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Confédération suisse
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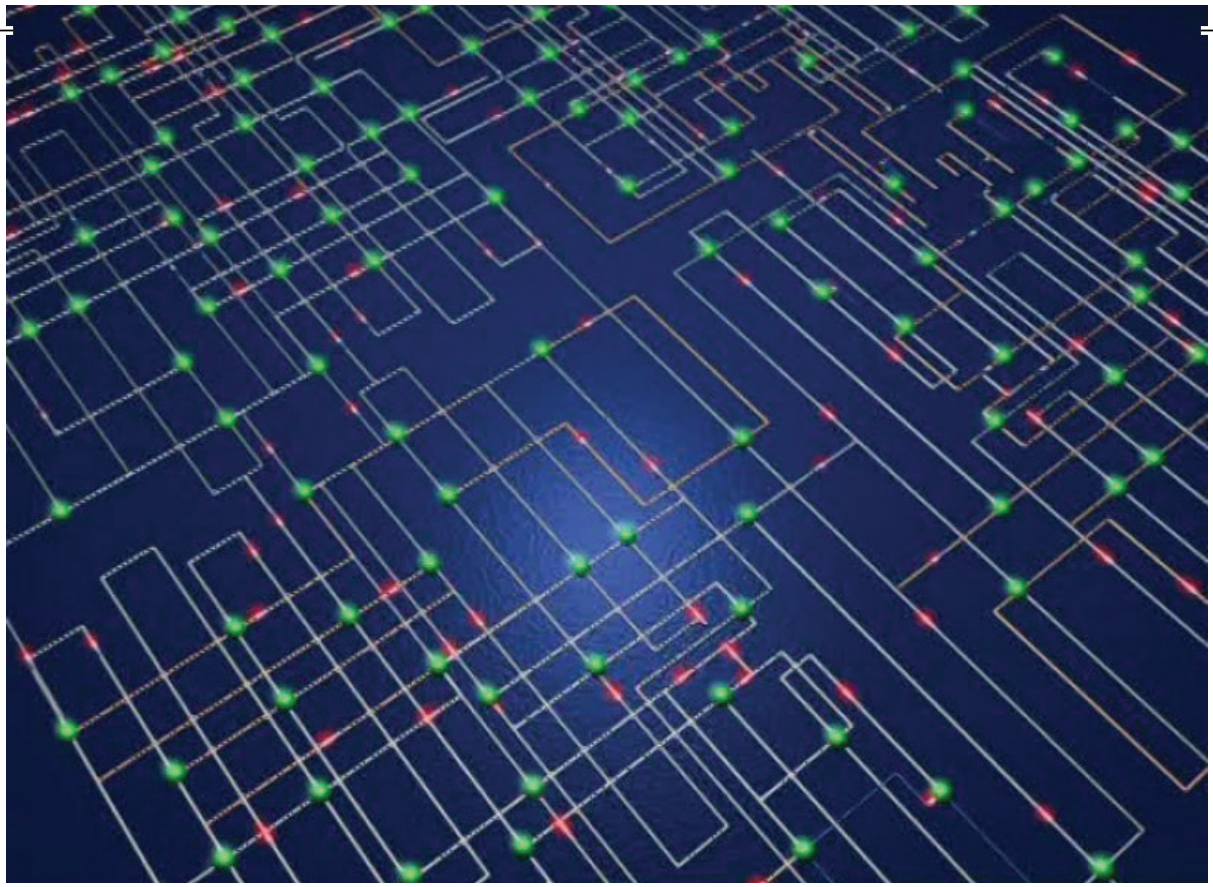
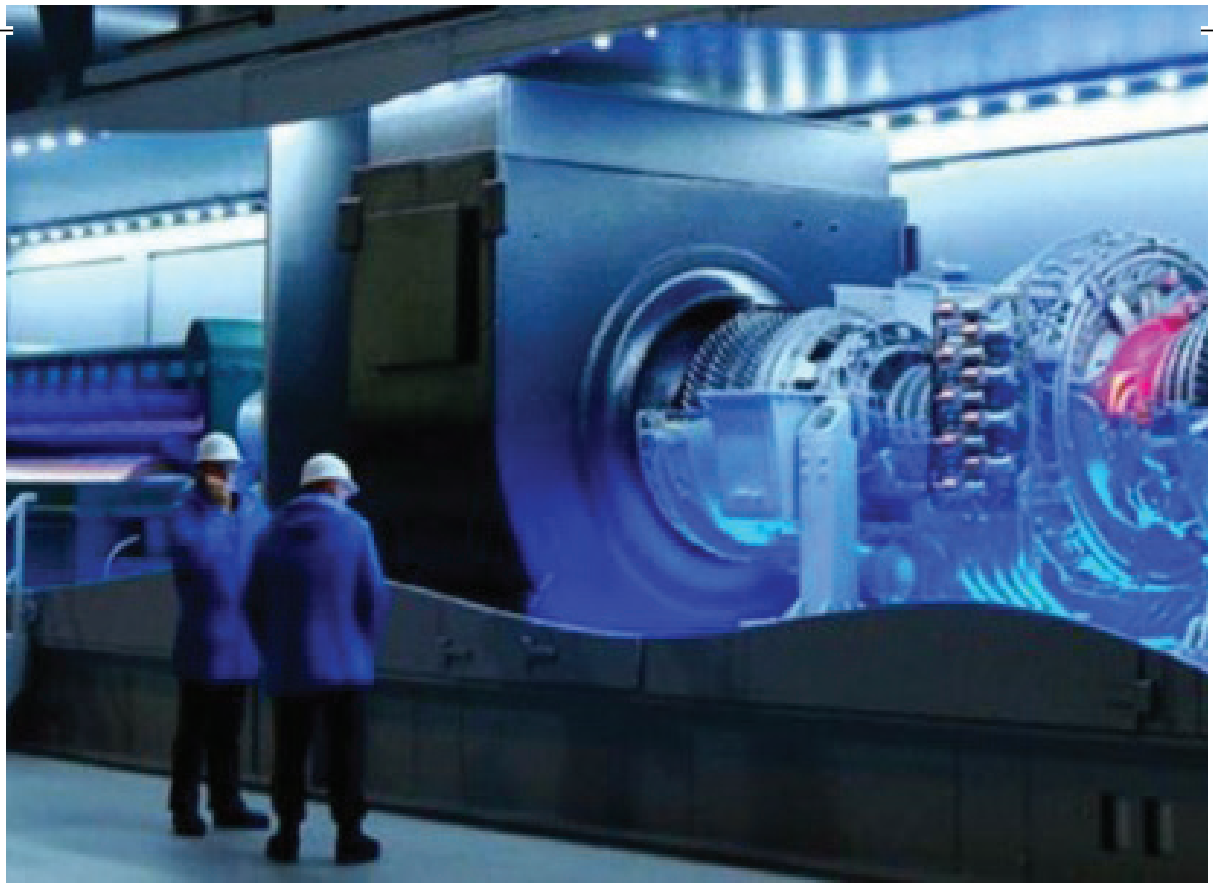


Distributed Power Generation

Generates electricity from many small energy sources instead of large centralized facilities. Centralized power plants offer economies of scale, but waste power during transmission, and are inefficient in rapidly adapting to grid needs.

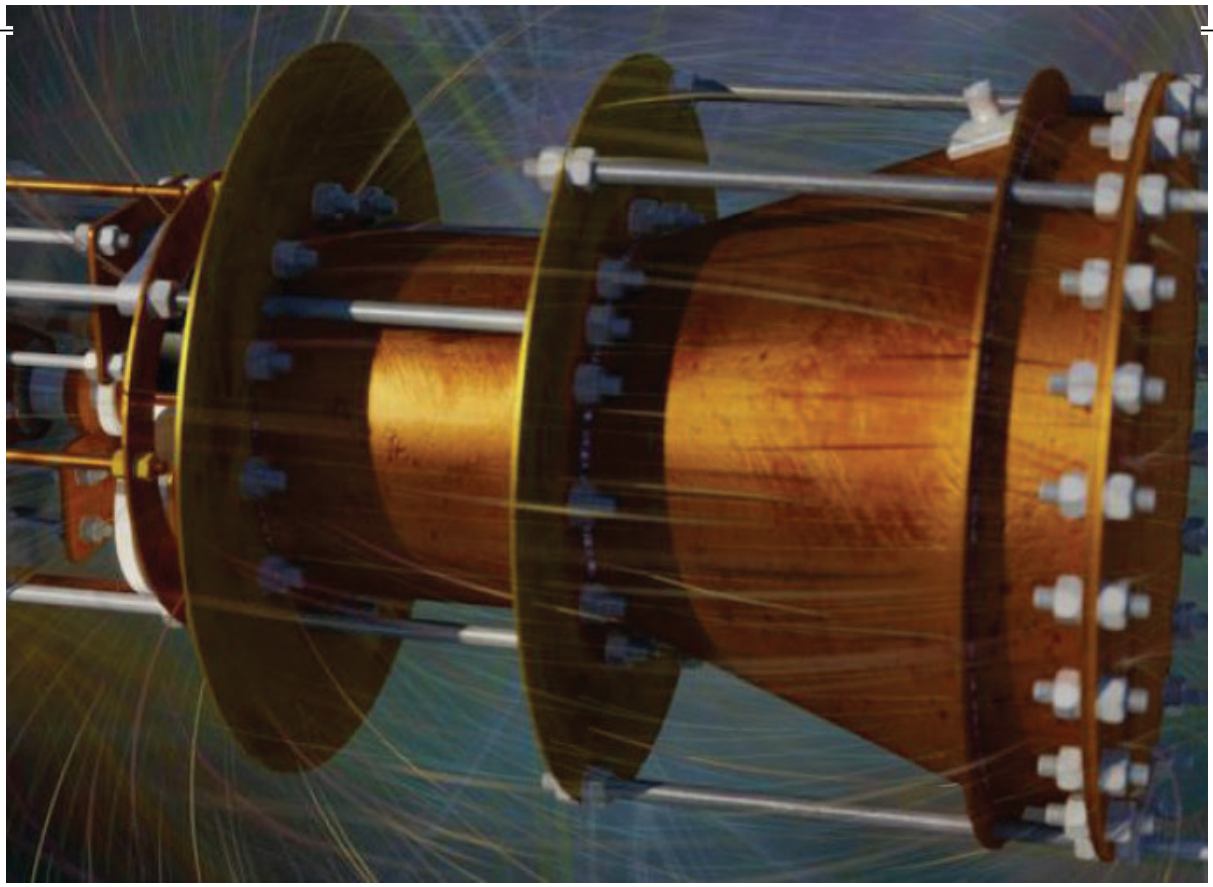
Long-range Wireless Charging

Lab's prototypes inductively charges devices with 90% efficiency to 30mm away from the power source via magnetic waves. The current technology works like a wireless router. With microwave technologies some crafts have stayed aloft for months. This could be used in the future to give more resilience to drones and other devices.



Small Modular Nuclear Reactors

Smaller, factory produced units designed to provide electricity in areas that are isolated or may have smaller electric grids, or where water and space are limited. SMR energy production can range up to 300MW and have relatively low capital costs per unit.



RF Resonant Cavity Thruster

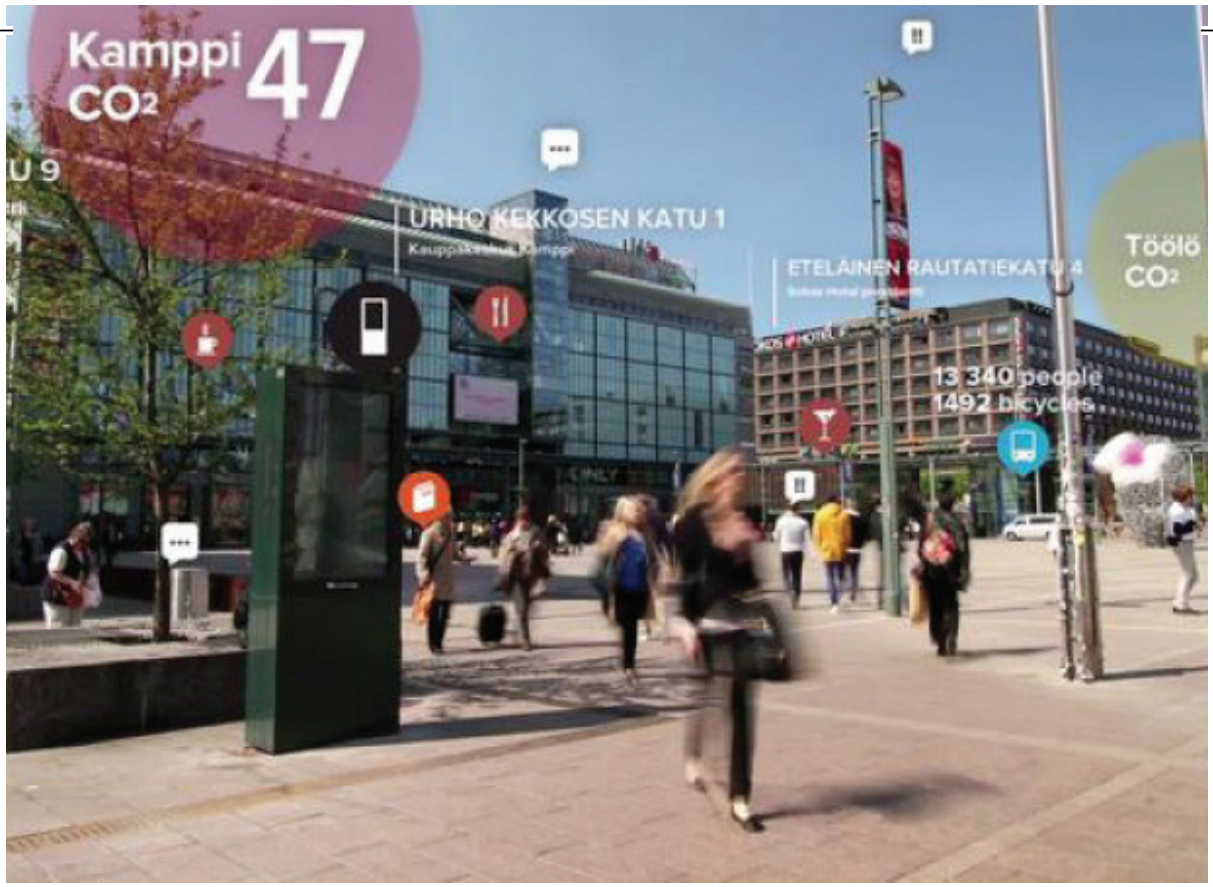
Radio Frequency RF Resonant Cavity Thruster appears to defy the laws of physics by breaking physical conservation of momentum laws. Preliminary tests have been conducted on the EM Drive design by multiple institutions.

Biological Batteries

Energy storage devices which are grown from a genetic base; and, house energy in biocompatible materials.

Smart Dust

A collection of microelectromechanical systems forming a simple computer in a container light enough to remain suspended in air, used mainly for information gathering in environments that are hostile to life.



