoselov fabricated the single atom-thick sheets of carbon back in 2004. The new substance won its discoverers the Nobel Prize in 2010 and is held out as one of the great finds of the 21st century.**
- Manchester University is now pressing ahead with plans to build a multi-million pound centre for graphene research and development. The £31m building project will create a national institute of graphene research and commercial development with both researchers and businesses will have access to the facility. The Government is backing the building project, which it hopes will allow Britain to reap the commercial benefits of the discovery.
- Up to 200 times stronger than steel and just one atom thick, graphene is the strongest and thinnest material ever measured, and also the world's most conductive material. It has a wide range of potential uses, including electronics, flexible touch screens, sensors and composite materials.

진공자기부 상열차

하이퍼루프
3천km로 달려

Deep Springs Technology (DST) and the New York University Polytechnic School of Engineering have created a new metal matrix composite that is so light it can float on water. In addition to having potential marine applications, the material would be suitable for use in automobile components. 2015. 5. 19



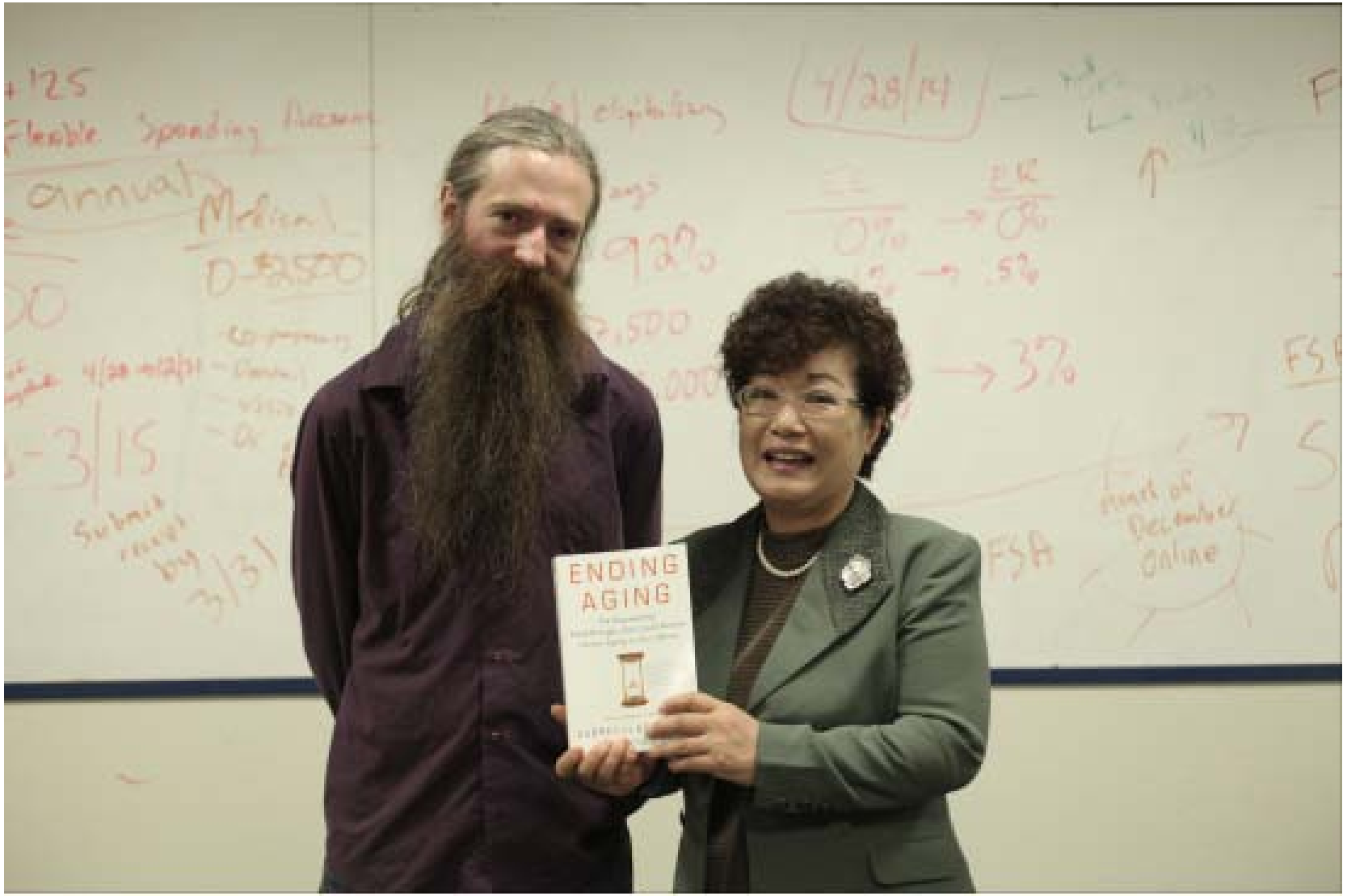

'SPACE TRAVEL ON EARTH'


'SPACE TRAVEL ON EARTH'

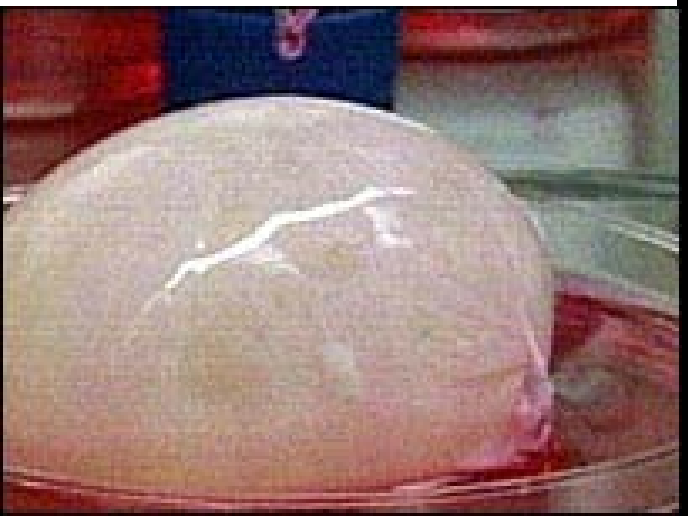
수명연장

무엇을 준비해야 하나?

SENS Foudnation 오브리 드 그레이 박사, 영생학자 (500억원)



