

# Silicon Valley Health Institute

Host of the Smart Life Forum

**Next Meeting: Thursday, April 20, 2017**

**Main Presentation: Andrew Campbell, MD**  
*“Toxins”*

**Second Presentation: Bernd Friedlander, DC**  
*“Diet and Health”*

**With a Bonus Article by Rob Baum**  
*“The Future of Health Technology”*



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*Meet Bernd Friedlander*  
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## Smart Life Forum

### Presentation Location

Cubberley Community Center

Room H1

4000 Middlefield Road

Palo Alto, California

Directions on our website:

[www.SVHI.com](http://www.SVHI.com)

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## Announcements & Upcoming Events

### Upcoming Speakers:

MAY 2017

Tom O'Bryan  
"Autoimmune Fix"

Rina Valia & Selor Albin  
"Homeopathy; an Option for Depression  
and Anxiety in Teens and Adults"

JUNE 2017

Cyrus Raji, MD, PhD  
"Brain Health and Imaging"

JULY 2017

Kitty Wells  
"Spices as Nature's 'Designer Drugs'  
for Longevity"

AUGUST 2017

Steven Drucker - "GMO"

SEPTEMBER 2017

Akil Palanisamy, MD  
"How to Keep the Brain Young"  
Sergio Azzolino, DC

### Upcoming Foundation for Mind Being Research Meeting (FMBR)

Friday, April 28, 2017 @ 7:30pm

Russell Targ

Unity Community Church  
Y.E.S. Hall

3391 Middlefield Rd, Palo Alto, CA

Please visit [www.FMBR.org](http://www.FMBR.org) for more info.

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Thank you.

## ***Main Presentation Speaker: Andrew Campbell, MD!***



Andrew Campbell, MD was the Medical Director of the Medical Center for Immune and Toxic Disorders in Woodlands, Texas (2000-2010) and the Medical Director of Chronic Fatigue and Immune Dysfunction Center in Houston, Texas (1990-2000). Both of these clinics treated patients from all over the world. Dr. Campbell was selected out of 720,000 licensed physicians to win the Patient's Choice Award 2009-2014. He also won the Most Compassionate Doctor Award (2011); International Health Profession of the year for the Outstanding Contribution to Clinical Toxicology", Cambridge, England (2005). Dr. Campbell is the Editor-in-Chief of several journals including *Alternative Therapies in Health and Medicine*; *Advances in Mind-Body Medicine*; *The International Journal of Complementary and Alternative Medicine*; and *Natural Solutions*. He speaks French, Spanish, Hungarian fluently and has conversational ability in Arabic and German.

*(End of Meet Andrew Campbell!)*

## Main Presentation by Andrew Campbell

### Article Written by Susan R. Downs

#### *“Toxins”*

Toxins are everywhere. They are in our personal care products, cleaning products, sofas, carpets, and clothes. Before a woman leaves the house she might have put on over one hundred toxic products. Most of these toxins have not been studied for their safety, and cause harm at doses lower than previously thought. They are synergistic causing greater harm when combined.

The US manufactures 70,000 different chemicals and makes five trillion pounds of toxins. Only 1500 of these toxins have been studied for toxic effects. Also in the US, 2.3 billion pounds of pesticides are produced and only 10 % of these pesticides have been studied for toxicity.

All US persons are exposed to at least 150 chemicals.

#### **EXAMPLES OF TOXINS**

- Gas fumes
- Fragrance candles
- Plug in sprays
- Fire retardant chemicals
  - New car smell
  - Airline interiors heavily sprayed
  - In curtains, bedding materials, clothes (especially clothes for children)

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- Toxins in the Home
  - Carpeting
  - Artificial flooring
  - Synthetic materials and fibers
  - Many release formaldehyde
- Building materials
  - Plywood and gypsum, foam insulation in attic
- Personal Care
  - Toothpaste, perfume, cologne, shampoo, cosmetics
  - Toothpaste tube states if one teaspoon is consumed, poison control center should be called.

## **SPECIFIC TOXINS**

### ***Bisphenol A (BPA)***

- Interrupts hormones (endocrine disruptor thyroid, estrogen, testosterone)
- In paper commonly used for receipts
- In plastic bottles
- Canned goods are coated with BPA
- Used in dentistry as a sealant
- Connected with diabetes, obesity, heart attacks, cancer, infertility
- Is neurotoxic
- Is found in 96% of individuals per one study
- There are Bisphenols A through U.
- Don't believe marketing ploys emphasizing newer bisphenols because they are harmful as well.
- A Harvard study in the Journal of the American Medical Association (2011) shows 6 ounces of canned vegetable soup for 12 days increases body BPA by 1200%

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- US government finally told manufacturers of children teething materials and bottle nipples to remove BPA
- Use glass for cooking, storing, and freezing
- Plastic in microwave create more toxins

### *Fluoride*

- There are no solid studies connecting fluoride with stronger teeth and cavities
- If fluoride helps teeth topically, the results of ingesting fluoride are not clear.
- It is not clear why children should have the same dose as adults.
- Interferes with thyroid function
- Increases the risk for bone fracture
- Associated with neurochemical changes
- The American Medical Association and the American Dental Associations endorse fluoridating water.

### **METALS**

#### *Nano Metal Particles*

- Metals does not refer only to steel or aluminum
- Nano particles in what we use – tiny; “nano” = one billionth of a meter in length.
- We produce 15,600 tons of titanium dioxide which makes things white and is used in white paint, horse radish, make up and tooth paste.
- The US makes 300 tons of cerium dioxide annually which is found in drinking water, tooth paste cosmetic, sunscreen and many personal products

#### *Lead*

- Correlated with ADHD, lower IQ
- In lipstick, glass ware, tooth paste, pre 1978 paints
- Used to be in gasoline

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### *Aluminum*

- In most vaccines and underarm deodorants
- Linked to Alzheimer's Disease
- This accumulates in the body, which can not get rid of it
- Dr. Campbell sees younger and younger patients with Alzheimer's Disease

### *Mercury*

- Is a hazardous material placed in teeth fillings
- Seeps out and can go into the brain
- EU passed a law that mercury cannot be put in a child under age 15.
- Removing mercury fillings has resulted in anecdotal improvement in many conditions including migraines, asthma and intestinal issues
- Extreme care must be taken to remove mercury filled fillings.

## **TOXINS IN FOODS**

### *Pesticides*

- Stay in body, fat, muscle, bone, brain, liver
- On lawns, playgrounds, parks
- Use more pesticides each year in US than the rest of the world combines
- The wind can blow pesticides to organic produce
- Pesticide residues found in cereals cheerios, corn flakes, and kasha
- Kills honey bees
- Cause inflammation in gut, intestinal tract
- Causes intestinal permeability ("leaky gut syndrome")
- This inflammatory material and chemicals spread through out body
- Associated with cancer, Alzheimer's Disease, neurological disorders, reproductive problems, IBS (Irritable Bowel Syndrome), pain and confusion.