Ubiquitous Computing

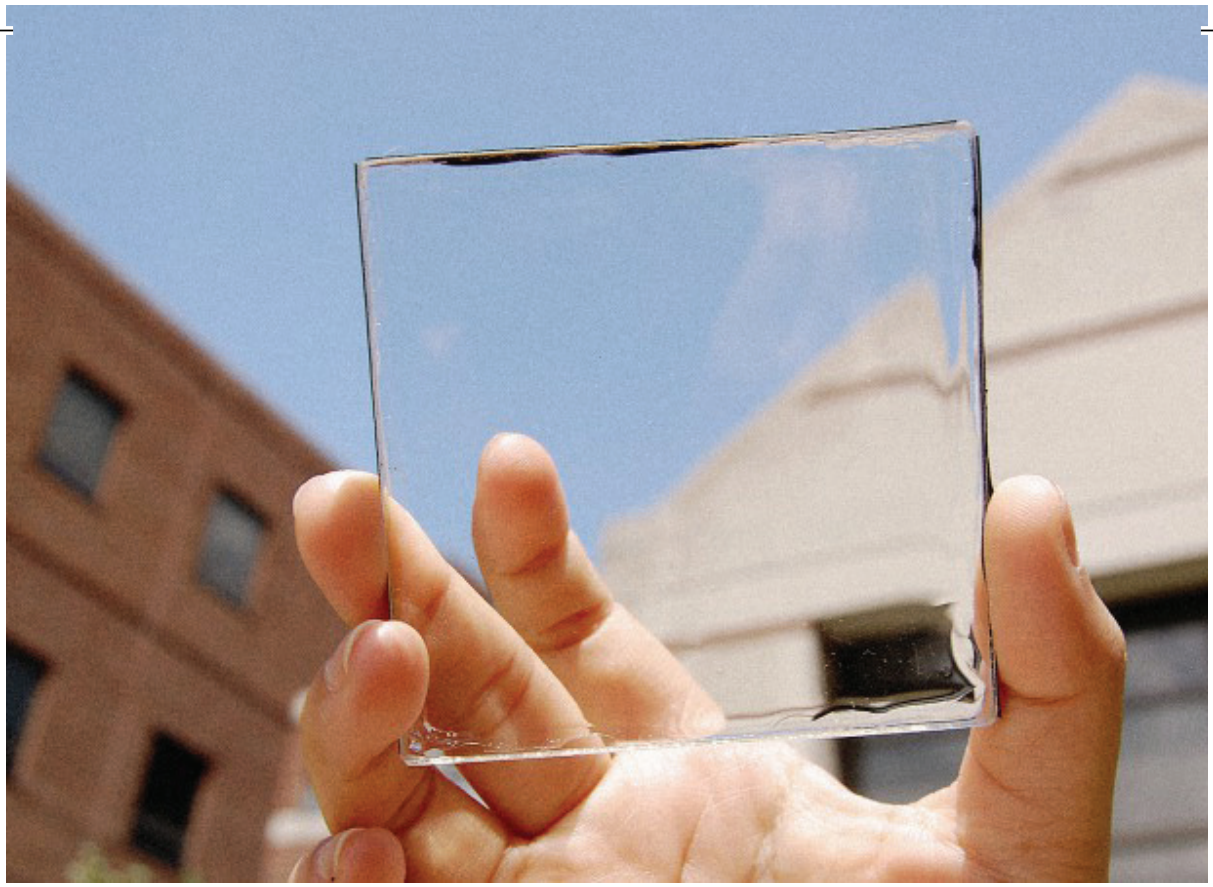
Also known as pervasive computing is the idea that computing can take place with any device at any place any time. It is not constrained by the object type. This is accomplished through embedded processors; and, is referenced as the opposite of Virtual Reality, whereas instead real world interaction is 'virtualized'.

Machine Vision

Face and object recognition with limited view and any angle. Currently high functioning image recogntion is creating sentential descriptions.

Gesture Based Interactions

Intuitive interaction styles speed input and understandings between man and machine. This integrates a non-verbal form of communication naturally used during speech for higher level functions.



Transparent Photovoltaic Glass

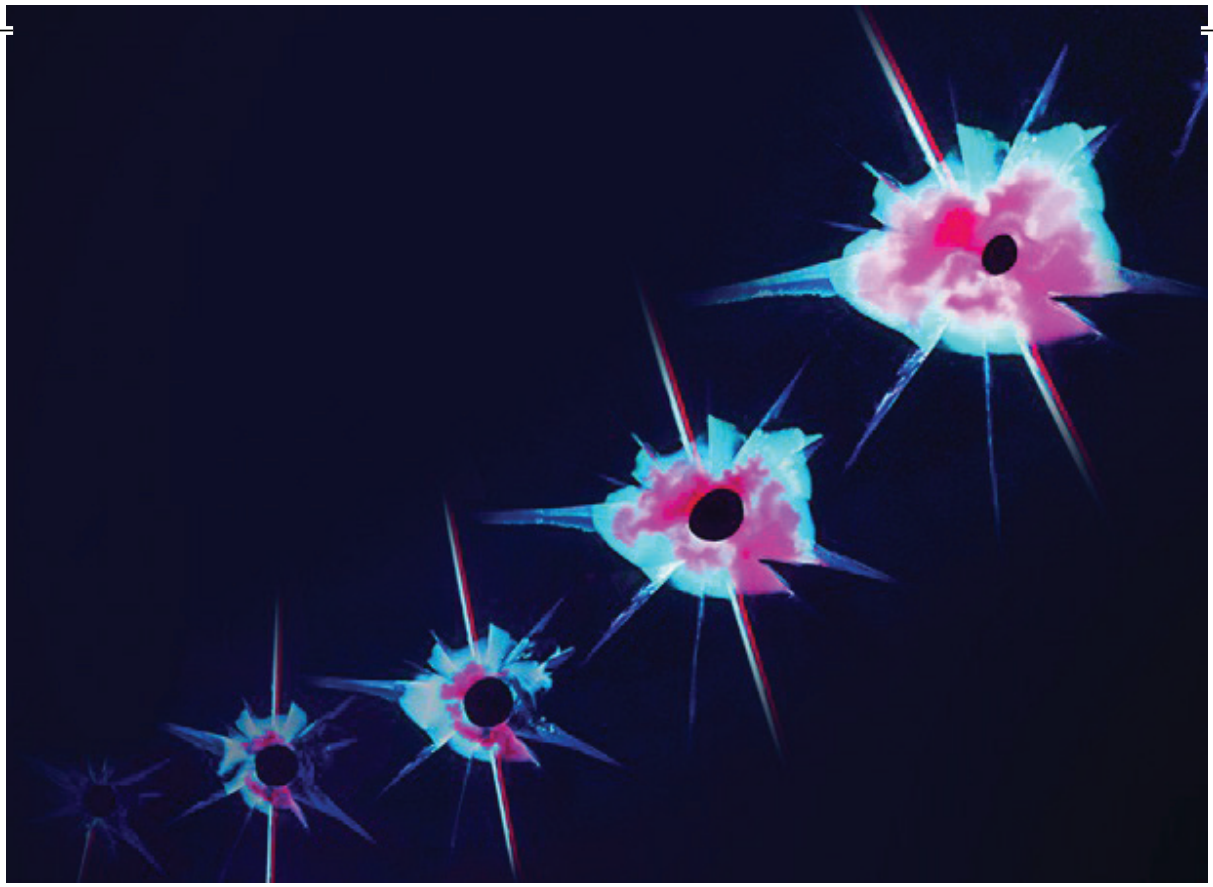
Glass which allows for visible light spectrum to shine through and captures energy from wavelengths which don't obstruct our vision.

WiFi for Things

Regular mobile networks are jammed with traffic from phone calls and people downloading videos. But for the Internet of things to become a reality, similar capabilities will need to be extended to billions of objects with a wireless slow lane for small, low-power devices.

Infrastructure Security

Energy plant & network vulnerabilities of interconnected structures.



Self-healing Networks

Networks capable of reconfiguring themselves and repairing damage from various possible causes.

Augmented Reality Eyeware

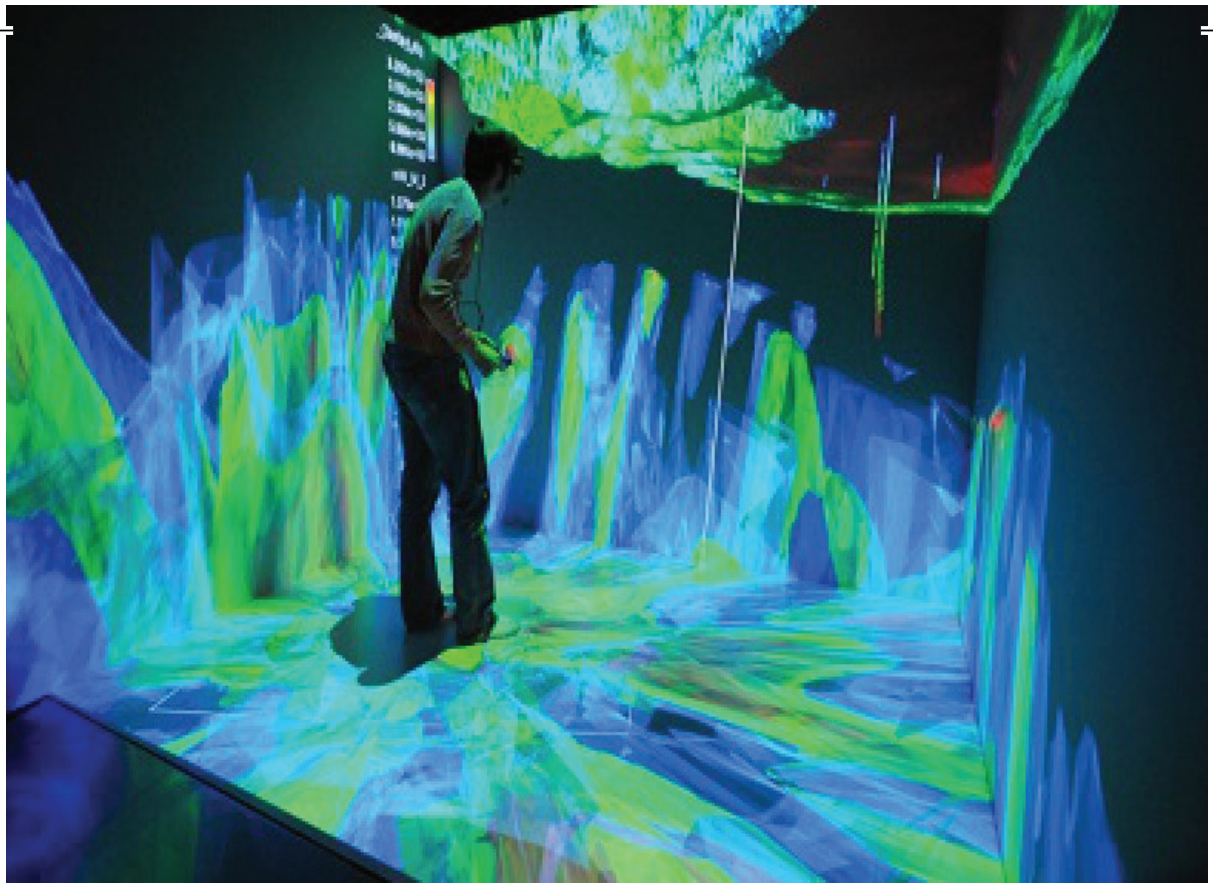
Augmenting reality through eyeware can create instant fictions overlayed onto real world physical constructs; contributing to the ability to deliver information as well as manifest fictions.

Immersive Spatial Interfaces

When the simulated interface creates a feeling in the user that what they are experiencing is real, from looks to touch. It is one of the highest levels of immersion.

Metaverse

Merges digital reality with the real world, able to generate images indistinguishable from real objects and then being able to place those images seamlessly into the real world. Sum of all realities, real, virtual, augmented, and internet.

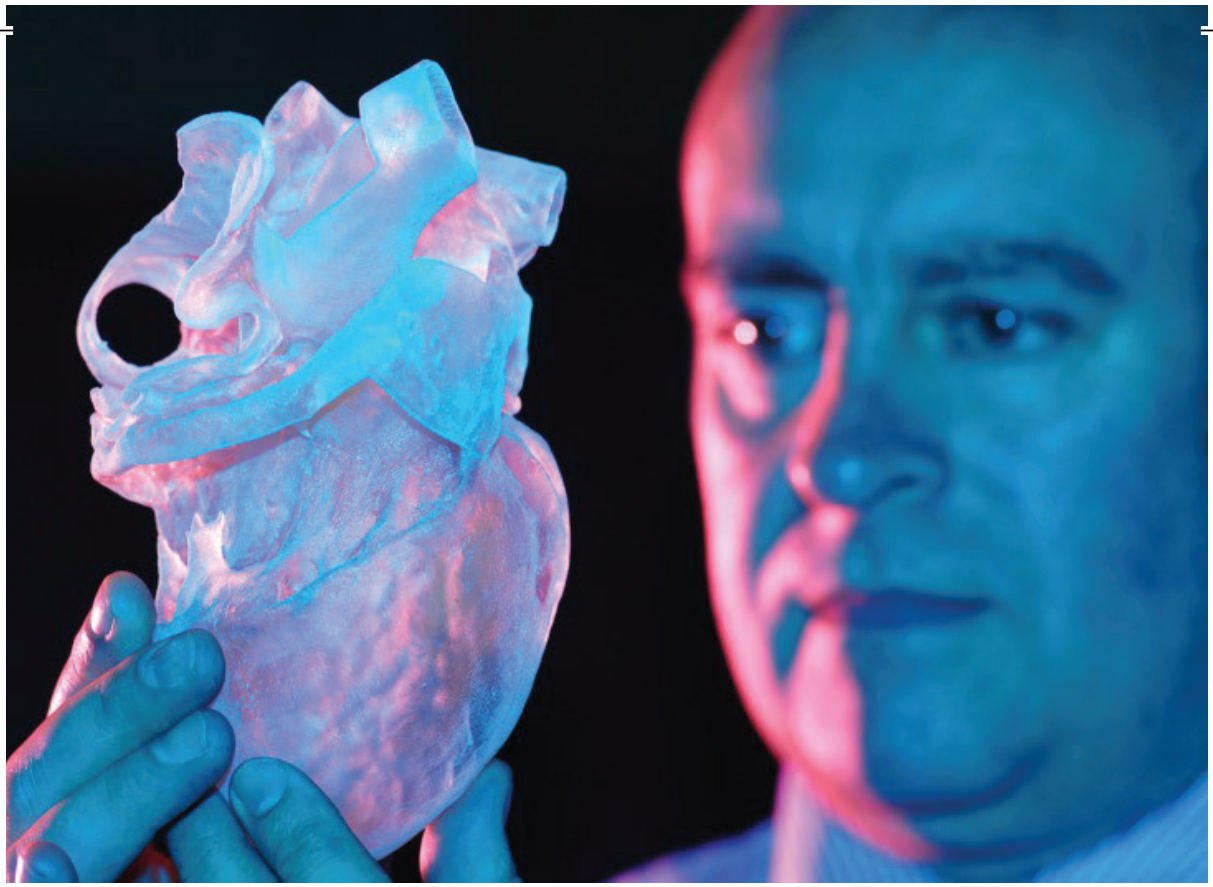


Holoroom

New breed of augmented reality devices help customers to imagine home improvements using 3D simulations, providing an intuitive and immersive experience. Hologram spaces can be modified at any time, giving customers the opportunity of designing and making choices on the fly. In the military, this could be used to simulate environments, recreate missions and training scenarios with more accuracy than existing methods.