장기프린트



건물 프린트 4D 프린터

-주택 무료

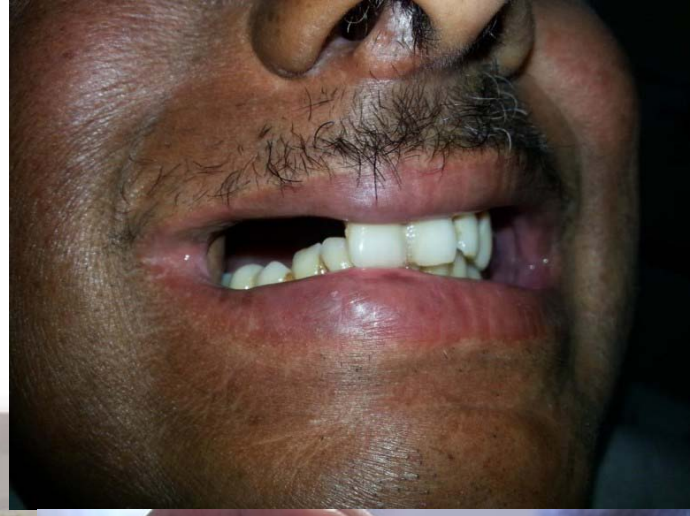
24시간내 5백만원, 건물 프린트

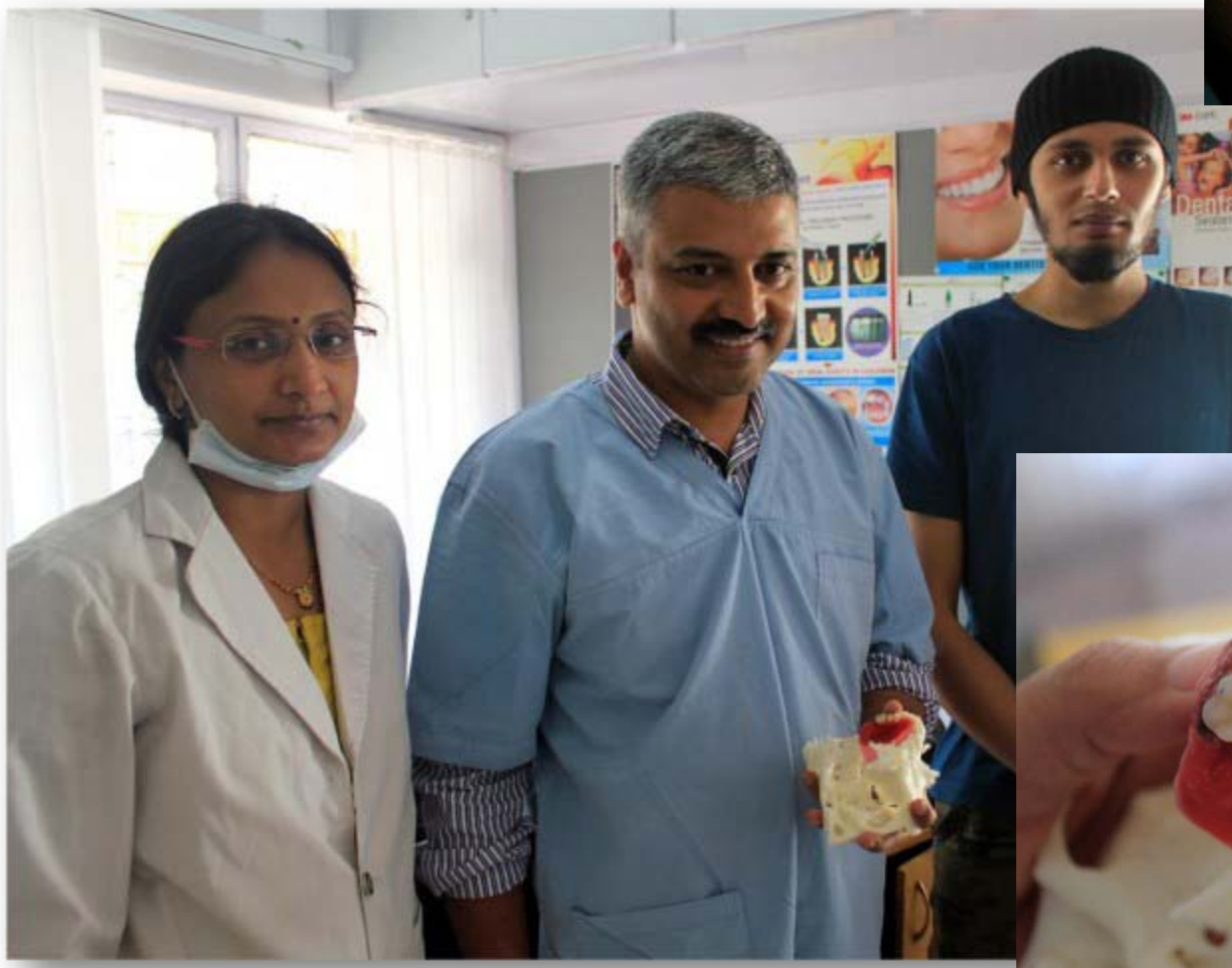
BetAbram 슬로베니아건설기업 1200만원, 3200만원짜리 주택3D프린터기 판매 시작 2014.12.31.

현실화된 예언: 3D프린터

서구 제조업 완전소멸 2039년

3D-printed car and munching on 3D-printed chocolate before returning to a 3D-printed home. Replacing cancerous vertebra, delivering cancer-fighting drugs and assisting in spinal fusion surgery





Dutch fashion designer Iris van Herpen showcased shoes that looked like works of abstract sculpture for her Haute Couture Fall 2013 collection in Paris.

네델란드 패션디자이너 아이리스 밴 하펜,

2013년 가을 파리 콜렉션