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- Children are twice as likely to get brain cancer in homes where their parents use pesticides, versus homes that do not use pesticides (ATSDR, Agency for Toxic Substances and Disease Registry).

**Produce Most Affected by Pesticides (The Dirty Dozen)**

Strawberries	Apples
Bell Peppers	Apricots
Cherries	Green Beans
Cantaloupes	Cucumbers
Celery	Kale, Organic Greens, Hot Peppers

**Clean List (Least Affected by Pesticides)**

Avocado	Sweet Corn
Pineapple	Cabbage
Sweet Pea	Onion
Asparagus	Mango
Papaya	Kiwi
Eggplant	Honeydew Melon
Grapefruit, Cantaloupe, Cauliflower	

**Genetically Modified Foods**

- In more than 150 US crops
- The genetic content of seed has been changed so it can be sprayed with glyphosate (Monsanto's Roundup)
- US uses more than all other countries combined
- Blocks cytochrome P 450 enzymes that detoxify toxins
- Allows all the toxins to accumulate in body
- In over 90% of corn and soy in US
- Also in wheat, beets, papayas, canola oil.

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### Chickens

- Are given hormones so they become so large that they can't get up and walk around
- Are given feed containing arsenic so that their stomachs swell and the chickens eat more.

### White Rice

- ½ cup contains the recommended maximum dose of arsenic
- arsenic also in rice syrups and rice products

### Pork

- Fed a beta agonist

### Cows

- Injected with hormones so that milk output is increased

### **OTHER COUNTRIES' REACTIONS TO US FOOD**

- EU dumfounded by inaction of US government to help public
- No country (including Russia) will buy US pork
- Canada does not want hormone laden cheese
- On March 10 show, Japan sends toxin laden coffee to US as US has no standards concerning toxins in coffee
- According to Dr. Campbell, "If you believe the government will protect us in our food, you are mistaken."

### **INFLAMMATION**

- Chronic disorders (cancer, diabetes, heart disease, depression, Alzheimer's Disease, Parkinson's Disease, ADHD) are all related to inflammation
- All forms leukemia, Non Hodgkin's lymphoma brain, bone breast, ovarian prostate, liver cancer are related to inflammation
- Inflammation is related to gut health which can lead to autoimmune diseases, depression

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- Chemicals in foods is one cause
- A leaky gut and inflammation can lead to a leaky blood brain barrier which means unwanted materials can enter the brain.
- Inflammation sets off a cascade in the brain that is difficult to stop.
- The brain is the most sensitive organ to toxins

### **WHAT CAN WE DO?**

- Don't eat or use anything with toxins discussed above
- Don't rely on the government for information.
- Can't trust community information (eg. Flint, Michigan) per Dr. Campbell
- Eat only organic produce
- Eat organic meat, not grass fed (Organic meats are inspected: grass fed farmers only have to fill out a form and are approved by mail)

### ***Don't Eat***

- Processed foods (leave a Big Mac out, it is unchanged in a year, due to preservative chemicals)
- Soft drinks
  - One drink contains 10 teaspoons sugar
  - Put a 5 inch nail in Coke: it is gone in one week
  - State police use Coke to pour on their car batteries
- Artificial sweeteners

### ***Probiotics Help***

- Yogurt is not a probiotic because pasteurization killed all the microbes
- Store bought probiotics do not contain what they advertise
- Want bacillus bacteria such as *Just Thrive*.

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### *Saunas Help*

- Skin has millions of pores to rid toxins
- Dry saunas are better than wet saunas because don't know if the water is clean
- Epsom salt baths in water containing fluoride not recommended

### **SUMMARY**

- We are exposed to different toxins
- Toxins are problematic at doses that were previously of little concern
- Our body can get rid of some toxins, but not at the high current rate of exposure.
- Toxins are synergistic in causing illness
- Toxins can lead to chronic diseases

*(End of Main Presentation)*

## *Secondary Presentation Speaker: Bernd Friedlander, DC!*



Bernd Friedlander, D.C., has a Bachelors Degree in Physical Education with emphasis in applied kinesiology from San Francisco State University, and a Doctorate of Chiropractic Degree from the Los Angeles College of Chiropractic. He has been involved in developing nutritional therapies since 1982. As result of his therapeutic formulas, he pioneered the research and use of nutrition and free form amino acids for improving athletic performance as a safe alternative to steroids.

During his career Dr. Friedlander has served as a nutritional and sports injury consultant for athletic members of track teams at UCLA, USC Berkeley, Stanford and many professional track and field athletes from all over the U.S. He has also worked with professional players from the Los Angeles Rams, Los Angeles Raiders, Los Angeles Clippers, Los Angeles Lakers and the San Diego Chargers. In 1984 he served as a chiropractor and a nutritional consultant to numerous members of the U.S. Olympic Track and Field Teams and U.S. Olympic Crew Teams.

In the ensuing years, Dr. Friedlander has also developed a number of proprietary nutritional formulas. These products are designed to maintain and promote health and longevity.

He is an experienced speaker who has lectured across the country for over 30 years on nutrition and anti-aging and has made numerous TV and radio appearances. He has written sports and nutritional articles and has given interviews for numerous magazines.

*(End of Meet Bernd Friedlander!)*

## Secondary Presentation by Bernd Friedlander *“Diet and Health”*

Dr. Friedlander’s talk will cover the importance of diet to prolong life and quality of health through a variety of biochemical repair mechanisms. Proteins that are high in the amino acids proline, lysine, glycine and alanine have shown in studies to extend life span, support repair, wound healing, immune function, thyroid, bone density, skin and arteries.

Collagen, a structural protein, is an ideal source of protein for the body. Other good sources of protein are bone broth and gelatin, which are also non-inflammatory.

It is recommended to reduce intake of inflammatory proteins such as tryptophan, methionine and cysteine. These proteins are commonly found in foods such as (whey protein, lean meats, chicken). While one should not completely exclude these proteins from their diet, which still offer other benefits, limited consumption is suggested. Restriction of tryptophan extended life span by 23%, by lowering Mtor (mechanistic/mammalian target of rapamycin) pathway which promotes cell growth like tumor, delays sexual maturation, and lowers IGF-1 in one study. Methionine restriction extends life span by 40% by lowering mitochondria ROS (Reactive Oxygen Species), reducing insulin sensitivity, promoting proper glucose levels, lowering IGF-1 and reducing accumulation of visceral fat. See <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4670908/>.

Reducing polyunsaturated fats such as corn oil, safflower, sunflower, and canola is important, as these oils lead to aging, via the mechanisms of glycation (bonding of a protein or lipid molecule to sugar molecule). Glycation results in a loss of elasticity of arteries (driving up blood pressure), aging skin (wrinkles), protein damage to DNA (cancer potential), and damage to the mitochondria. Mitochondria are the energy producing organelles; damage to these reduces intracellular energy, otherwise used to repair and maintain the cell.

