

Notes from the Edge

Insights into an Evolving Future



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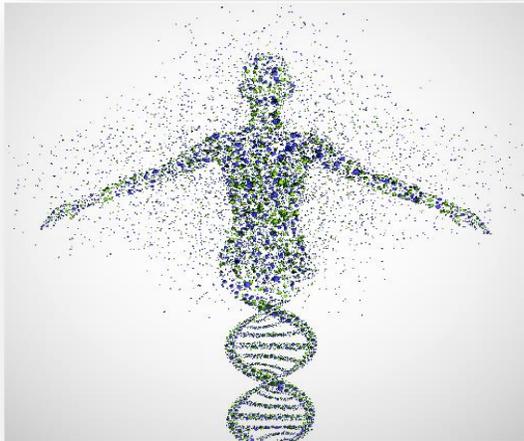


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HUMAN 3.0

What 2,500 Sequenced Genomes Say About Humanity's Future. In 2003, the Human Genome Project published the first complete map of the human genome. In 2007 geneticists Gonçalo Abecasis and Adam Auton began the 1000 Genomes Project to sequence 1000 genomes from people all over the world. After 8 years and exceeding their goal with 2500 human genomes sequenced from 26 distinct groups of people, the project has come to an end. What the project showed is that humans are all much more alike than different. The 1000 Genome effort has been an early step toward looking at human genetic variation and leading the way to personalized medicine based on someone's particular genomic makeup.

Humanity's Future

A New Way to Fight Aging in the Brain. For the first time, scientists can take skin cells from people of various ages and transform them into brain cells reflecting the ages of their donors. In the past, scientists have created neurons in a dish using stem-cell technology, but those efforts produced the equivalent of embryonic neurons. Our brain cells change with age: various genes become more or less active, the membrane that holds the nucleus together starts to degenerate, and molecules that in young cells are neatly compartmentalized become scattered and disorganized. Now scientists have found a way to transform ordinary skin cells into living cultures of aging human neurons—opening up new avenues for studying aging, age-associated diseases, and the possibility that drugs might stave off what was once inevitable. Extended viability and productivity in aging populations could alter current social and economic assumptions concerning aging societies.

Fight Brain Aging

Ray Kurzweil: In The 2030s, Nanobots In Our Brains Will Make Us 'Godlike'. Futurist and inventor Ray Kurzweil predicts humans are going to develop emotions and characteristics of higher complexity as a result of connecting their brains to computers. Kurzweil predicts that in the 2030s, human brains will be

able to connect to the cloud, allowing us to send emails and photos directly to the brain and to back up our thoughts and memories. This will be possible, he says, via nanobots—tiny robots from DNA strands—swimming around in the capillaries of our brain. He sees the extension of our brain into predominantly non-biological thinking as the next step in the evolution of humans—just as learning to use tools was for our ancestors.

[Nanobots in Our Brain](#)

DEMOGRAPHICS

Population: How Many People Will Live in Africa in 2100? Africa is rising fast, at least demographically. Today, the continent is home to more than a billion people. The UN, for its part, predicts that the continent's population will double by 2050—and then double again by the end of this century, to make it a continent of more than 4 billion. According to projections at the Wittgenstein Center, projecting population by age, sex, and educational attainment for almost all countries of the World, Africa's population may only rise to some 2.6 billion by 2100. That number is only 60% of the 4.4 billion predicted by the UN. Population projections mostly depend on two factors; the number of children per woman and, the chance of those children to survive.

[Africa's Future Population](#)

Why the World Economy as We Know It is About to be Turned on Its Head. The author of this article explains how the world is in for a rude shock as labor costs and savings decline. Since the 1970s, low birth rates and longer life-expectancies resulted in a one-off sweet-spot that was further enhanced by the Soviet collapse and the opening up of China. Now, however, China is becoming more expensive, the yuan is overvalued, and global birth-rates have declined further. Experts believe laborers will be few and profits low due to rising manpower costs. In China alone, the one-child policy has already shrunk the workforce by three million people every year. The shrinking manpower will lead to high inflation as China will not be able to invest externally and the elderly will have to tap their savings. Experts feel robots will not make up for the ageing population fast enough, and that India and Africa will not be able to replicate China's effect on the world economy. We are facing a new challenge as the world has never before faced an ageing population of this magnitude.