Empathic Things

Devices of all kinds, shapes and sizes – around, on or inside the body – that behave increasingly smarter and link up more and more intuitively with mankind's extremely personal and natural interface.



3D Organ Printing

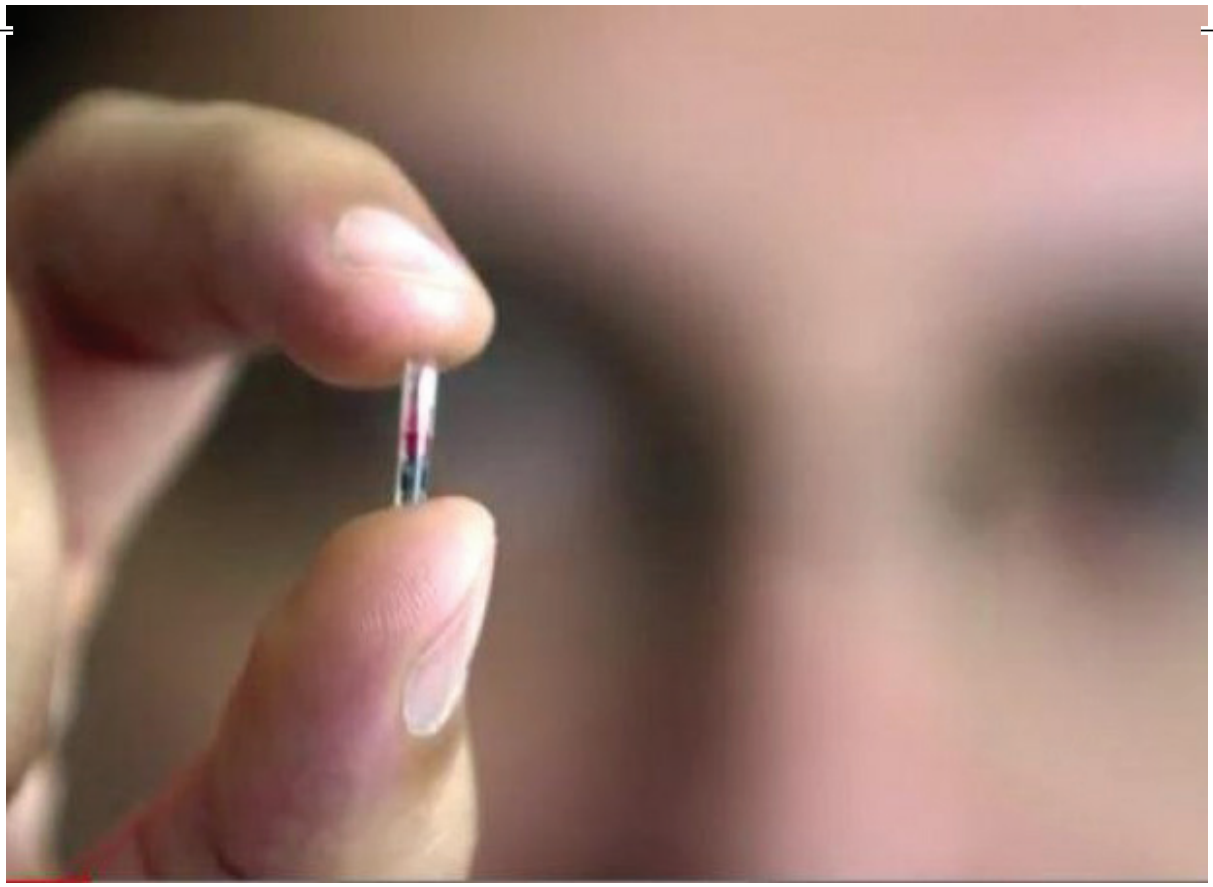
Organ donor rejection won't be an issue when there is the possibility of trading your stroked heart by a new one with your unique DNA.

Biofeedback Clothing

Clothes that respond to needs such as improvement of trodden dynamics and posture control by adapting or providing alerts to the user, through electrical or mechanical stimulus.

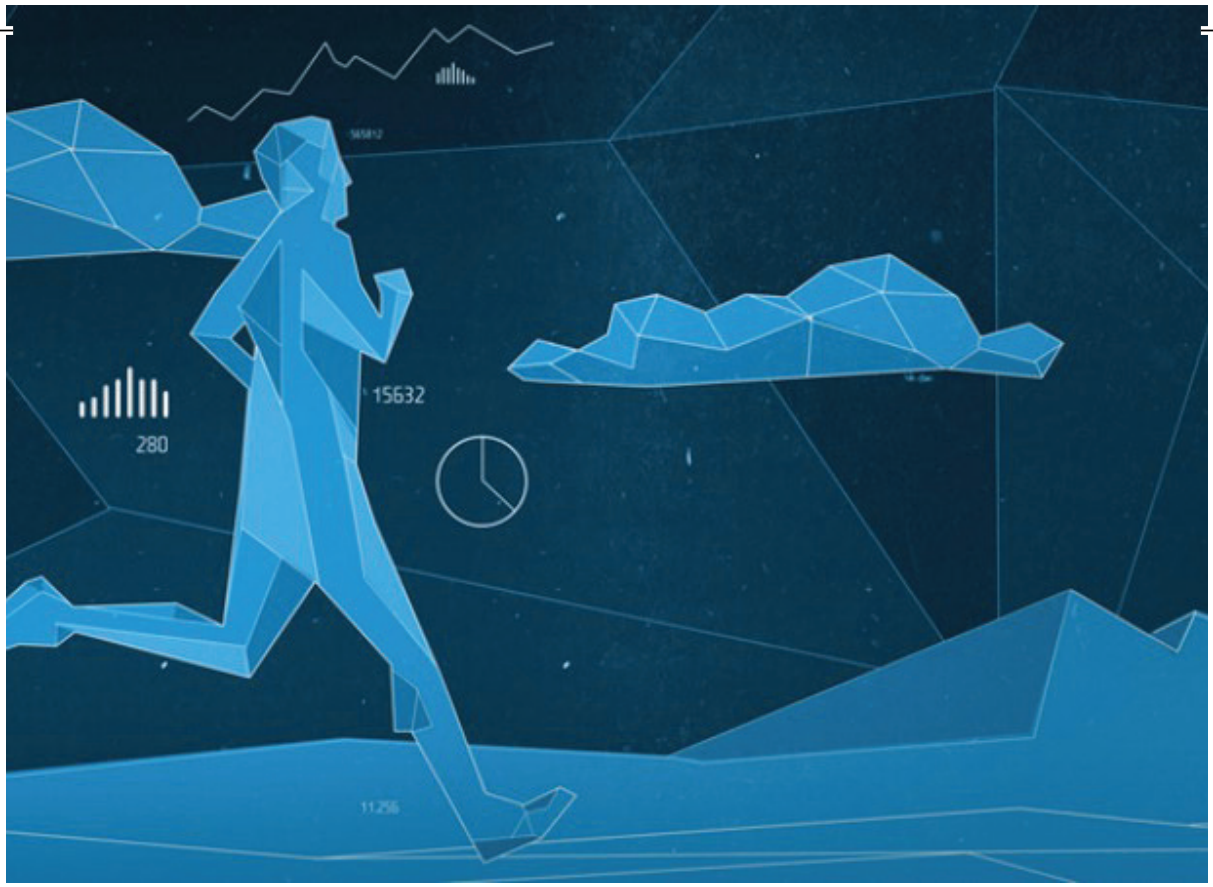
Virtual Reality Headset

High-quality virtual-reality hardware that is cheap enough for the consumer market. Visually immersive interfaces will lead to new forms of entertainment and communications. Combined with accessories and technologies such as eye-tracking and haptic gloves are creating an even more immersive experience.



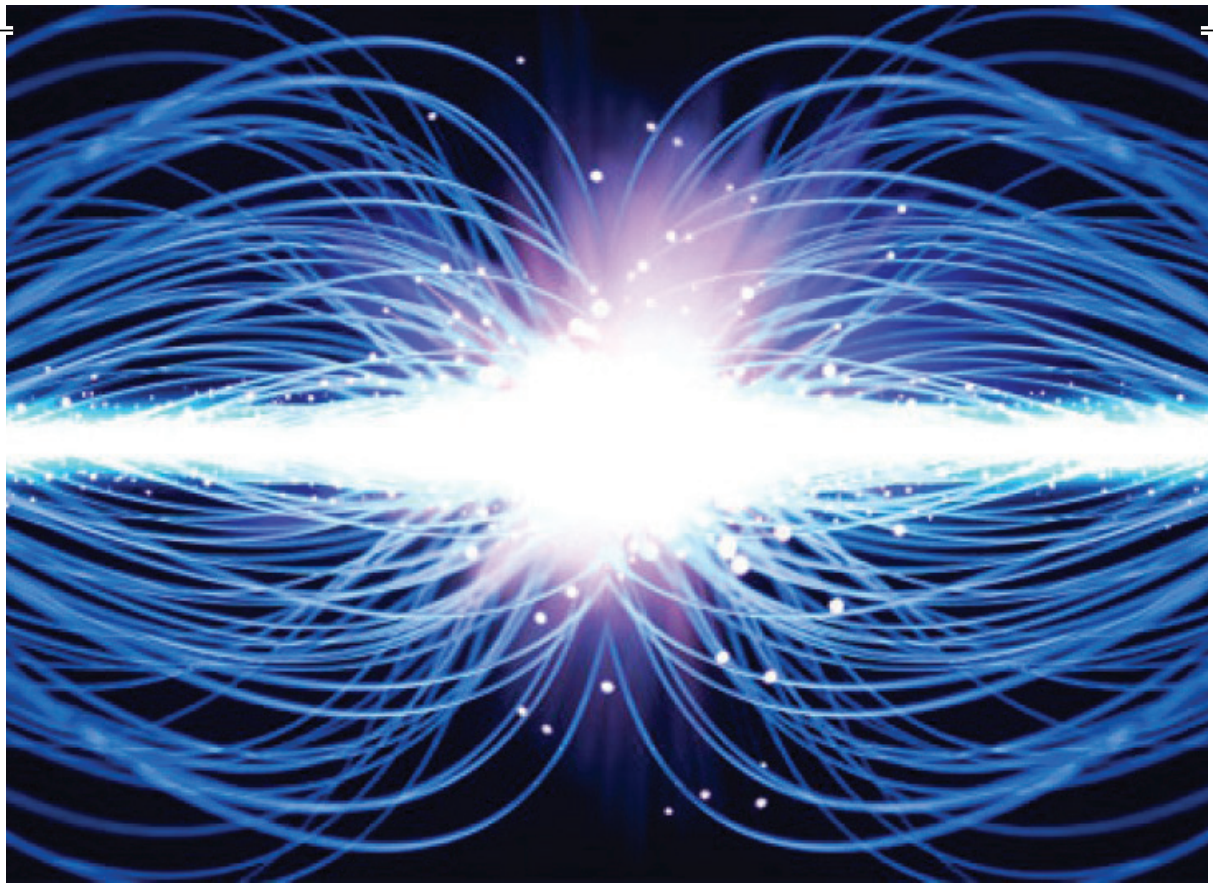
Biohacking

A techno-progressive cultural and intellectual movement which advocates for open access to genetic information and defends the potential of truly democratic technological development. This may include the use of nootropics and/or cybernetic devices for recording biometric data & enhancing performance.



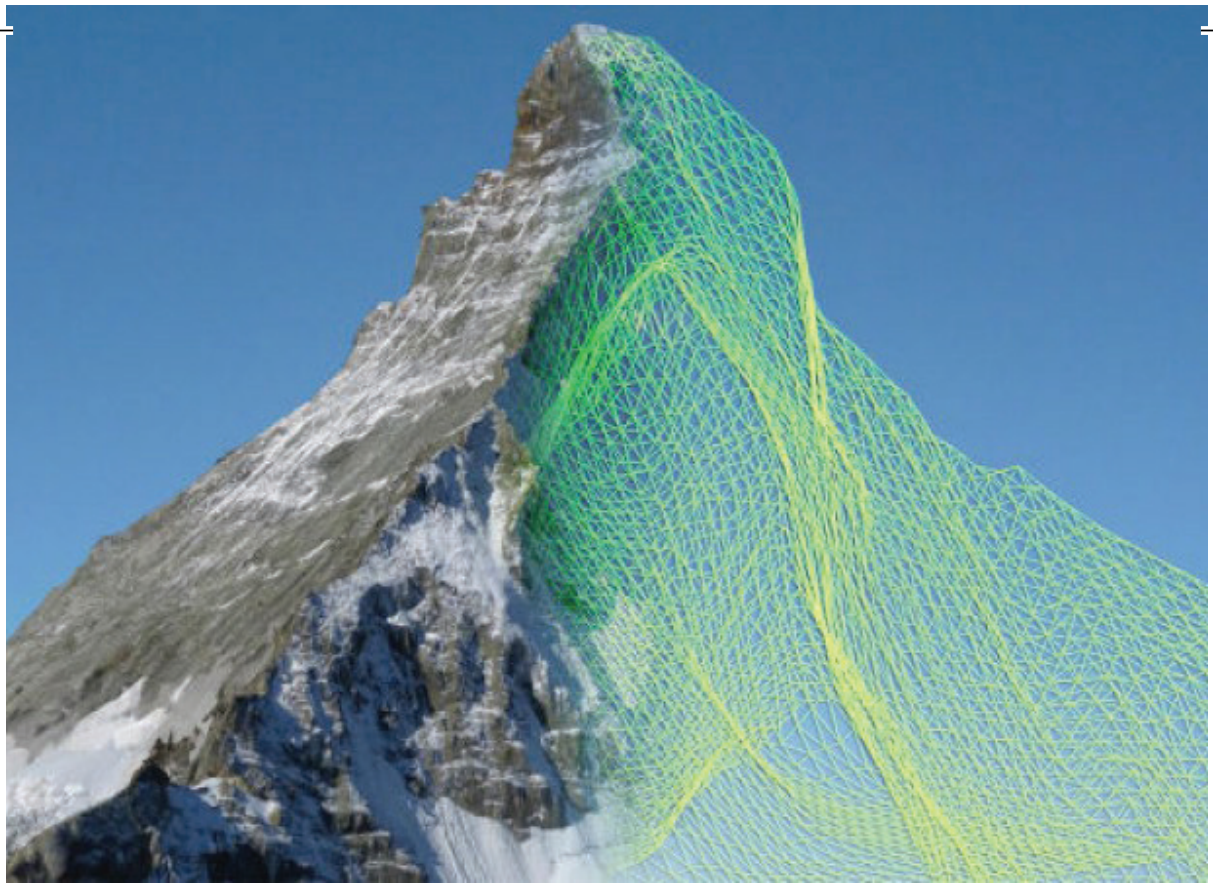
Quantified Self

Movement to incorporate technology into data acquisition on daily life in terms of inputs (e.g. food consumed), states (e.g. mood), and performance (mental and physical).