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Adding the right forms of fats such as coconut oil, butter, cream, olive oil, and palm oil, encourages good health by supporting cognitive function (the brain is mostly fat and cholesterol). Good fats also support myelin, nerves, neurons, and hormone synthesis - since cholesterol is the source material for the body to create hormones. (Perhaps another reason to think carefully before taking a statin drug).

Glucose is fuel for the body, so there is no need to fear sugar, but it's important to avoid the wrong sugars, and sugar in excess. Sugar from fruit, honey, and pure cane sugar support mitochondrial energy function.

Life span has been shown to increase in those that can maintain a high metabolic rate, as well as optimizing the NAD/NADH ratio. An optimal NAD/NAH ratio also reduces aging and disease. Raising NAD+ levels are beneficial against fighting diseases, slowing and possibly reversing the aging process. DNA is damaged thousands of times during each cell cycle, and that damage must be repaired. NAD+ is consumed when repairing DNA damage.

Poly (ADP-ribose) polymerase (PARP) is a family of proteins involved in a number of cellular processes such as DNA repair, genomic stability, and programmed cell death (apoptosis). When a cell becomes damaged, it is better the bad cell dies and allows new cells, stem cells, to take its place. PARP inhibitors are used in some cancer treatment protocols because several forms of cancer are more dependent on PARP than regular cells.

Damaged cells may be removed through a process called autophagy and inhibitors of PARP will preserve the NAD+ levels, and facilitate autophagy. Autophagy allows the orderly degradation and recycling of cellular components. In the process of autophagy, parts of the cell slated for recycling, are surrounded in a double-walled vesicle and then broken down into its constituent parts. Those parts may then be re-used by the cell to rebuild new structures and proteins.

Raising CO2 levels and lowering lactic acid (of potential use in cancer) is also important in maintaining health. CO2 levels are boosted by nutrients such as B1 (thiamin), B6 (pyridoxine), Biotin, B3 (Niacin) and the hormones thyroid and progesterone.

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Dr Friedlander will discuss the best forms of protein, fats, and carbohydrates, and the best forms of exercise. Dr Friedlander will review the nutrients that support epigenetic factors, good genes vs. bad genes and how to control them from switching on and off. The genes which control cardiovascular disease, cancer, diabetes, arthritis, Alzheimer's disease, Parkinson's disease, cognitive and longevity are inherited, but lifestyle choices can turn many of them on or off. Genetics are usually not destiny, because the phenotype (genetic expression) matters most. We have control, to some degree, over our phenotypes through diet, lifestyle, exercise, sleep patterns and mindset.

*(End of Secondary Presentation)*

## **Bonus Article by Rob Baum**

### *“The Future of Health Technology”*

CES 2017 — The Future of Health Technology

© Rob Baum (Principal, Pacific Audio Consulting; Rob.Pacific.Audio@Gmail.com)

[A version of this report was originally published in The BAS Speaker — the print journal of the Boston Audio Society; [www.BostonAudioSociety.org](http://www.BostonAudioSociety.org).]

This was the 50th-anniversary of the Consumer Electronics Show (CES), as the first show was held in June 1967, with 117 exhibitors covering 100,000 square feet. 17,500 attendees came to New York City to see radios, stereos, and black and white televisions. In 1967 New York was a technology center — the center of print and radio/television broadcast networks that completely dominated the media. A lot has changed since 1967, as technological innovation has shifted to the West Coast and consumer electronics manufacturing has largely left the US for China. American companies have been building products in China (and other places) for decades; the flip side of getting products built with low-wage labor is technology transfer to China. This CES marks the rise of Chinese brands, a trend that has been clearly coming since Lenovo bought IBM's PC/laptop business in 2005.

Today, legacy media (ABC, CBS, NBC, CNN, Fox, the New York Times, Washington Post, etc) have lost their grip with collapsing audiences, as the internet offers streaming audio, video, tweets and podcasts on any subject (such as health). Internet based media is often not dependant on traditional advertising by Big Pharma, and direct connection via social media to friends and thought leaders permits interesting news to “go viral” and spread, by-passing traditional “gatekeepers”.

CES has become a huge and successful show, this year with more than 3,800 exhibitors, 165,000 attendees and 2.6 million square feet of exhibits, many of them new (20% of the exhibitors did not even exist three years ago). However, we did see the continuation of some underlying megatrends from earlier CESes and other trade events. The rise of health tech, in the hands of the patient, continues to accelerate as consumer versions of medical devices

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makes its way to smart phones and homes around the world. Voice control continues to expand into many devices, beyond phones, to “smart homes” filled with “Internet of Things” devices ( IoT; i.e., devices connected to the internet and each other, usually wirelessly).

Smart homes will generate \$3.5 billion in revenue (+57% from 2016) and ship 29.2 million devices in 2017 (up 63% from last year). This market still lacks a 'killer app' — a compelling reason many people feel the need to go out and get a smart home — and suffers from severe security vulnerability (like smart phones/TVs), as detailed in the Wikileaks “Vault 7” documents. IoT also has to overcome a lack of interoperability. <https://wikileaks.org/ciav7p1/>  
<http://www.wired.co.uk/article/cia-files-wikileaks-vault-7>

Note: All sales and unit projections are for 2017 in the USA, from the Consumer Technology Association (CTA; sponsor and producer of CES).

### ***FOCUS ON ENTREPRENEURS***

CES is actually several significant consumer trade shows rolled into one. CES always offered a platform for new products, but Eureka Park takes that to a whole new level. Eureka Park, started in 2012, is the largest start-up marketplace anywhere, completing the ecosystem spawned by Kickstarter, Indiegogo, and other sites that allow the public to “vote with their money” to decide which new consumer product ideas get financed (a function once exclusively performed by angel, venture, government and corporate investors). Eureka Park allows the public, press, buyers, distributors, business people and a herd of global investors to see and touch products and meet the founding teams face to face; there is no substitute for an in-person meeting and hands-on time with a new idea and team. Eureka Park has grown 16% since last year, to encompass 600 exhibitors and generating \$1B in funding. Many of the startups in Eureka Park have a health focus. Thus Eureka Park can also be seen as a business accelerator for innovating tech startups from around the world who have taken advantage of the components and technologies (sensors, ICs, wireless, displays, software) developed by larger, more-established firms.

### ***SMARTPHONES***

About 183 million smartphones are expected to be sold this year (+3% over 2016) for \$55.6B (+2%). Virtual/augmented reality continues to expand rapidly, albeit from a small base (2.5 million units forecast for 2017 — +79%, ~\$660 million revenue — +43%). Health/

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fitness and its tracking through handheld devices and software continue to expand (31.7 million units — +22% — are expected to be sold in 2017, for \$2.6B — +24%).