[Demographic Economics](#)

RESOURCE COMPETITION

Future of Food: How We Grow. In response to the impending threat to food security as the world population grows, producing food more efficiently and more sustainably becomes a more pressing challenge. *The Guardian* highlights a couple of the latest innovations in farming:

- **Vertical farming.** Steve Fry, head of hydroponics hardware firm HydroGarden, believes it is the next step in reforming the wasteful, polluting, oil-dependent aspects of the farming industry, and preparing for future threats to food security. According to Fry, products grow faster via vertical farming as opposed to traditional methods. Although he admits that this method is limited to salads and small vegetables, and not staple crops. Nevertheless, vertical farming uses significantly less water and energy, and requires no pesticides or fungicides. Fry postulates that it is important to change the mindsets of modern agriculture, as we need to start growing crops in peri-urban environments.
- **Driverless farming.** The technology for fully automated and connected precision farming is thriving in the U.S. and coming to Europe as big data, machinery, climatology and agronomy are all combining to increase productivity and reduce labor costs. What was developed for very big farms is now applicable to mid-sized ones.

[Future of Food](#)

TECHNOLOGY

Seven Emerging Technologies That Will Change the World Forever. The author highlights seven current emerging technologies that are set to change the world forever:

1. **Age Reversal.** 2025 will be marked by the emergence of true biological age reversal.
2. **Artificial General Intelligence.** By 2020, we will see AI in factories, hospitals, restaurants and hotels around the world.
3. **Vertical Pink Farms.** Vertical Pink Farms require less water, less energy, and will enable people to grow food underground or indoors year round in any climate.
4. **Transhumanism.** By 2035, a majority of humans will be technically become Transhuman. Digital implants, mind-controlled exoskeletal upgrades, age reversal pills, hyper-intelligence brain implants and bionic muscle upgrades will continue our evolution as humans.
5. **Wearables and Implantables.** Smartphones will fade into digital history as the high-resolution smart contact lens and corresponding in-ear audio plugs communicate with our wearable computers.
6. **Atmospheric Water Harvesting.** Atmospheric Water Harvesting could save arid parts of the world from severe drought and possibly change the techno-agricultural landscape in the future.
7. **3D Printing.** A new Field Guided Fabrication 3D printer called ELECTROLOOM enables anyone to create seamless fabric items on demand.

[Forever Changing the World](#)

MARINE CORPS SECURITY ENVIRONMENT FORECAST

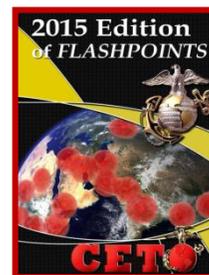
The 2015 *Marine Corps Security Environment Forecast: Futures 2030-2045* as announced in [MARADMIN 387/15](#) is open for public release and is available for download at the FAD website below:



[Futures Assessment Division - MCSEF](#)

FLASHPOINTS 2015

The 2015 edition of Flashpoints provides the results of our most recent analysis of factors associated with a nation's risk for conflict. It also provides an updated ranking for the 159 nations included in the study based on each nation's potential to experience future conflict or instability. This effort included extensive research, review, and analysis of several global patterns and trends related to the potential for instability and armed conflict. This work was conducted through a prism defined by rapidly occurring actions, events, and decisions with potentially significant regional and global implications, challenges, and opportunities. This is the tenth annual edition.



[Futures Assessment Division - Flashpoints 2015](#)

This newsletter is intended to highlight issues and ideas which may prove significant in the evolving future. In keeping with our focus on both alternative futures and analysis, items in this bulletin will generally be of an alternative nature, or drawn from atypical sources.