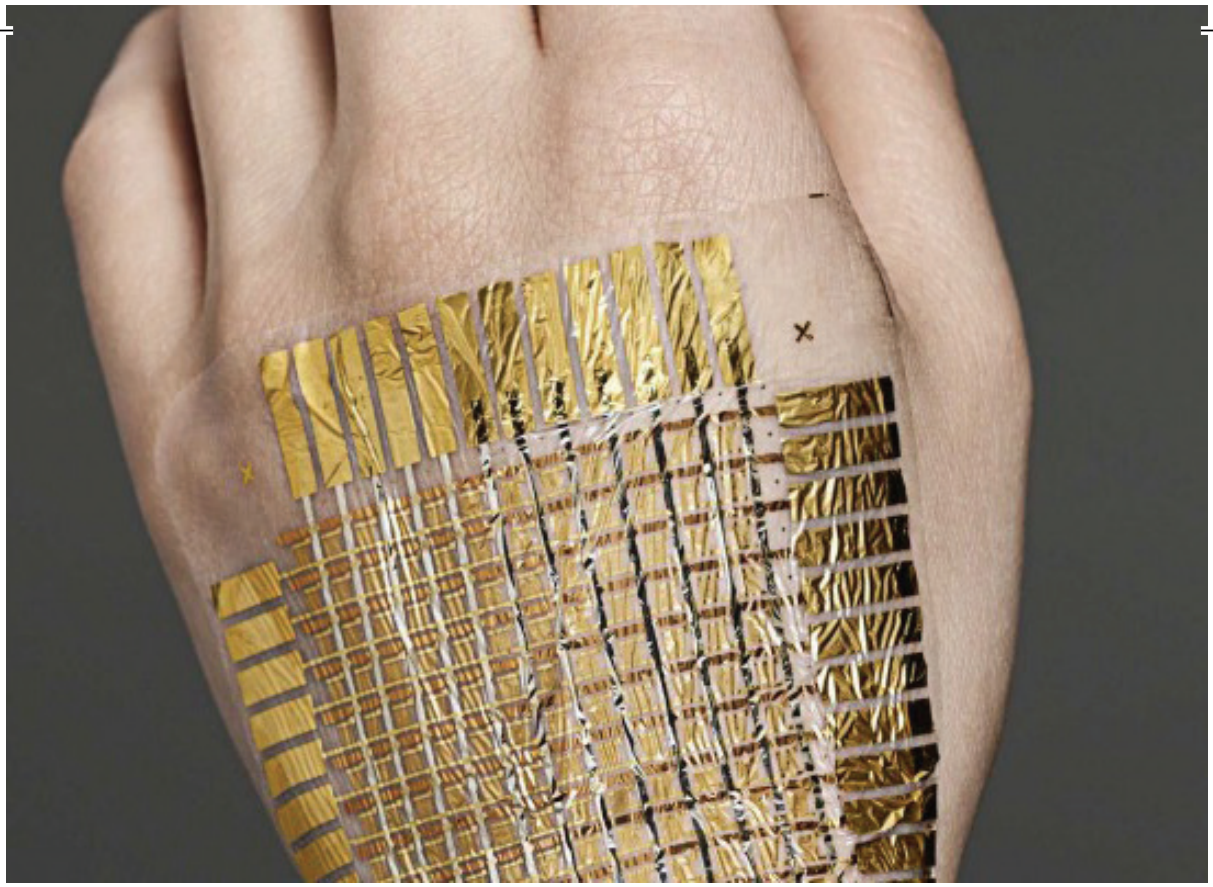
Quantum Computing

Quantum computing relies upon the super-position state of a qubit, which is a system which can hold multiple levels of states; atomic spin and quantum dots are examples. Creating highly dense and complex computing mechanisms, with units holding multiple I/O positions at once in relation to each other.



Environment Mapping

Drone Mapping creating High-Definition, High-Resolution 3D imagery with spectro-graphic details; able to give insights down to identifying and assessing the health of a specific leaf.

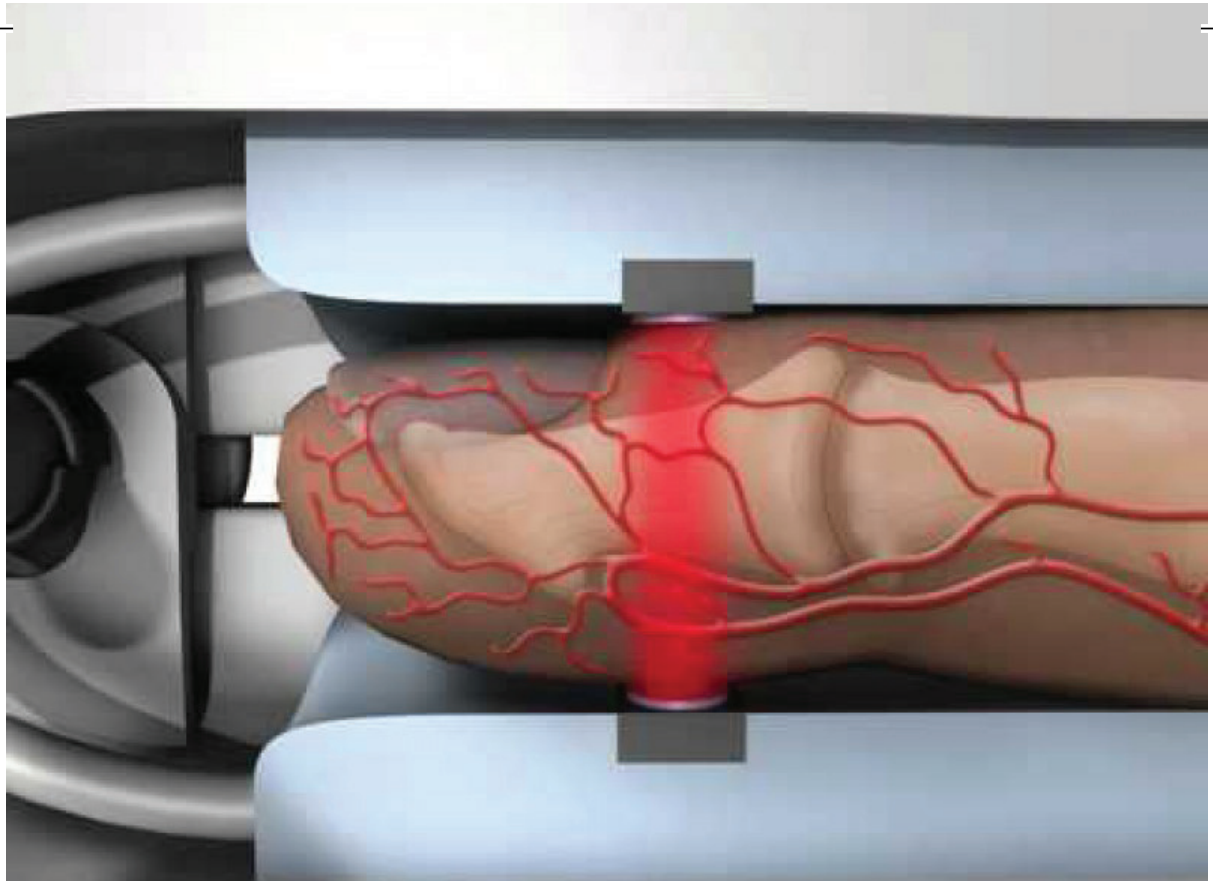


Wearable Computing

Wearable devices as interfaces and data point collection.

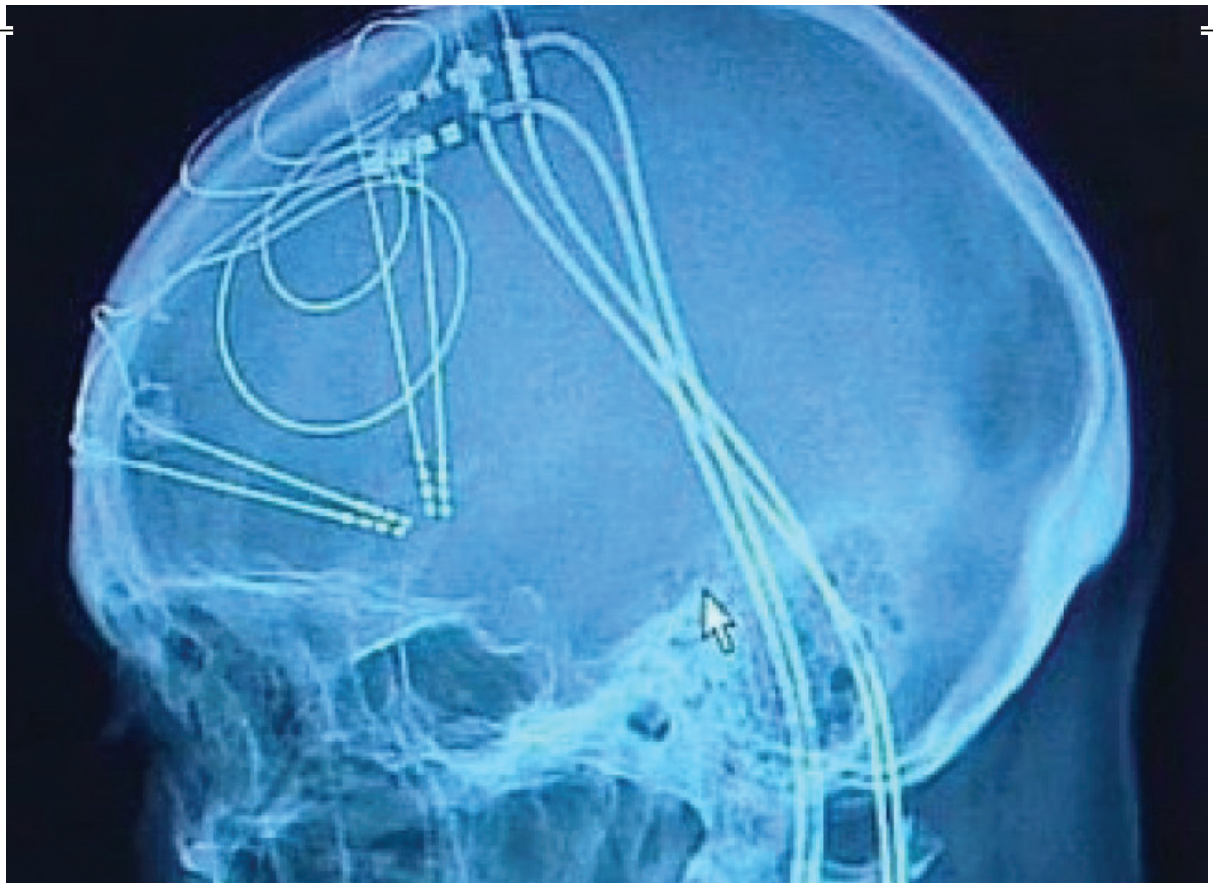
Powered Exosuits

Exoskeletons designed to help workers lift and carry objects more easily and with less risk of injury. For example a suit having a soft, supportive undersuit for the lower body, with a system of spring and rubber bands, the suit stores a soldier's own kinetic power (from walking or running) and then releases it, lowering metabolic energy use.



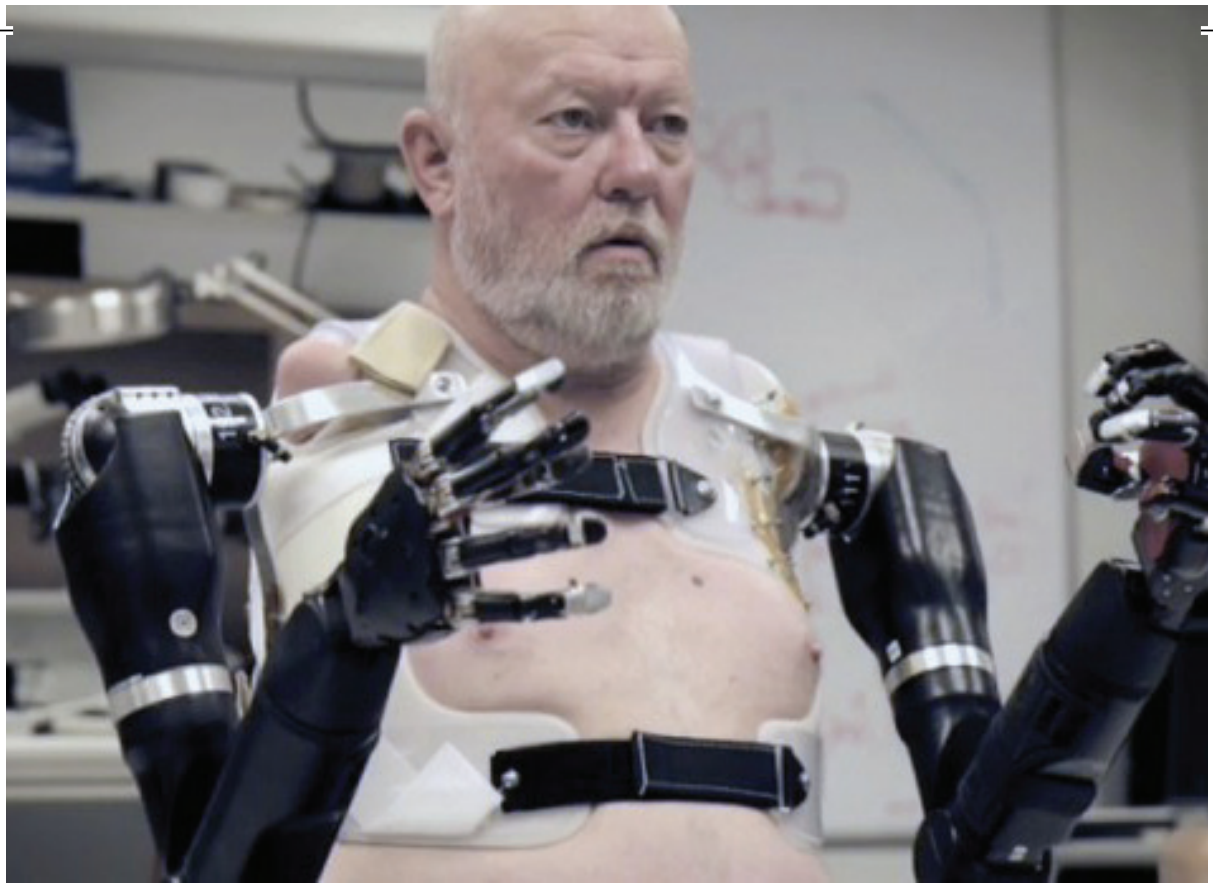
Pulse Oximetry (Blood O2)

Advancements in the measurement & delivery of oxygen in the blood supply. Now smartphones and mobile devices have the functionality built in.