### ***VOICE INTERFACES***

Proliferation of voice interfaces continues to accelerate via Amazon Alexa, as well as with competing ecosystems from Google, and potentially Apple and others. Amazon's Alexa Voice Service (AVS) and Alexa Skills Kit (ASK) are available to developers for integration into IoT designs. The struggle among leading contenders and a few other smaller firms with interesting technologies will take a few years to play out. For cars, voice interfacing means the driver can keep his eyes on the road; Ford announced cooperation with Amazon at the show. In the meantime, the infrastructure to support smarthomes and a truly interconnected mesh of IoT devices in the home continues to rapidly develop: Bluetooth and Wi-Fi. Currently, homes might have multiple networks running and still have dead spots or poor coverage, and an inability to cover outdoors (for example to connect to a security camera).

### ***LOCAL MESH NETWORKING IN THE HOME***

**Bluetooth** ([www.BlueTooth.com](http://www.BlueTooth.com)) uses lower power and exhibits lower latency than Wi-Fi. If Bluetooth meshes proliferate, and interoperate, this becomes a challenge to the more closed home control systems as no hub or special protocol is required. Thus Bluetooth might compete against Z-Wave ([www.Z-Wave.com](http://www.Z-Wave.com)) and ZigBee ([www.ZigBee.org](http://www.ZigBee.org)). Bluetooth has another advantage: it radiates less power. There is a theoretical (nonthermal, nonionizing) health risk from wireless networking's RF transmissions throughout the house. It can't be healthy to constantly bathe in radio frequency electromagnetic radiation, be it Wi-Fi, Bluetooth or cellular. Many people still hold their phones next to their heads when they talk, or use a headset and leave their phones (the transmitter) in their pants pocket. Bluetooth and Wi-Fi are short range systems, but a cellphone must transmit to a tower that could be several miles away, so it has to radiate more power (roughly one watt, a nontrivial amount if the transmitter is placed directly against the head).

At an office or coffee shop we expect to get bombarded with Wi-Fi, but at home we at least have the option to shut off Wi-Fi, for example in the evening. There were a variety of smaller companies selling protection against this unwanted radiation — a few years ago it was a firm selling RF-blocking clothes for pregnant women. This year, Spartan (<http://Spar->

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[tanUnderwear.com/en/home](http://tanUnderwear.com/en/home)) was selling RF-blocking underwear for men (\$45, three for \$125), made with silver thread. There are several firms selling these products on Amazon, one claiming up to a 60dB drop in RF energy (99.9% shield from 10MHz-3GHz; great if true).

Bluetooth 5 was rolled out, which offers increased range and bandwidth and should translate into better audio if the rest of the system (transmit and receive antennas) is properly designed. Bluetooth 5 supports a mesh network, where signals are passed through a home from device to device, perhaps using repeaters for better coverage. Wi-Fi is also moving to a mesh configuration for better in-home coverage, with many product introductions.

For example, **Linksys**' ([www.LinkSys.com/us](http://www.LinkSys.com/us)) Alexa-compatible **Velop** Wi-Fi mesh (\$200 for a single unit, \$350 for two and \$500 for three routers). Or **eero** (<http://Eero.com>; \$200), which introduced mesh Wi-Fi last year. Other mesh Wi-Fi vendors include Google Wi-Fi (<http://MadeBy.Google.com/wifi>; three units for \$300) and **Netgear's Orbi** (<http://NetGear.com/home/products/networking/orbi>; two units for \$380).

### **EARPHONES & HEALTH**

Headphones were exhibited by the usual companies, plus a few new ones. Most notable was the stretching of the category to add new functions, typically health related, using a variety of head-attached biometric sensors that permit monitoring a variety of parameters from heartrate to brainwaves.

**Muzik One** wireless headphones (“the Smartphone of Headphones”; \$300; [www.MuzikConnect.com](http://www.MuzikConnect.com)) illustrates another trend, where the user interface is expanding to include voice control, touch gestures and customizable hotkeys on the earcups. The user can, for example, control his Spotify stream directly from the headphones. This model also features interchangeable ear cushions (on-ear for small and over the ear for large).

In what is referred to as the emerging “hearable” category, there were several new products. Hearables look like big ear buds, combining noise cancellation, some of the functionality of a hearing aid (meaning signal processing to improve speech intelligibility under a variety of conditions) with the ability to play back relatively high-quality music typically streamed by Bluetooth. There is the option to combine modes to maintain situational awareness while

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listening to music — very useful when crossing a busy intersection or working in an office. When real time language translation gets good enough, this could be a killer app for travelers.

Hearing aids are a market ripe for disruption due to their very-high price, difficulty of setup, arcane distribution through audiologists, low reliability and relatively poor audio performance. Some iteration of hearable will be the mechanism for disrupting a market controlled by a handful of large international firms.

**Jabra** ([www.Jabra.com](http://www.Jabra.com)) offers the \$160 Sport Pulse (with in-ear heartrate monitor) and the \$120 Sport Coach with intelligent audio coaching (meaning the device will keep track of your reps, among other parameters programmed through an associated Sport Life app that guides you through a workout). The Jabra Elite Sport (\$250) is wireless and waterproof with two mikes per side, and is more of a hearable, with the option to let in some of the ambient sound so you aren't hit by a car while running in the street.

A startup from London, Kickstarter-funded **Kokoon** (<http://Kokoon.io>) showed prototype Bluetooth headphones (\$260 preorder; \$350 thereafter) that help people sleep better. It supplies relaxing sounds and uses ANC (Active Noise Cancellation) to reduce ambient noise. Kokoon also uses EEG biofeedback sensors to adapt the audio in real time for greatest benefit, and allows the user to track progress and better understand their sleep with an app.

**Kuai Fit** ([www.Kuai.Fit](http://www.Kuai.Fit)) from Hong Kong offered a new twist on sports earbuds: waterproof earbuds that help coach you as you exercise. They use sensors to measure heartrate and acceleration; their software guides the exercise. Its smartphone app will connect with bike sensors, power meters, gym equipment, or sport watches. No price at press time.

**Moovlab** ([www.Moovlab.fr](http://www.Moovlab.fr)) is similar — a startup from France, offering an enhanced gym experience. The goal is to use motion sensors in wearables to analyze your performance and enable automatic adaptation of a personalized training session via the “Smart Coach” application. Teams can train together as well. Pilot systems will be launched this year.

**NuCalm** ([www.NuCalm.com](http://www.NuCalm.com)) offers a relaxation-aiding headphone that uses a trans-cranial electrotherapy stimulation device and audio feedback to calm the brain, reducing anxiety.

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Note: users with certain medical implants should not use this or related devices that input electrical energy (albeit low-level and undetectable, as it's less than 100 microAmps) to the body. A mask blocks light to increase relaxation. The audio uses a binaural beats program and frequency-following response as a feedback mechanism to modulate brainwaves, specifically to reduce high beta (23-38Hz) brainwave frequencies associated with stress and anxiety. The company also sells dietary supplements to further reduce stress. The product is currently shipping; a price is not listed on the website.

Australian hearable entry **NuHeara's** ([www.NuHeara.com](http://www.NuHeara.com)) IQ buds (\$300; should ship in early 2017) are controlled via an iOS or Android app.

