



# Notes from the Edge



## Insights into an Evolving Future

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### BIOHACKING

As we've presented in previous editions of *Notes From The Edge*, [CRISPR-Cas9](#) technology has the potential to be a truly transformative, if not completely disruptive, technology. The first article linked below looks at the recent first human trial conducted in Chengdu, China, on a patient with aggressive lung cancer. The second article below considers the legal landscape to suggest where the world's first CRISPR baby could be born. Finally, the third linked article looks at how a group of scientific advisers are urging the U.S. government to adopt a new biodefense strategy against CRISPR and other related medical techniques (*Ed: The link to the original letter is in the article and it's worth a read*).

[First Human Trial](#)   [Is your baby a CRISPR baby?](#)   [Biodefense Strategy](#)

**Turning back the aging clock.** Researchers from Caltech and UCLA have developed a new approach to removing cellular damage that accumulates with age. The team developed a technique to remove mutated DNA from mitochondria, the small organelles that produce most of the chemical energy within a cell. The accumulation of mutant mitochondrial DNA (mtDNA) over a lifetime is thought to contribute to aging and degenerative diseases of aging such as Alzheimer's, Parkinson's, and sarcopenia—age-related muscle loss and frailty. Inherited defects in mtDNA are also linked to a number of conditions found in children, including autism. The team found that when they artificially increased the activity of genes that promote mitophagy, the amount of mutated mtDNA was dramatically reduced.

#### [Turning Back Time](#)

**Hi-tech skin patch might someday track your health.** A new type of acoustic sensor that resembles a small Band-Aid on the skin can monitor your heartbeat and other health measures, researchers say. The sensor may one day offer a way to painlessly and wirelessly track an individual's health. The patch, which weighs less than one-hundredth of an ounce, can help doctors monitor heart health, stomach

condition, vocal cord activity, lung performance, and potentially many other bodily functions. The research team behind this latest example of so-called "epidermal electronics" says the patch is both soft and thin. Its silicone core construction is intended to comfortably match the pliable feel of skin tissue. That makes it easy to adhere and wear anywhere on the body. [Monitoring Your Vitals](#)

## TECHNOLOGY

**What Artificial Intelligence Can and Can't Do Right Now.** Artificial Intelligence has the potential to disrupt and transform many industries, but it's not magic. A lot of valuable work currently done by humans—examining security video to detect suspicious behaviors, deciding if a car is about to hit a pedestrian, or finding and eliminating abusive online posts—can be done in less than one second. These tasks are ripe for automation. However, they often fit into a larger context or business process. The ability for AI to cut through those more complex processes is a little farther away in the future.

[Artificial Intelligence of Today](#)

**The world's computer code is fundamentally imperfect and likely sexist.** The two linked articles below look at the code that drives our computerized world. For all their wondrous actions, computers are still GIGO (garbage-in-garbage-out) machines. Until code can write itself, programming will continue to be done by imperfect humans. Also, new research shows that subtle gender bias is entrenched in the data sets used to teach language skills to AI programs. The problem results from the way machines are being taught to read and talk. As chatbots, translation systems, image-captioning programs, and recommendation algorithms become more capable and widespread, their sexist point of view could have negative consequences – in job searches, for instance.

[Programming by Imperfect Humans](#)   [Sexist Programming](#)

**Murder in VR Should Be Illegal.** Science-fiction writers have fantasized about virtual reality (VR) for decades. Now it is here—and with it, perhaps, the possibility of the complete physical experience of killing someone, without harming a soul. But this new form of entertainment is dangerous. The impact of immersive virtual violence must be questioned, studied, and controlled. The author argues that before it becomes possible to realistically simulate the experience of killing someone, murder in VR should be made illegal. [VR Murder](#)

## FORECASTING/BACKCASTING

**Lessons from 200 Years of Failed New York City Megaprojects.** History's biggest failures offer a few hints for the present. This article highlights examples of this idea from architecture writers Sam Lubell and Greg Goldin's 2016 book, *Never Built New York*. The book chronicles conceptual plans for everything from skyscrapers, to pneumatic subway systems, and utopian housing plans; all of which failed to make the jump from paper to reality. [Lessons From Failed Megaprojects](#)