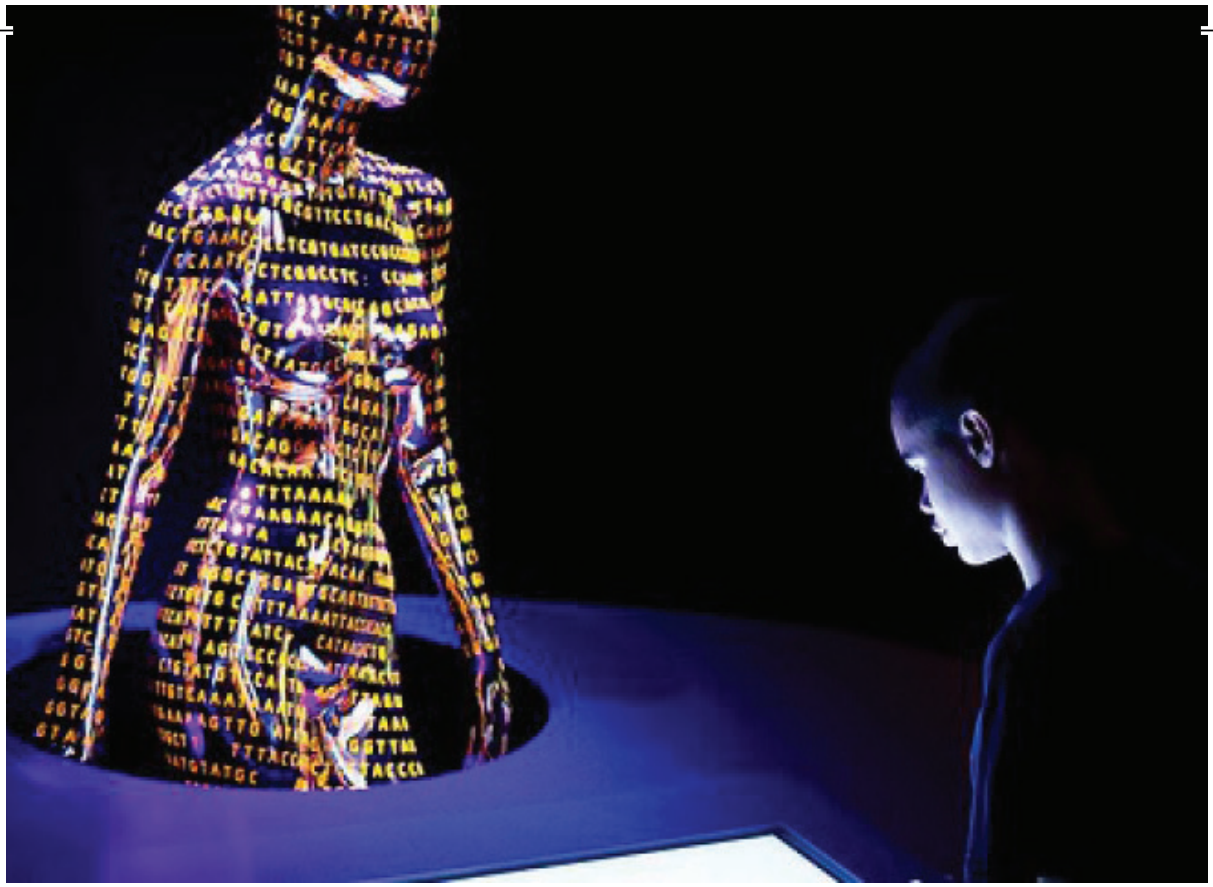
Brain Computer Interface

BCI is currently being studied by military applications as well as civilian medical. It's applications range from memory expansion, and hueristic anticipation, to external control of devices.



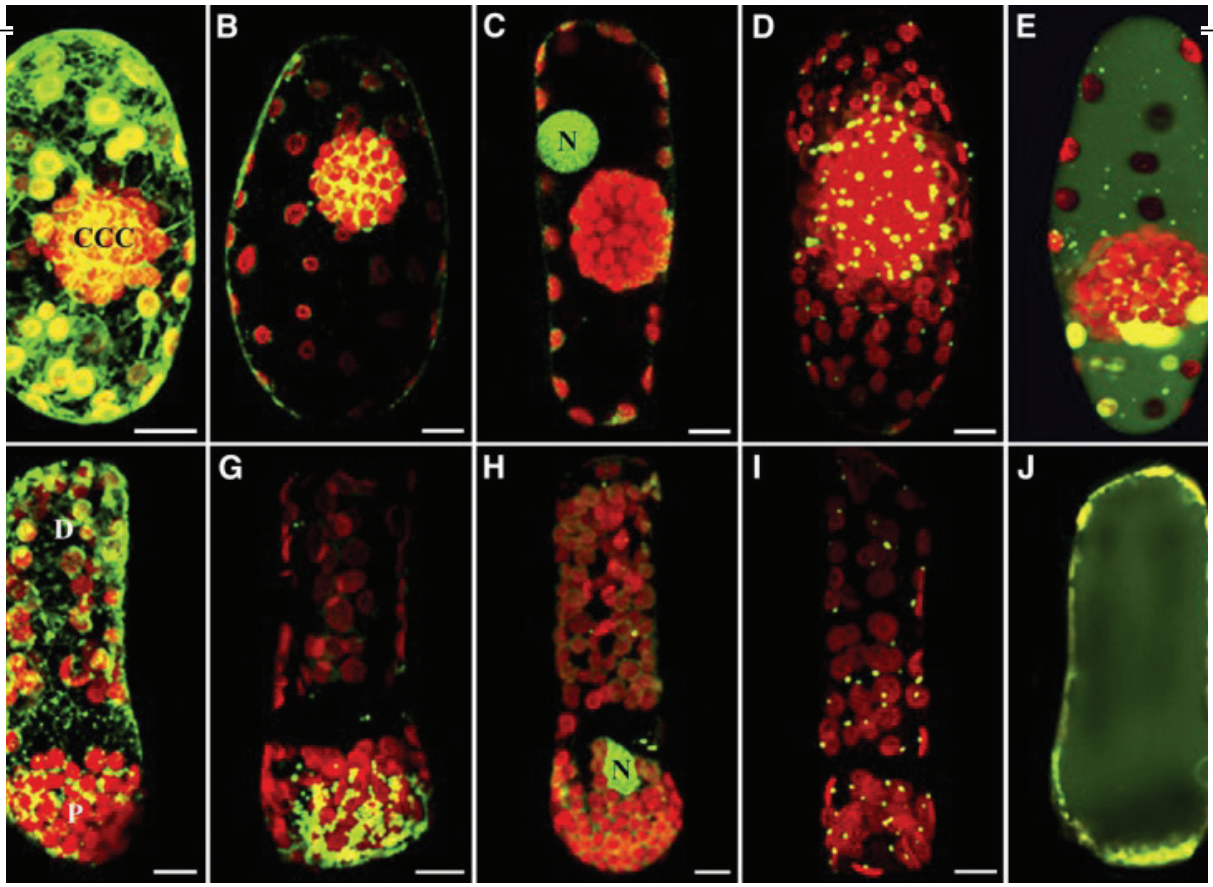
NeuroProsthetics

Devices designed to replace senses; like cochlear implants, optical devices to the visual cortex; related to neural engineering required for other functions including motor control and cognitive deficiencies.



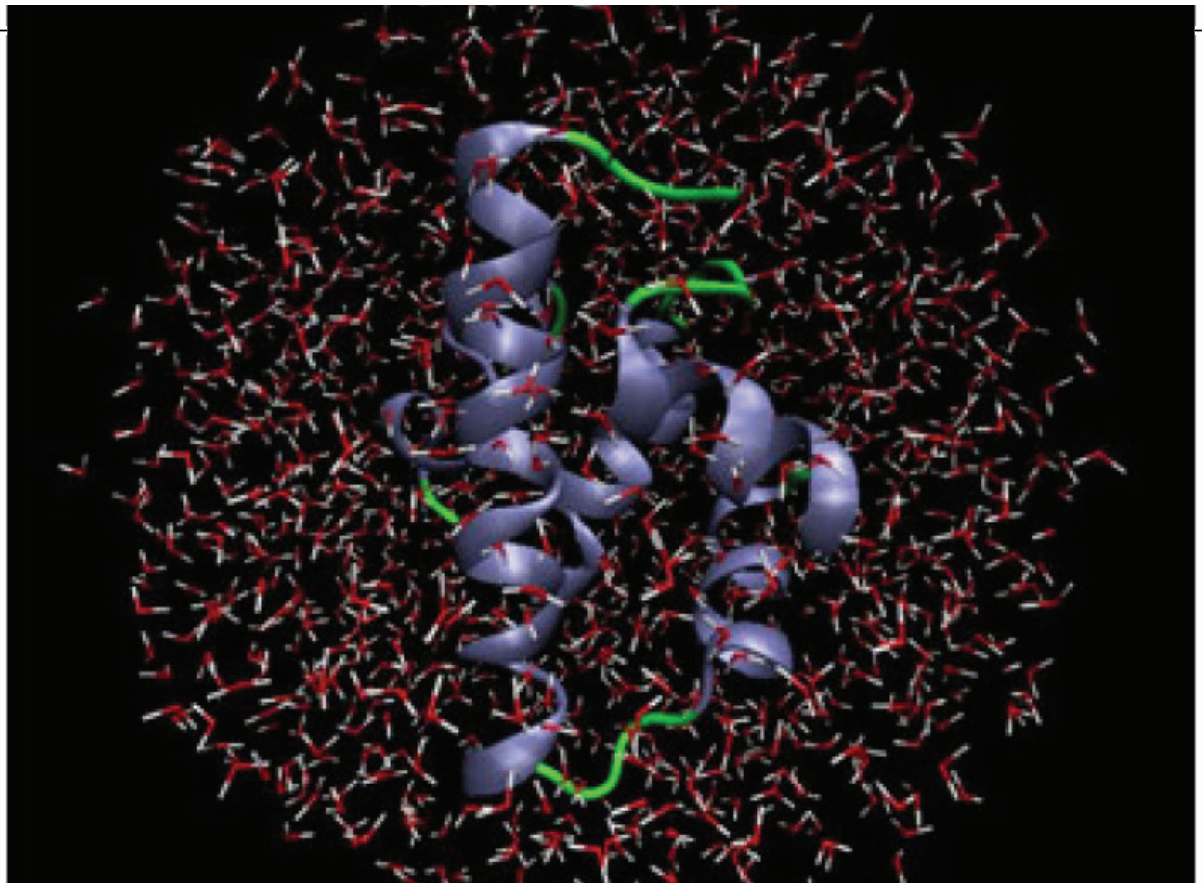
Full Genome Mapping

Lowered barriers to entry and more advanced toolsets allow for distributed & crowd sourced invention & solution modeling.



Supercharged Photosynthesis

As 33% of rice production has flattened, and crop yields aren,Äôt increasing fast enough to keep up with demand from a growing population. Genetically engineering plants to extract energy from sunlight more efficiently will increase production yields. De Facto, ratio of production energy use per acre harvested increases.



Synthetic Biology

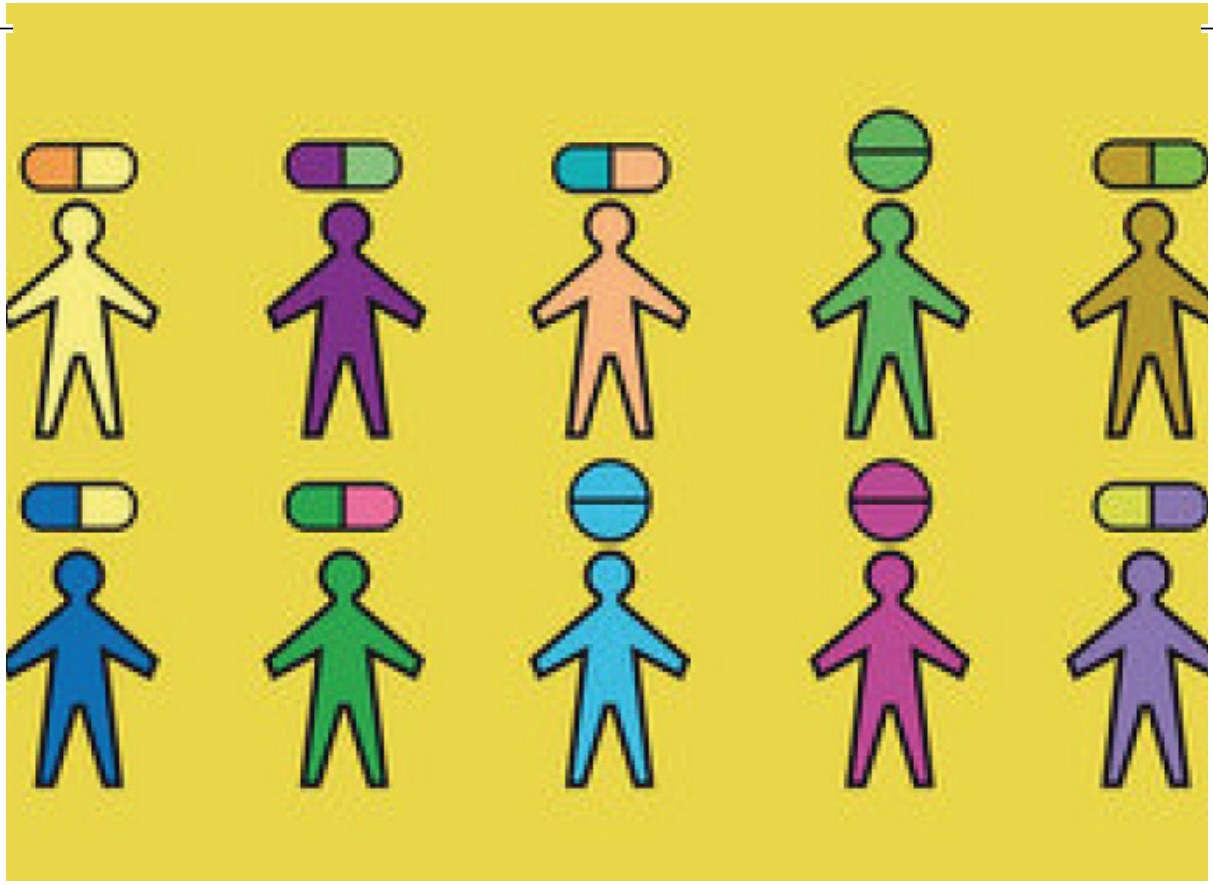
The closely related cousin of Genetic Engineering; Synthetic Biology, the child from Molecular Biology & Biotechnology, aims to "design and construct biological devices and biological systems for useful purposes."

Transgenic Organisms

An organism which contains foreign genetic material; sometimes from entirely different species.