**QuietOn** ([www.QuietOn.com](http://www.QuietOn.com); Kickstarter funded; preorder for \$160) is an active noise-cancelling earbud from Finland, useful for sleeping, airline travel or a noisy work/study space. Use on motorcycles seems like a good idea. Normally when thinking about noise cancellation, you use large sealed-back over-the-ear headphones, as they offer substantial passive noise isolation. But they are quite bulky, and an earbud substitute might not be a bad idea. Batteries are claimed to last 50 hours on a single charge.

### ***MORE KICKSTARTER/INDIEGOGO***

The phenomenon of crowdfunding new products has led to a proliferation of what in software is called vaporware, because some of them never ship to customers or the products don't really work that well in practice. In hardware it is an opportunity to pre-order and test-market what are in effect product proposals made directly to the public (who by buying it are financing product development and production). Nevertheless, it definitely brings some interesting ideas all the way through the development process to production.

**Vinci** ([www.Kickstarter.com/projects/inspero/vinci-first-smart-3d-headphones-that-understand-yo](http://www.Kickstarter.com/projects/inspero/vinci-first-smart-3d-headphones-that-understand-yo)) is a smart headphone, a standalone device that "understands you". It learns your music preferences and measures vital signs like heartrate. It uses voice control for music, as well as Siri-type functions like checking the weather, and uses touch controls on the earcup (which the user can't see when wearing the headphones ... hmm, at least it lets your friends see something so you can show off).

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## **RETRO TECH**

For fans of retrotech as well as science fiction, Firebox announced plans for some fun products: a Star Trek communicator, the first “flip phone” ([www.FireBox.com/Star-Trek-Original-Series-Bluetooth-Communicator/p7243?via=related-products](http://www.FireBox.com/Star-Trek-Original-Series-Bluetooth-Communicator/p7243?via=related-products); works over Bluetooth when paired with your smartphone) and a remote control shaped like Star Trek phaser ([www.FireBox.com/Star-Trek-Original-Phaser-Universal-Remote-Control/p6679](http://www.FireBox.com/Star-Trek-Original-Phaser-Universal-Remote-Control/p6679)).

## **GADGETS**

**Kingston's Data Traveler Ultimate GT** ([www.Kingston.com/en/usb/personal\\_business/DTUGT](http://www.Kingston.com/en/usb/personal_business/DTUGT)) is a USB 3.1 Gen 1 (300MBps read, 200MBps write) flash drive that can store 2TB, enough portable storage for anyone.

French start up **Rifft** ([www.ByRifft.com/en](http://www.ByRifft.com/en)) offers the CT Band ([www.CT-Band.com/en](http://www.CT-Band.com/en)), a thin watch band (\$150 preorder) with smartwatch functionality built in, to attach to a watch body. Software for iOS/Android is included. A clever segmentation of the watch market, as most people who own a classic mechanical watch would not replace the watch itself.

For a simple way to combine all remote control functionality into one device, look at **Seven Hugs** (<http://Remote.SevenHugs.com>; \$230 pre-order), a buttonless all-display remote control for >25,000 devices via IR, Bluetooth or Wi-Fi. As you point it at a specific device, say a TV, it turns into a TV remote. Point it at a Nest thermostat and it changes to a thermostat control. Their first product was the **HugOne** iOS/Android app (\$180) with a smart-alarm function to wake you at the best time in your sleep cycle, after their device and several small sensors analyze your sleep cycle.

## **HEALTH**

Health is a consumer-electronics megatrend, as technology such as smartphones is combined with a variety of sensors (such as heartrate monitors and accelerometers) to place more information in the hands of health-conscious consumers. This trend shows no signs of slowing down as the tools become more advanced each year, with EEG probes showing up this year.

Originally funded via a 2014 indiegogo campaign, **Healbe's GoBe2** (<http://HealBe.com/gobe2>) is a “smart-life band” fitness tracker focused on weight-loss and maintenance. The

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device is claimed to track calorie intake and body-water level, though the skin, a unique feature based on its ability to measure glucose. It also measures calories burned, emotional tension, stress, sleep, energy balance, heartrate, and distance-travelled/steps-taken (via a nine-axis accelerometer). GoBe2 also has a skin galvanic-response sensor, and all data is communicated via Bluetooth 4.0 to an iOS/Android app on a smartphone/tablet. Healbe is the first Russian firm to raise money for hardware via indiegogo, and has 14 patents granted.

In the wearable health category, **Fitbit** ([www.FitBit.com](http://www.FitBit.com)) is the market leader, selling a cumulative total of over 38 million units to date.

There were a range of biosensor companies selling technologies into the growing market, including **Valencell** ([www.ValenCell.com](http://www.ValenCell.com)) and **CardioMo** ([www.CardioMo.com](http://www.CardioMo.com)), with its single-lead EKG for heartrate and respiration. Cardiomo is a Ukrainian startup offering a wearable patch to track heartrate and other vital signs.

**Feetme** ([www.FeetMe.fr](http://www.FeetMe.fr)) is an insole for your shoes or sneakers that collects data on your gait via 80 embedded pressure-sensors, connected via Bluetooth to a smartphone for real-time analysis of your movement. The products are currently sold via healthcare distribution in France.

South Korea's **Dadam Micro's Mobeat** ([www.DadamMicro.com/technologies/wellness-bio-technology](http://www.DadamMicro.com/technologies/wellness-bio-technology)) is a non-contact vital-signs monitoring system. Mobeat can measure heartbeat (and heartrate variability) and respiration from 3m away with ultrawideband pulse doppler radar. Potential services including breathing-pattern improvement via biofeedback, detecting a fall (and initiating an automatic response such as a call for help) and DIY home-healthcare information.

**Sublimed** ([www.Subli-Med.com](http://www.Subli-Med.com)) is a "transcutaneous electrical nerve stimulation (TENS) medical device for chronic pain management". The device applies low-voltage stimuli to the nerves to manage pain, administered through small patches attached to the skin. Control is via an app. The company has raised 700k€ (~\$745,000) for development of the product, which will be released mid-year.

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**HEALTH — SLEEP**

Getting a good night's sleep is a key part of being healthy (like a decent diet and basic exercise), and clearly a lot of Americans are not getting the quantity or quality of sleep they need. Thus a flood of Rx products (they work, but have many side effects, like increased risk of death), supplements (melatonin, anyone?) and now consumer-electronic products to help people get the sleep they are missing.

**Luciding** (<http://Luciding.com>) is accepting pre-orders for their LucidCatcher head-worn device plus app that tracks and analyzes brainwaves in order to promote lucid dreaming. A lucid dream is one where you know you are dreaming while you are in the dream. Once in a lucid dream, you can direct the dream to some extent. The device detects your REM and pushes mild electric impulses to the prefrontal cortex at a frequency of 40Hz (gamma waves, in neurology) using transcranial direct-current stimulation. It brings the logical brain back into service and makes you realize that you must be in a dream. The clinical relevance might lie in alleviating recurrent nightmares. Lucid dreaming was a plot device in the popular 2010 film Inception, the 2001 film Vanilla Sky and the 2013 Indian film Lucia.