## DEMOGRAPHICS

**Demographic Destiny: 2050.** The year 2050 is right around the corner, and yet it is hard to imagine the sweeping changes the world will confront by then. In this multimedia series, *The Wall Street Journal* helps readers envision how we will work, how we will age, and how we will live. [2050 World](#)

**What the U.S. map should really look like.** A pair of researchers from Dartmouth College and the University of Sheffield looked at demographic and commuting patterns in the United States. They created maps of what they call economic "mega-regions" — cities, satellite cities, towns and suburbs that are woven together into the communities where Americans live, work and spend their free time. The researchers argue that these, rather than the current states, are the real units that make up the U.S. economy. [What the U.S. Map Should Really Look Like](#)   [Original Mega-Region Study](#)

**Future immigration will change the face of America by 2065.** According to a new Pew Research Center projection, a snapshot of the United States in 2065 would show a nation that has 117 million more people than today, with no racial or ethnic majority group taking the place of today's white majority. About one-in-three Americans would be an immigrant or have immigrant parents, compared with one-in-four today. The projected changes in population makeup could have implications in a variety of realms, changing the face of the electorate, raising the education levels among the foreign-born population, and altering the nation's birth patterns. [2065 America](#)

## MILITARY TECHNOLOGY

**Separating Fact from Fiction in the Debate over Drone Proliferation.** The authors make the case that claims that drones will soon remake warfare or international politics are unwarranted. Although almost a dozen states now possess armed drones, and more are racing to acquire them, they will not play a decisive role in interstate conflicts. Drones will rarely be "winning weapons," because they are vulnerable to air defenses. States will, however, continue to use drones against terrorists and domestic opponents. [Future of Drones](#)

**BAE Systems takes a cue from ironclad beetle to build self-repairing military suspensions.** Seeking ways to make military vehicles less vulnerable to blast damage, BAE Systems is looking to one of the toughest insects in nature—the frighteningly hard to kill ironclad beetle. The defense contractor is developing a new bendable titanium alloy suspension system that not only does away with springs, but snaps back into shape after taking on landmines. BAE engineers say that initial tests of a small-scale prototype have been successful, surviving five increasingly powerful explosive attacks. The company is now looking at developing the technology for full-size vehicles that militaries could field within a decade. [Lessons From a Beetle](#)

**DARPA: OFFSET Envisions Swarm Capabilities for Small Urban Ground Units.** To help overcome the challenges small-unit combat forces face while operating in dense urban environments, DARPA has launched its new OFFensive Swarm-Enabled Tactics (OFFSET) program. OFFSET seeks to develop and demonstrate 100+ operationally relevant swarm tactics that could be used by groups of unmanned air and/or ground systems numbering more than 100 robots. DARPA aims to provide the tools to quickly generate swarm tactics, evaluate those swarm tactics for effectiveness, and integrate the best swarm tactics into field operations. [Small-unit Urban Swarms](#)

## ECONOMICS

**What is the future of free trade? 5 facts about US trade policy.** What do the independent data and research tell us about free trade and what it actually means for American workers? In several new policy briefs and posts, Brookings experts have addressed these questions and others to help provide guidance for the new administration. The linked article discusses five facts derived from their research about the current state of free trade in the United States. [Future of Free Trade](#)

**21 Areas of Blockchain Application Beyond Financial Services.** As long-time *NFTE* readers have seen, blockchain technology has the potential to change the way all types of monetary transactions are made and to undermine the existing global currency markets. Despite mostly finance-related interest in blockchain technology, the areas of distributed ledger technology (DLT) application are not limited to the financial services industry. Along with banks and financial technology (FinTech) startups, non-financial players have been paying attention and looking for ways to leverage the opportunities that DLT opens. The article linked below looks at some interesting examples of the application of blockchain technology beyond financial services. [DLT Application](#)

## USMC SCIENCE FICTION FUTURES

Futures Assessment Division is proud to announce the release of the *Science Fiction Futures*, a supplement to the 2015 MCSEF. The project began earlier this year in coordination with the Atlantic Council [Art of the Future Project](#). This product is the work of many people, both in and out of uniform, who generously donated their valuable time and creative talent to see it to completion. The next step is to consider the implications of this imaginative journey for future Marine Corps force development and operating concepts. Then, through Wargaming, Science & Technology investment, and live force Experimentation, test and improve force design and those future concepts. Both the *Science Fiction Futures* anthology and the MCSEF can be found at the link: [Futures Assessment Division](#)



*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.*