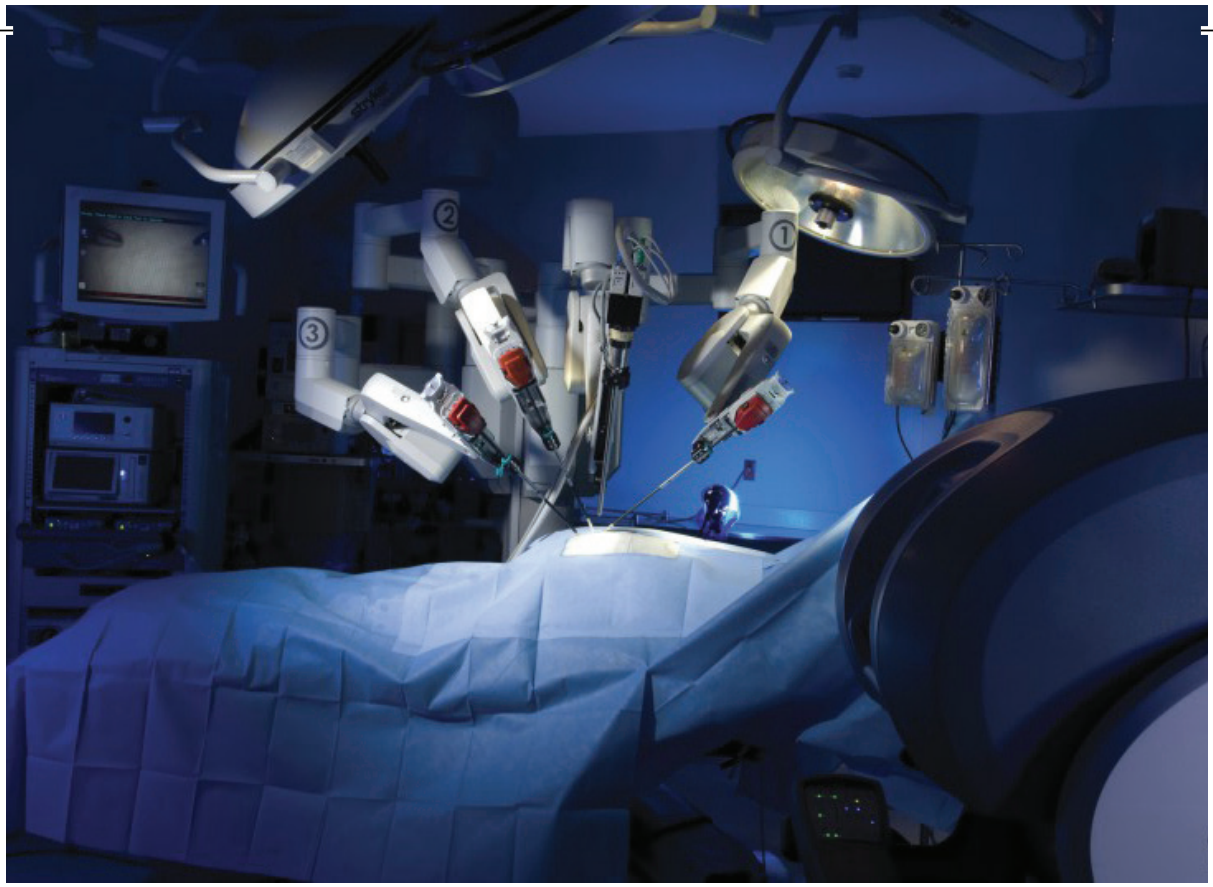
Genetic Therapy

Replacing, Inactivating, or Introducing new genetic code to an already existing organism to change it's structure for repairs, or enhancements.



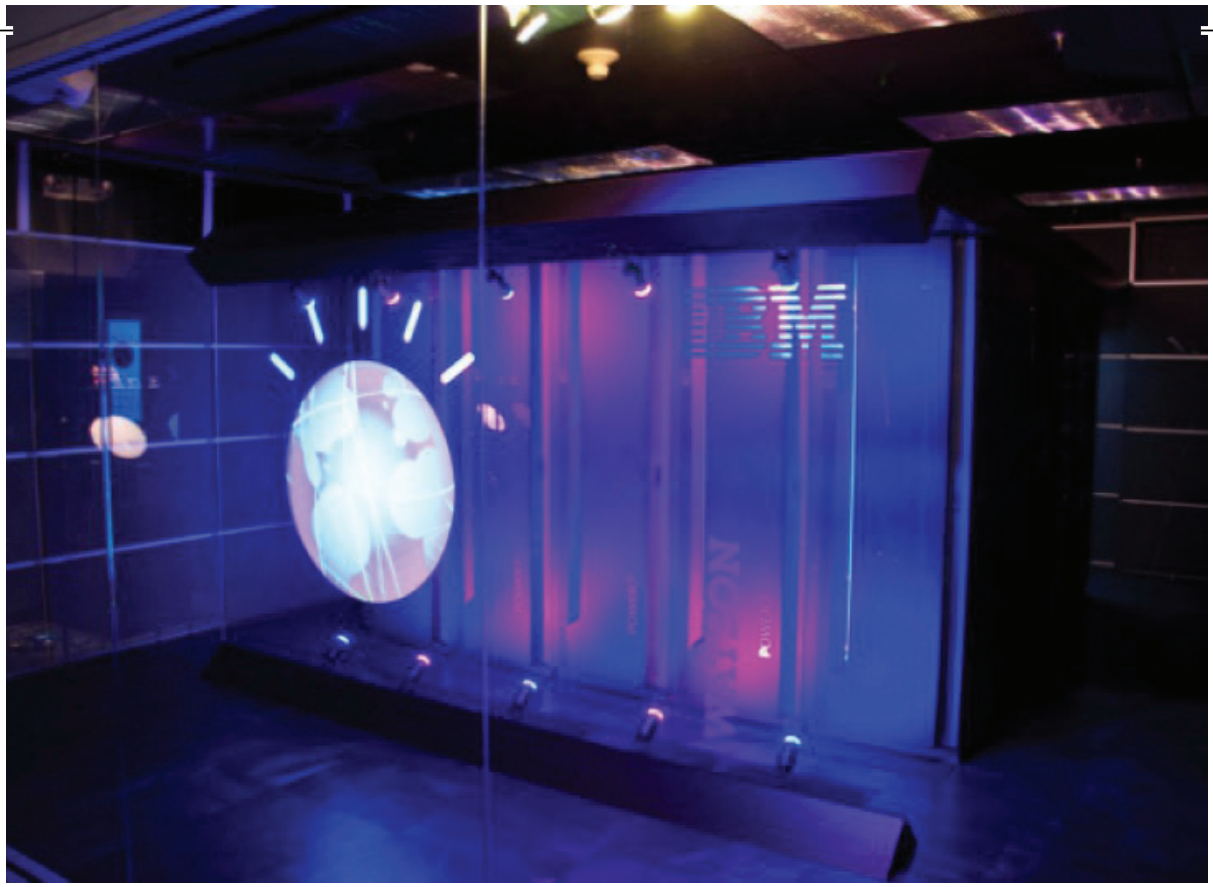
Personalized Medicine

Trackability will enable a more effective preventive care, that can follow us into our daily lives. Besides this, big data analyses, which are softwares that can process and analyse mass content in real time will be able to use our own personal inputs to create our own quantified self.



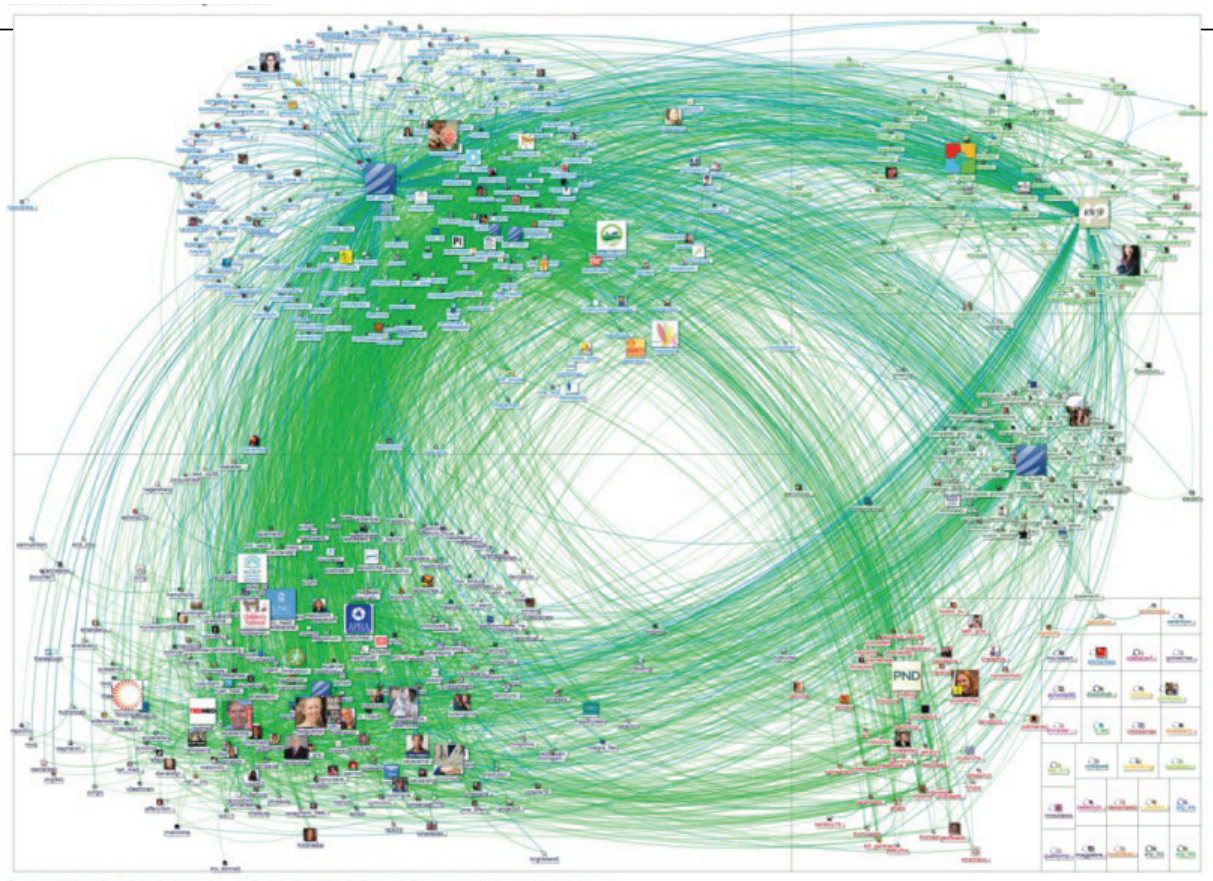
Robot Surgery

Developed to overcome both the limitations of minimally invasive surgery or to enhance the capabilities of surgeons performing open surgery.



AI Doctor

New artificial intelligence programs are very different from the Siri of your phone which is programed to think linearly and have just a set of responses, those new softwares have deep learning technology embedded which means that they “learn how to learn”.



Crowdsourced Medicine

The knowledge generated by a group of people is always going to be greater than someone alone. People with similar conditions gather themselves around health communities, which can be used as trial groups way cheaper and more engaged than lab tests.

Telehealth

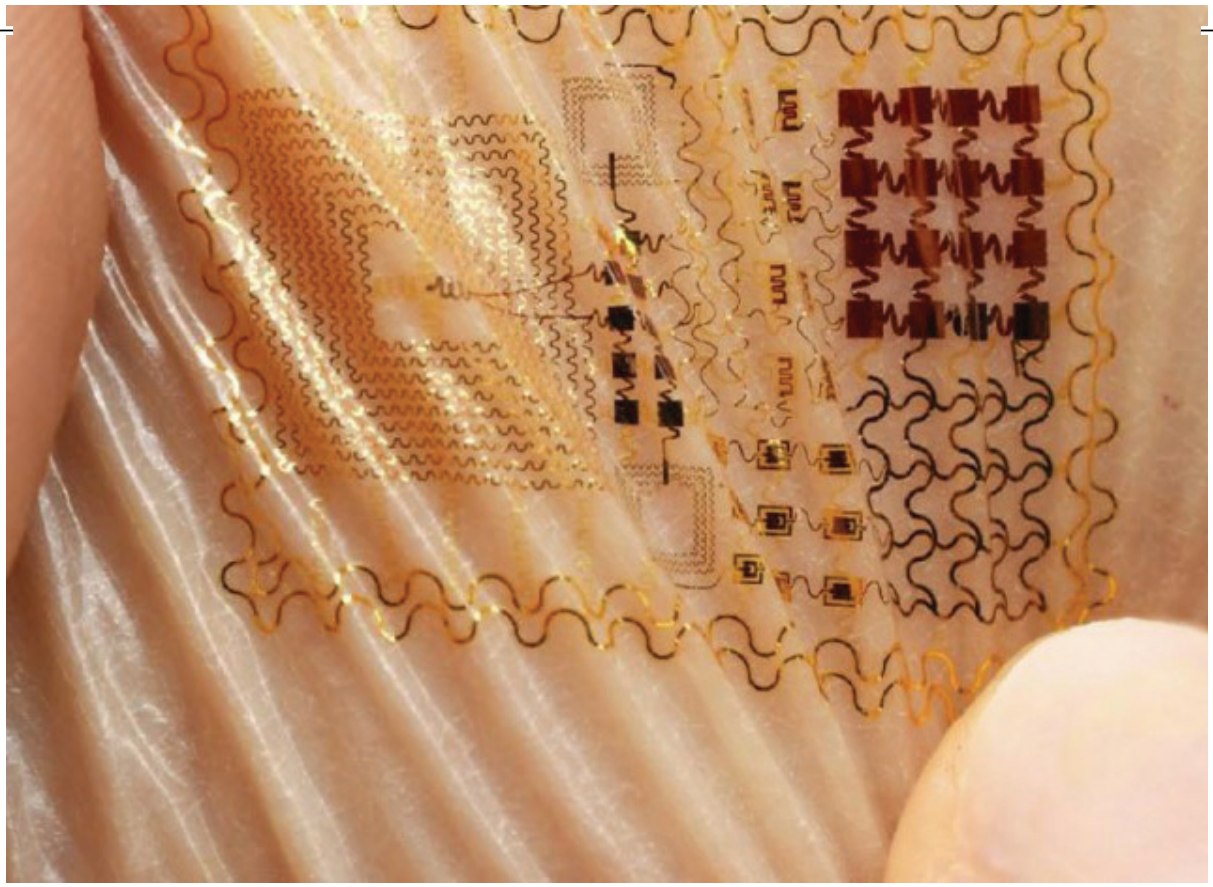
Can be as simple as text messages to a family doctor, and as complex as using a health chair that checks from heart beat to throat coloration. This communication is particular important to connect people that live in remote areas to specialists. Furthermore, telehealth is a great way to reduce lines in hospitals, to assist first aid care when necessary and to reduce overall costs.