**Nightingale** ([www.MeetNightingale.com](http://www.MeetNightingale.com)) is a sleep system controlled from an app or Amazon Alexa that plugs into your power outlets and generates soothing nature sounds to mask noise and promote relaxation. Nightingale has a multicolor nightlight, and allows for personalized settings.

**Sensorwake** (<http://SensorWake.com>), a French firm, has two products: The Orla, which uses two patented scents to first help you get to sleep, and then to sleep longer and better. They also have the Olfactory Alarm Clock that uses scents to wake you up gently and progressively.

**Sleep Easily** (\$80; [www.SleepEasily.com](http://www.SleepEasily.com)) is a form of cognitive behavioral therapy for insomnia, using a technique developed by psychotherapist Richard Shane, a sleep specialist; that technique comes in an MP3 playback device. The recording guides the user through five physical triggers (tongue, throat, breath, heart and abdomen) to help him get to sleep. The company claims people get to sleep, or go back to sleep, in 20 minutes. It comes with a guidebook, eyeshades and earplugs. One journal article describes a pilot two-week study starting with 73 subjects and ending with 49, that showed modest but real clinical improvements.

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**HEALTH — VISION**

**Reticare** ([www.RetiCare.com](http://www.RetiCare.com)) offers screens for displays such as cellphones that protect the eyes from bright screens. This would be particularly important for children.

**HEALTH — FERTILITY**

The **Comper** (<http://Comper.com/en>) Smart Fertility Tracker is based on a smart basal body-temperature thermometer with built in UV light for automatic disinfection, and an app for tracking ovulation.

Most products, treatment and efforts to boost fertility are focused on women (men are much less likely than women to see a doctor about anything).

**Trak** (\$200; <http://TrakFertility.com>) is a system from Sandstone Diagnostics (with some participation from scientists at Sandia National Labs in Livermore, CA) to help men measure sperm-concentration (since this variable is associated with time-to-pregnancy) and improve their fertility, using an app to improve health and education. The majority of Western men have too few sperm (dropping for decades), and so men contribute to at least 30% of infertility cases, according to a journal article. The testing kit centrifugally spins a sperm sample to isolate and quantify sperm count, which is then logged in the app. This will not replace a doctor's visit, but is an adjunct, and was the subject of a trial: <http://ClinicalTrials.gov>; identifier: NCT02475395.

Competitors include Micra First Step, Spermcheck ([www.SpermCheck-Fertility.com](http://www.SpermCheck-Fertility.com)), and FertilCount by BabyStart (<https://BabyStart.co.uk/fertilcount/>). Home sperm tests are compared at <http://Human-Fertility.com/best-home-sperm-tests-compared>.

**HEALTH — AIR FILTRATION**

Indoor air is typically more polluted than outdoor air, with the exception being in China's large cities where the outdoor air is terrible due to lack of enforcement of the most basic environmental standards. Hence that is really where the market should be focused; those with asthma (perhaps 8% of the population) or allergies (perhaps 20% of the population) in the West might benefit as well.

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**Air Serenity** ([www.Air-Serenity.com](http://www.Air-Serenity.com); Paris) is crowdfunding their LiV air filter that includes a three-part module: a HEPA filter (particulate matter like pollen, dust), absorbents (catches volatile organic compounds — VOCs — such as formaldehyde and other chemical pollutants), and cold plasma to kill viruses, bacteria and fungi. No ozone is emitted.

**AirDog** ([www.SiliconValleyAirExperts.com](http://www.SiliconValleyAirExperts.com)) sells the AirDog X5 ionization-based air purifier with claimed performance beyond HEPA, without using consumable filters. They are indiegogo-financed ([www.indiegogo.com/projects/world-s-most-advanced-air-purifier-without-filters#](http://www.indiegogo.com/projects/world-s-most-advanced-air-purifier-without-filters#)). The product is not yet available.

**Aykow** ([www.Aykow.com](http://www.Aykow.com)), from Normandy, France, has the Aube silent, no-filter, compact, connected air purifier. It purifies through visible light photocatalysis (breakdown by light). It uses purple visible light, rather than the typical UV light, to destroy VOCs, allergens, formaldehydes, bacteria, viruses, mold and fungi. The process does not generate other pollutants or irritants as byproducts, and should cover an area of 12-15m<sup>2</sup> (130-160ft<sup>2</sup>). An app allows monitoring air quality via a Bluetooth connection.

Aykow also offers solar-powered, connected radon-gas (in the soil) monitoring device, for use as an earthquake forecaster with its associated app. Increased radon gas is claimed to give several days warning prior to a major earthquake. The science is not settled, despite some association between radon-gas release from fault zones and earthquakes; there is no definitive relationship.

**Airthings** (<http://AirThings.com>) from Oslo, Norway, measures radon gas in the home, not for warning of impending earthquakes but because it is the leading cause of lung cancer among non-smokers. Radon is formed from the breakdown of Radium, and has a half life of 3.82 days. It usually builds up in a lower floor or basement. Their Wave sensor (\$200; 2Q2017 availability) looks like a smoke detector and displays data on an app, including detailed hourly readings. A freestanding thermostat-looking device called Home (\$200, available) is not connected. Accuracy is claimed to be within 9%; not bad for a consumer device.

There also is the **FitAir** portable air filter (no company website found; informative video at [www.CNet.com/products/airdog-fitair/preview](http://www.CNet.com/products/airdog-fitair/preview)), positioned in the US for runners who don't want to breathe dirty air (say from nearby cars) but would be more effective on the streets

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in China, where the air quality often is terrible. Finally, they have a small unit for use in the car or at bedside.

**Wair** ([www.Wair.fr/en](http://www.Wair.fr/en)), from Lyon, France, offers the first anti-pollution scarf (expected second quarter 2017 availability), in a variety of prints. The scarf has a three layer filter that will catch small particles like pollen down to 0.1 micrometer. The accompanying app will remind you to change the filter, every 1-2 months. While these might perform more or less the same as a high quality industrial/medical mask, they certainly look a lot better.

### **HEALTH — ANTI-FALL DEVICE**

Elderly people sometimes fall and break a hip, which can be the beginning of the end of their lives as they lose mobility and relocate to a nursing home, which leads to a downward spiral of health. To avoid breaking a hip in a fall, there is an airbag-style belt that works like an automotive airbag, deploying when an accelerometer senses trouble. ActiveProtective's Smart Belt (<http://ActiveProtective.com>) will begin pilot testing in mid-2017 at several large senior-care facilities. The device also can be of value for those active in sports, equestrians, in high-risk occupations like high-rise construction. The business model will be a monthly subscription.