Auditory Sensors

From sonar to radar, accoustic sensing devices rely up on a specific bandwidth of frequencies to interpret information from the enivironment. Bio compatible embeddedable technologies can restore and even enhance human sense perceptions.

Biometrics

Secure identification via fingerprints, vein scanning, physical geometries, handwriting, iris, retina, voice, etc.. are all biometric technologies allowing identifications or people; this is particularly important in military operations in high populated areas to have a mechanism to catalogue and track information about residents.

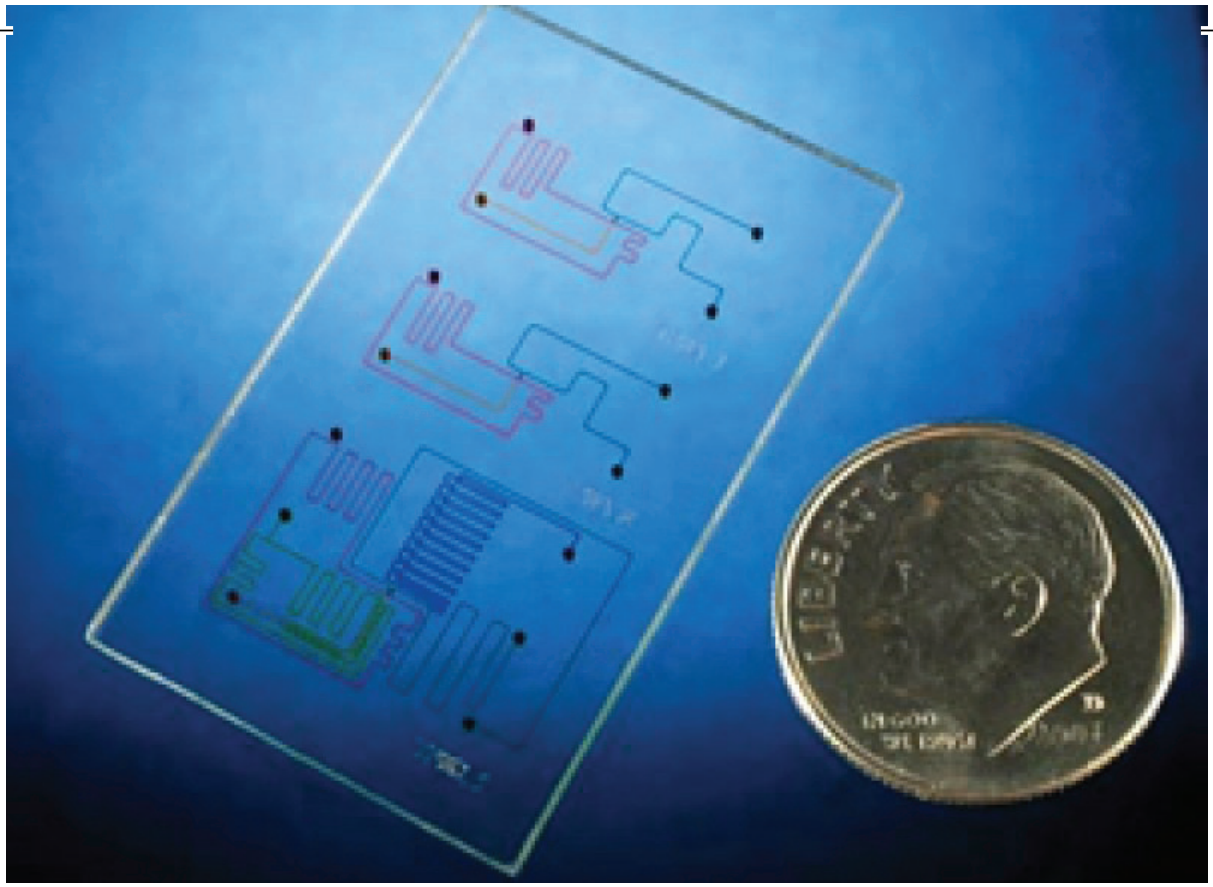


Skin Stickers

Stretchable, skin-friendly cosmetic stickers gives control of beauty regimen. They can alert via phone when it's time to reapply sunscreen and even measure skin's properties while sleeping to recommending ideal treatment.

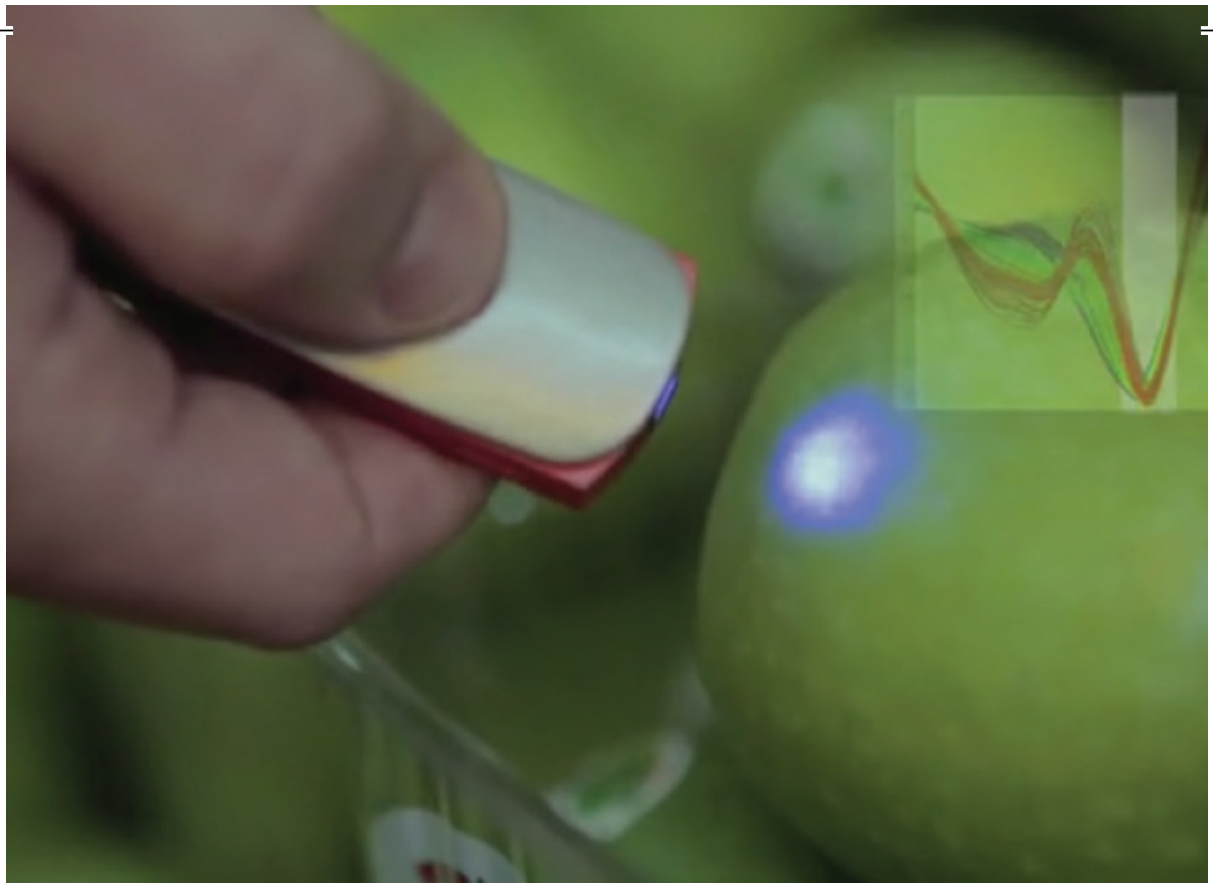
Ingestible Sensors

Digital devices with tiny sensors that you swallow for gathering and storing data, transmitting body temperature, heart and respiration rate to an external device.



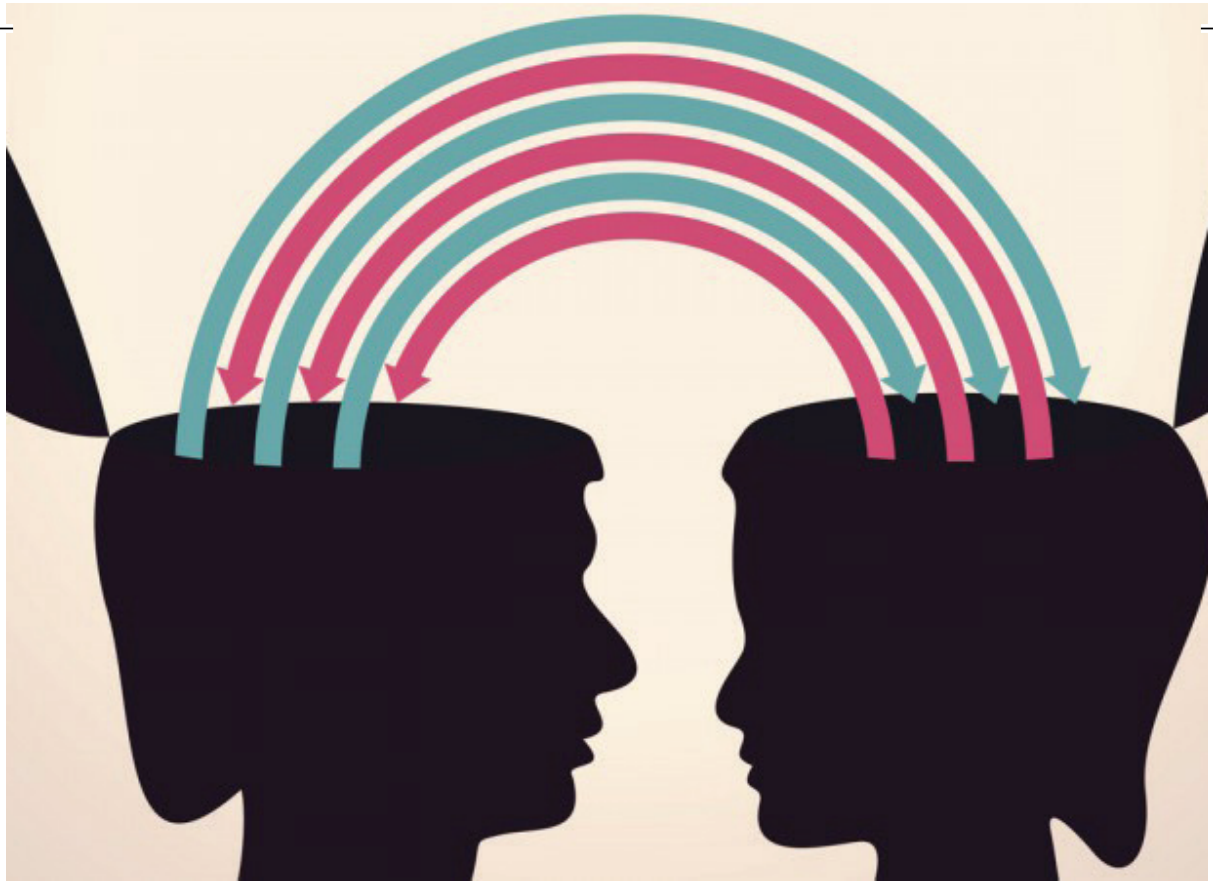
Labs-On-Chips

Devices that integrates one or several laboratory functions on a single chip of only millimeters to a few square centimeters in size. LOCs deal with the handling of extremely small fluid volumes down to less than picoliters. They represent safer platforms for chemical, radioactive or biological studies.



Molecular Sensor

Tiny spectrometer that allows to get instant relevant information about the chemical makeup of materials or physical objects.



Brain-to-Brain Interface

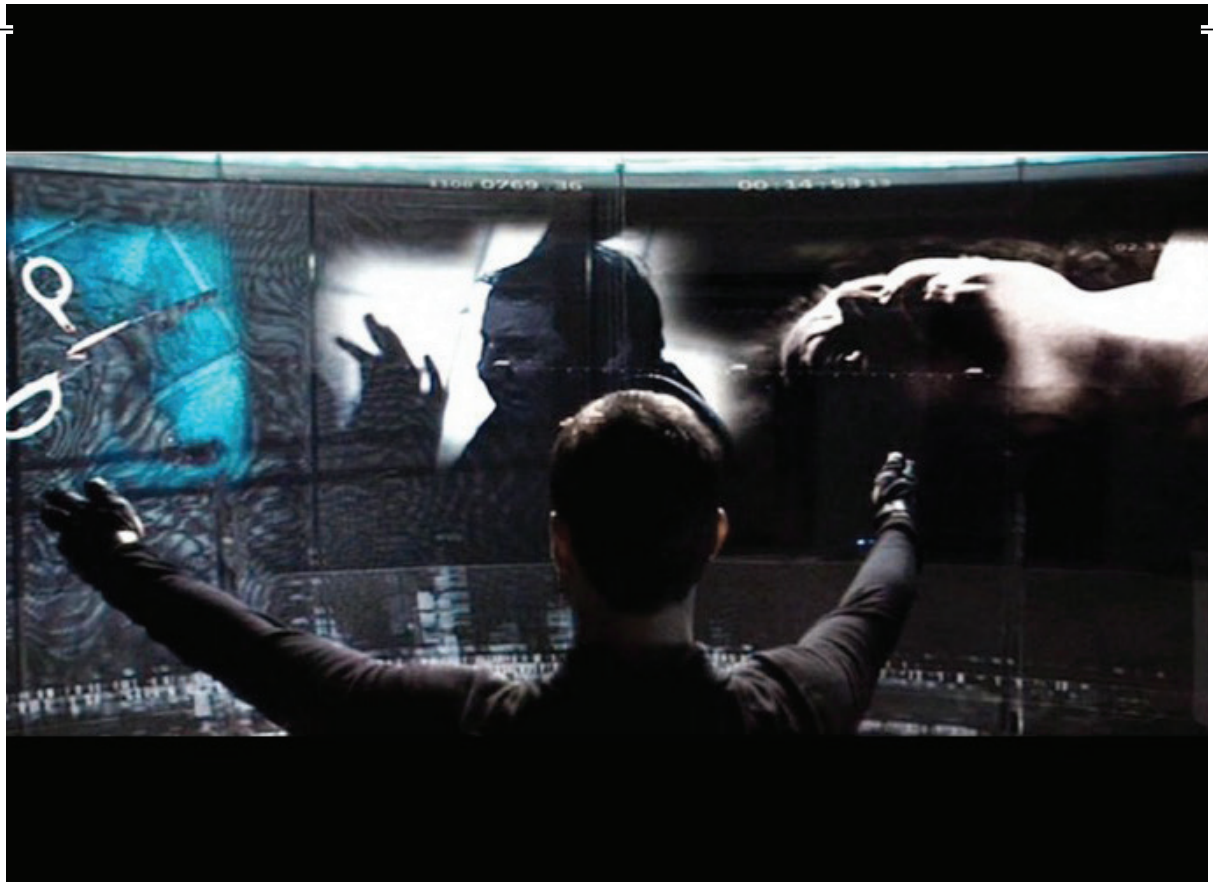
The ability to transmit action to an avatar has been demonstrated; and, reading neural activity is the real science of telepathy.