### **GENERAL HEALTH**

**Relax** (\$500 projected cost; ship date unknown; <http://www.leti-cea.com/cea-tech/leti/english/Pages/Industrial-Innovation/Demos/relax.aspx>) is a neurofeedback (biofeedback to the brain) device that measures brain activity — EEG, specifically alpha waves — with a few dry electrodes. Neurofeedback is an emerging tool to help monitor the brain's functioning when used with the associated app. The value of such feedback is in improving stress management and sleep enhancement. Future applications include command and control of devices via thoughts, such as in virtual/augmented reality gaming, or to help the disabled function more easily. Neurofeedback devices might be integrated with other sensors in a personal area network of devices worn by the user, such as around the wrist or across the chest.

**RESPeRATE** ([www.Resperate.com](http://www.Resperate.com)) claims to be the only FDA-cleared non-drug noninvasive device to treat hypertension (high blood pressure). All it does is slow the breathing rate. It analyzes the breathing pattern and composes a personal melody with an inhale tone and an exhale tone, simply to slow the rate.

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An even more convenient product is **HeartMath's** ([www.HeartMath.com](http://www.HeartMath.com)) Inner Balance (\$130 wired; \$160 wireless), which uses an iPhone or Android app to guide you to breathe deeply and slowly. The company measures heartrate variability as part of its biofeedback process. HeartMath has fully validated their techniques over decades of study. Their products work to lower blood-pressure and calm the user, reducing stress (I bought a unit for a family member with high blood-pressure). It's a pity that such an inexpensive, great product with a track record is not better known; reducing high blood-pressure medications would help millions of Americans. This application of technology in the hands of the patient is the future of medicine that works, and at low cost.

**Remi** ([www.UrbanHello.com](http://www.UrbanHello.com)) is a baby monitor from a French startup that tracks what happens in a baby's room at night — light temperature, and noises — to help parents understand the child's best sleep conditions. The parents can monitor via smartphone. It is also an adjustable nightlight and plays lullabies. Remi can also stream audiobooks, by subscription.

**Temp Traq** ([www.TempTraq.com](http://www.TempTraq.com)) is a baby temperature-monitor using a flexible patch connected via Bluetooth. Control is via an app. Each \$20 single-use patch is for 24 hours only.

### ***DENTAL HEALTH***

Brushing your teeth (with flossing) is an essential maintenance habit to keep one's teeth for a lifetime. Yet children do not like to brush, at least until they start getting cavities. Toothbrush companies like Oral-B offer free apps that have video, a timer and a tracker to encourage children to brush. Grush ([www.GrushGamer.com](http://www.GrushGamer.com); \$60) is a connected motion-sensing toothbrush that turns brushing into a game for children, and provides tracking for the parents.

### ***EDUCATIONAL TOYS***

**CogniToys** (<http://CogniToys.com>; \$100) are smart devices in toy form, tailored for kids, to provide an educational and entertaining experience without a mind-numbing screen. While other smart toys rely on preprogrammed responses, Cognitoys uses IBM Watson (for processing) and Elemental Path's ([www.ElementalPath.com](http://www.ElementalPath.com)) Friendgine (for speech and personality) to interact with powered Dinosaurs to listen to kids' questions and adapt answers to their age group, allowing them to grow. The toys also know age-appropriate games

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to play and stories to tell. The second-generation Dino 2 toy dinosaurs will learn and adapt to their new friends — another example of machine-learning throughout the IoT.

IBM's Watson (named after IBM's first CEO Thomas Watson) is a system for answering questions posed in natural language, developed in IBM's DeepQA project. The computer system was developed to answer questions on the quiz show Jeopardy! In 2011 Watson competed on Jeopardy! against former winners Brad Rutter and Ken Jennings and won, collecting the first place prize of \$1 million. IBM Watson's former business chief, Manoj Saxena, says 90% of nurses who use Watson follow its guidance. So given the exponential rate of machine learning when software is widely deployed, how long will it be until the holographic doctor avatar as seen on Star Trek ([http://Memory-Alpha.Wikia.com/wiki/The Doctor](http://Memory-Alpha.Wikia.com/wiki/The_Doctor)) is reality?

Writing software is a key skill for current and future generations of professional workers, across multiple fields. Hence the huge demand in the US for programmers. Many are imported (H1-B visas), plus the work is being outsourced around the world, especially to India. CES saw several child-focused products and games to help children learn to think logically, like software programmers. The products were typically a combination of a physical device with some type of abstracted, child-friendly programming. The simplest was a child drawing a colored line on a piece of paper to guide a robot's path. As the color changed, the state of the device changed and it did something different.

**CircuitScribe** ([www.CircuitScribe.com](http://www.CircuitScribe.com)), launched on Kickstarter, lets kids draw their own circuits with electrically conductive ink, avoiding hot soldering irons and breadboards.

South-Korea-based firm **Coding&Play** ([www.CodingNPlay.com/english](http://www.CodingNPlay.com/english)) is convinced that "the future is the age of software [so] the ability to handle software is a necessary skill to prepare children for the future. [Thus it has devised ways to] "educate children so that they learn to code and think for themselves as naturally as when they are playing." The company has expanded its product line down to the preschool level. The product is designed for use in a school setting or at home. Currently it's focused on domestic rollout, using books, stickers, cards and a smartphone/tablet app, but it's clear there is a global market for teaching children (as well as adults) how to think critically and how to write basic code.

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**Technology Will Save Us**, ([www.TechWillSaveUs.com](http://www.TechWillSaveUs.com)), from London, sells teaching tech-toys for children. At CES they introduced a DIY LED bracelet.

### ***DIY (Do It Yourself)-TO-MAKER: THE NEXT GENERATION OF ENGINEERS***

In the post-WW2 days of hi-fi and radio (1950s-'60s), Americans were commonly building their own loudspeakers and tube amplifiers, teaching themselves something. Some went on to building companies in the process. The sheer wealth of the US, combined with increasingly sophisticated ICs and a flood of cheap products built with low-wage labor led by China fueled a disposable, don't-fix-it throw-away culture by the late 1980s. Today, with the power of computers and software (to design your own product) and 3D printers (to make your own parts), DIY is coming back.

By 2010 a synergy of new technologies such as 3D printing, the free (or nearly free) distribution of all forms of knowledge over the Internet, far more powerful ICs supporting computing and graphics, machine vision, sensing and learning, artificial intelligence (a long term trend), and MEMs, or Micro Electro Mechanical Systems (such as sensors or digital microphones) all controlled by easy-to-learn high-level programming languages, has spawned the "Maker Movement" — the new DIY (or DIT, do it together) movement. These technologies, synergistically combined with mesh network connectivity, are leading to embedding sensors and the Internet everywhere.

At CES, the Maker Movement could also be seen in educational toys for children such as STEM (Science, Technology, Engineering, Math) robot kits at various levels. **UBTech** ([www.UBTRobot.com](http://www.UBTRobot.com)) offers Jimu interactive robots for kids and teens (\$150 and up), whose motion can be programmed via the Jimu Robot App. Other entrants include Hexapod (a DIY six-legged robot kit; [www.RobotShop.com/en/hexapod-development-platforms.html](http://www.RobotShop.com/en/hexapod-development-platforms.html)), **Stemi** ([www.Stemi.Education](http://www.Stemi.Education)), and **Modi** ("Create anything you want with robotics of things"; [www.LuxRobo.com](http://www.LuxRobo.com)).

### **SUMMARY**

At the end of four days of nonstop CES an attendee has experienced many new and apparently improved products. Likely it will take a while to sort out what will be most significant. Author William Gibson, who coined the term "cyberspace" in 1982's *Burning Chrome*, said in 1993 that "the future is already here — it's just not very evenly distributed". That is more

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true of CES, particularly Eureka Park — the eye of the tech storm where many future products first show up.

Innovation plus the ability to get product into consumers' hands, hardware or software, is the key to sustaining economic growth and making a better life for the masses. For hardware today that means manufacture in Asia, which has the hidden price of technology transfer to create competitors, as it has reliably done in Japan, Taiwan, South Korea and now China.

The first industrial revolution, which used steam and water to power machines such as weaving looms and steam locomotives, started in the UK in the early 1800s and built up the economic infrastructure of the British Empire and a Pax Britannica enforced by the Royal Navy. The first industrial revolution spread to the US by the 1830s, where it was rapidly adopted and given a huge boost by the demand for industrial output during the American Civil War (1861-1865).

The second industrial revolution used electric power plus Ford's production line and division of labor to create mass production around the start of the 20th century, which grew in the US exponentially due to two catastrophic world wars that wrecked Europe and allowed the US economy to fuel a Pax Americana for the latter half of the 20th century.

The third industrial revolution relied on computers, cellular and smart phones, electronics, software and significant advances in medicine that can be dated from the 1970s and largely created the world we live in today. Now we see potential emergence of a near-peer rival, China, which might be on track to reclaim its historical dominance of East Asia. Should Americans be worried?

### ***THE FUTURE***

Eureka Park allows us to see into the future and the fourth industrial revolution — a digital revolution of exponentially greater speed than prior ones, with a foot in the digital, biological, and physical worlds as it scales up, repeating what Joseph Schumpeter (1883-1950) called “creative destruction” in *Capitalism, Socialism and Democracy* (1942):

“The opening up of new markets, foreign or domestic, and the organizational

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development from the craft shop to such concerns as US Steel, illustrate the same process of industrial mutation — if I may use that biological term — that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of creative destruction is the essential fact about capitalism”. (p83)

Just as the second industrial revolution began with many new and useful novelties of electric motors, by the third, compact quiet electric motors were invisibly embedded in everyday life. The third industrial revolution offered the novelty of speakers, microphones, computers, computer networks and networks of networks — the internet. The fourth industrial revolution will see these onetime marvels absorbed and invisibly, silently embedded in our daily life. The IoT in our homes, cars, highly flexible factories using 3D printing and soon even our bodies will fade into the background as one continuous mesh of data and automated machine-to-machine communication, artificial intelligence and machine learning. This assumes a high degree of interoperability, information transparency, decentralized (really autonomous) decisions (as in self-driving cars, trucks, trains and self-piloted planes) and the aggregation of information to support people making decisions — like an augmented reality (AR) heads-up display on a car’s windshield or far more sophisticated individualized medical care — something so advanced its almost magical, as from Star Trek.

As with prior revolutions, it will offer much disruption and change, and more subtly shifts in consciousness — how people think about everything. For example, peer to peer communication beyond the control of media gatekeepers has made mainstream corporate media obsolete, and has unleashed a revolutionary global increase in political awakening and consciousness. Zbigniew Brzezinski, a brilliant forecaster and shaper of global policies for the last 40 years said, “For the first time in history almost all of humanity is politically activated, politically conscious and politically interactive.”

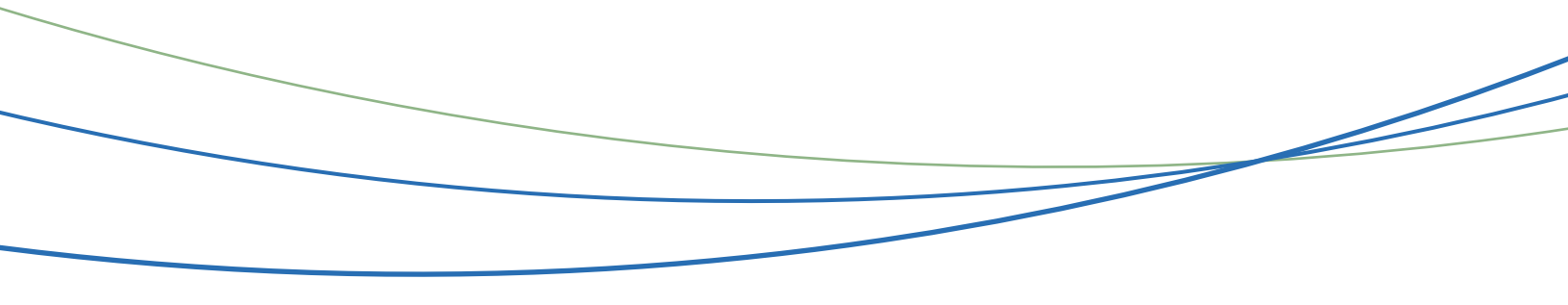
Societies that are most flexible, technically innovative and yet stable are those that will benefit the most from disruptive revolutionary technologies that are, to paraphrase Gibson, already here but not widely distributed. There is uncertainty in the US and worry abroad about the future of America. As the myriad technologies of Eureka Park ship, mature and develop, in the shadow of emerging Chinese brands, think back to the early 1990s. It was

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the peak of Japanese technical ascension in consumer electronics and cars. Back then, Americans were worried about their future vis a vis Japan, just as they today worry about a rising China. The USA has made major missteps: military adventures, erosion of industrial capacity, a generally under-performing education system, trade deficits and huge expansion of debt. As a day of reckoning approaches, there may be instability and difficult times in the next few years in the US – as well as Europe and Asia, who have equally serious structural issues. Yet the coming Pacific Century will be lead by an American renaissance fueled by innovation and creative destruction, with China (and later India) joining Japan as developed countries in a multipolar world - still lead from America.

*(End of Bonus Article)*

The bottom of the page features several decorative wavy lines in shades of blue and green, creating a modern, flowing aesthetic.

### **About Smart Life Forum**

Smart Life Forum, Inc. is a 501(c)(3) California nonprofit corporation whose primary mission is to provide credible health education to the public with an emphasis on optimal wellness, anti-aging medicine, and longevity.

Annual memberships in Smart Life Forum, Inc. and charitable donations are tax deductible to the extent allowed by law. For information on how to join or make a donation, please visit our website: [www.SVHI.com](http://www.SVHI.com).

For questions, please contact Susan Downs at [susanrdowns@hotmail.com](mailto:susanrdowns@hotmail.com).

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