Human-Robots Relationship

The human ability to form bonds between oneself and objects is advanced through the mediums of interaction. This includes looks, feel, and also ever increasing empathetic cognitive abilities.

Personalized Predictive Analytics

Analytics which get to know the user; and predict behaviors from travel patterns, social interactions, and energy cycles. This leads to personality categorization & assessments of behavior.

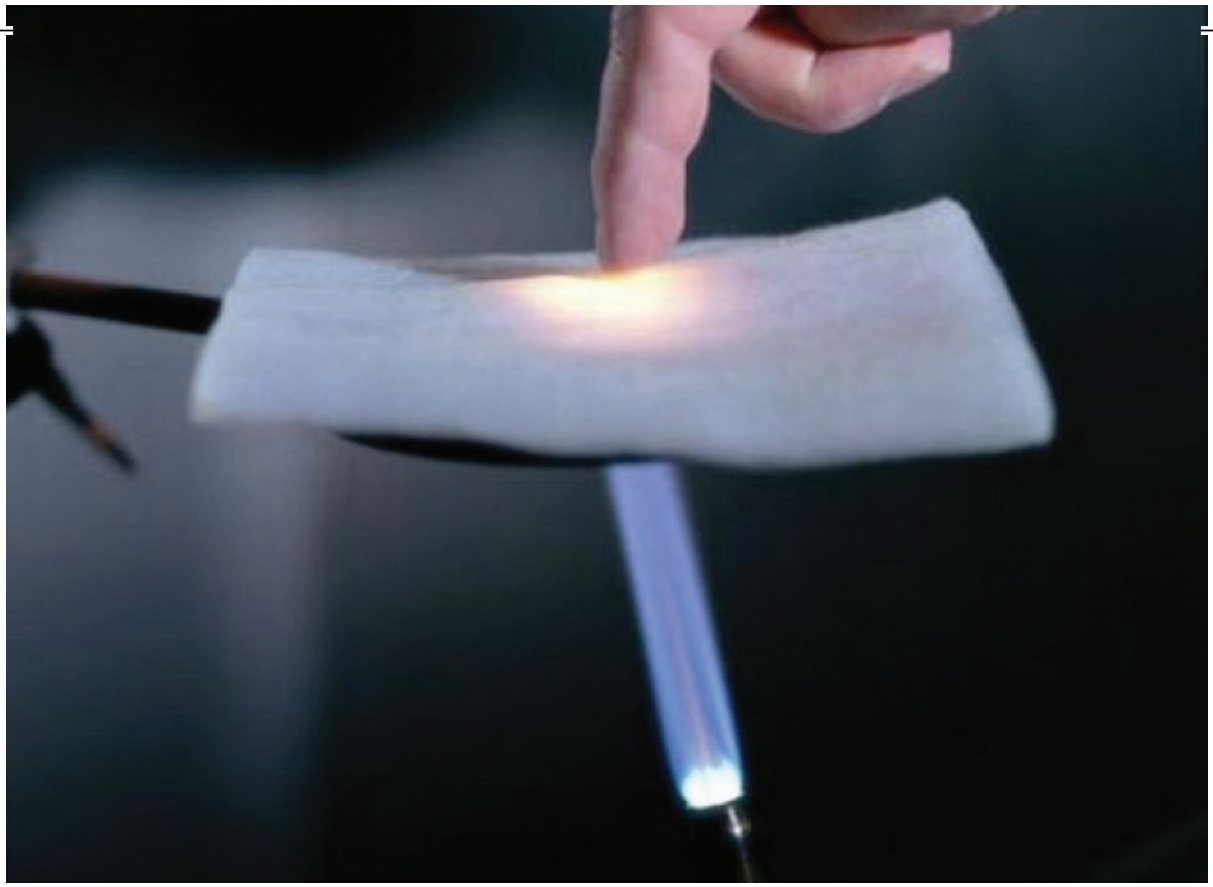


Predictive Crime Prevention

The use of sociometric sensors coupled with neural networked computers to statistically determine the probability of crime (or other anti-social behavior) taking place before it happens.

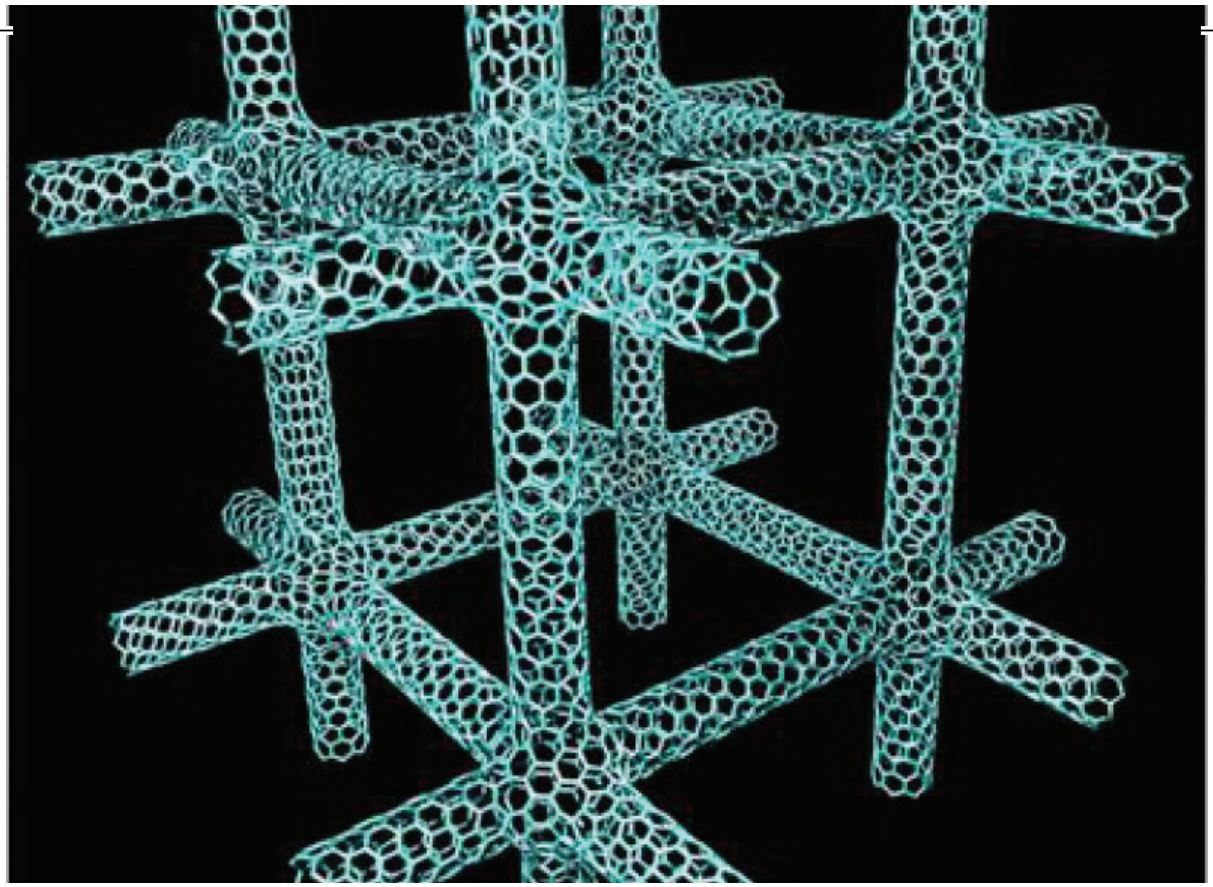
3D Materials

From powders, CLIP liquids, PLA, and multitudes of other choices; the options for 3D printing even include Carbon Fiber & Kevlar.



Aerogel

A synthetic porous ultralight material derived from a gel, in which the liquid component of the gel has been replaced with a gas. Potential applications include improved thermal insulation, chemical absorber for cleaning up spills, electrochemical supercapacitors and shock absorption.

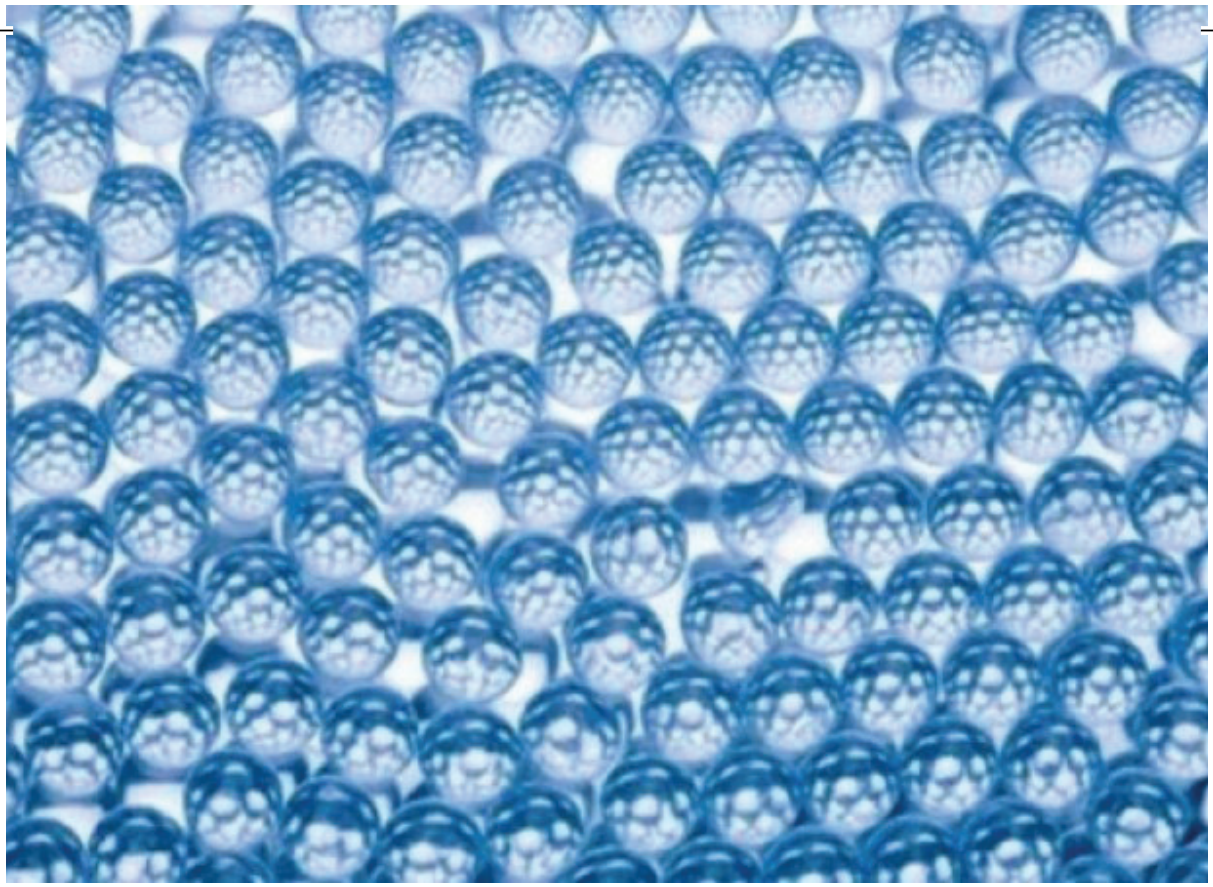


Carbon Nanotube

Molecular-scale tubes of graphitic carbon, they are among the stiffest and strongest fibres known.

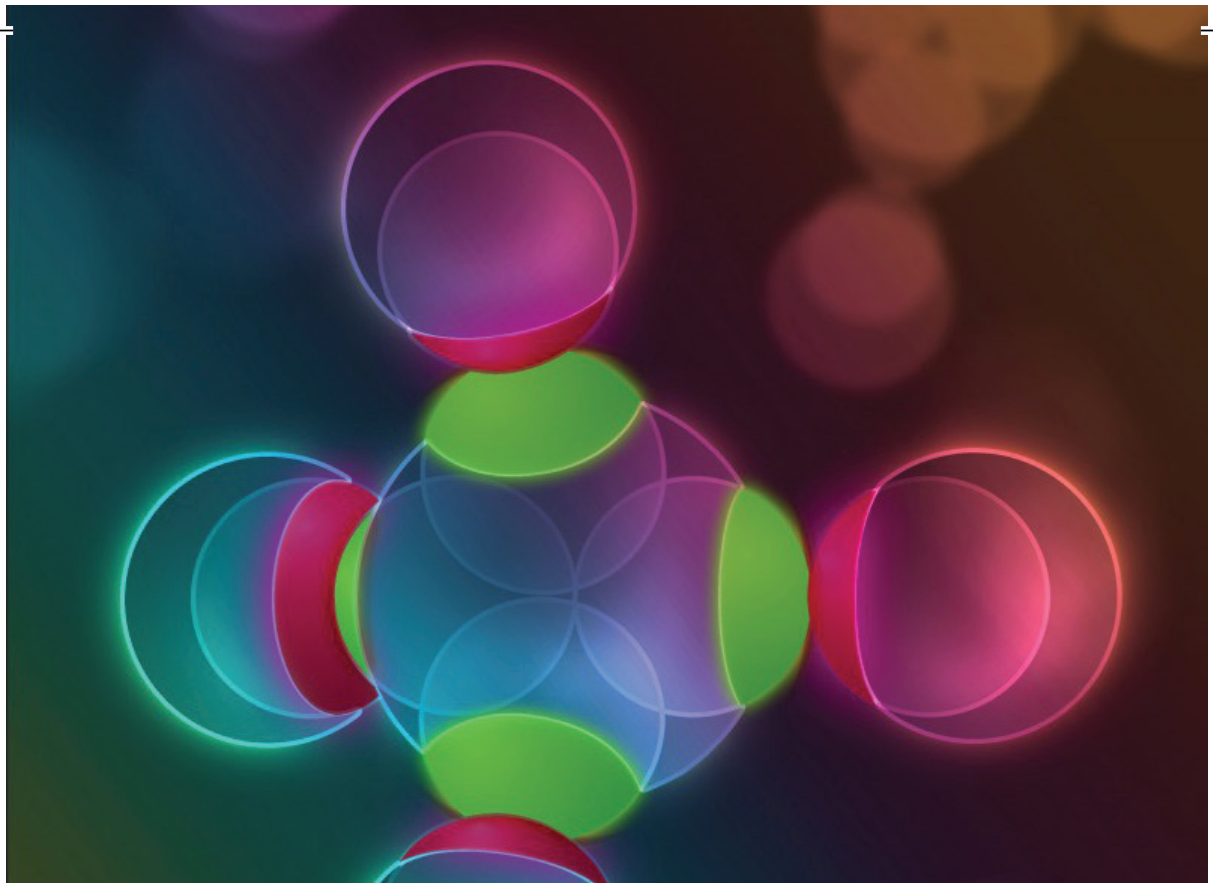
Metamaterials

Materials with a precise shape, geometry and arrangement which can affect light and sound in unconventional manners. Potential applications iclude smart solar power management, public safety, improving ultrasonic sensors, and even shielding structures from earthquakes.



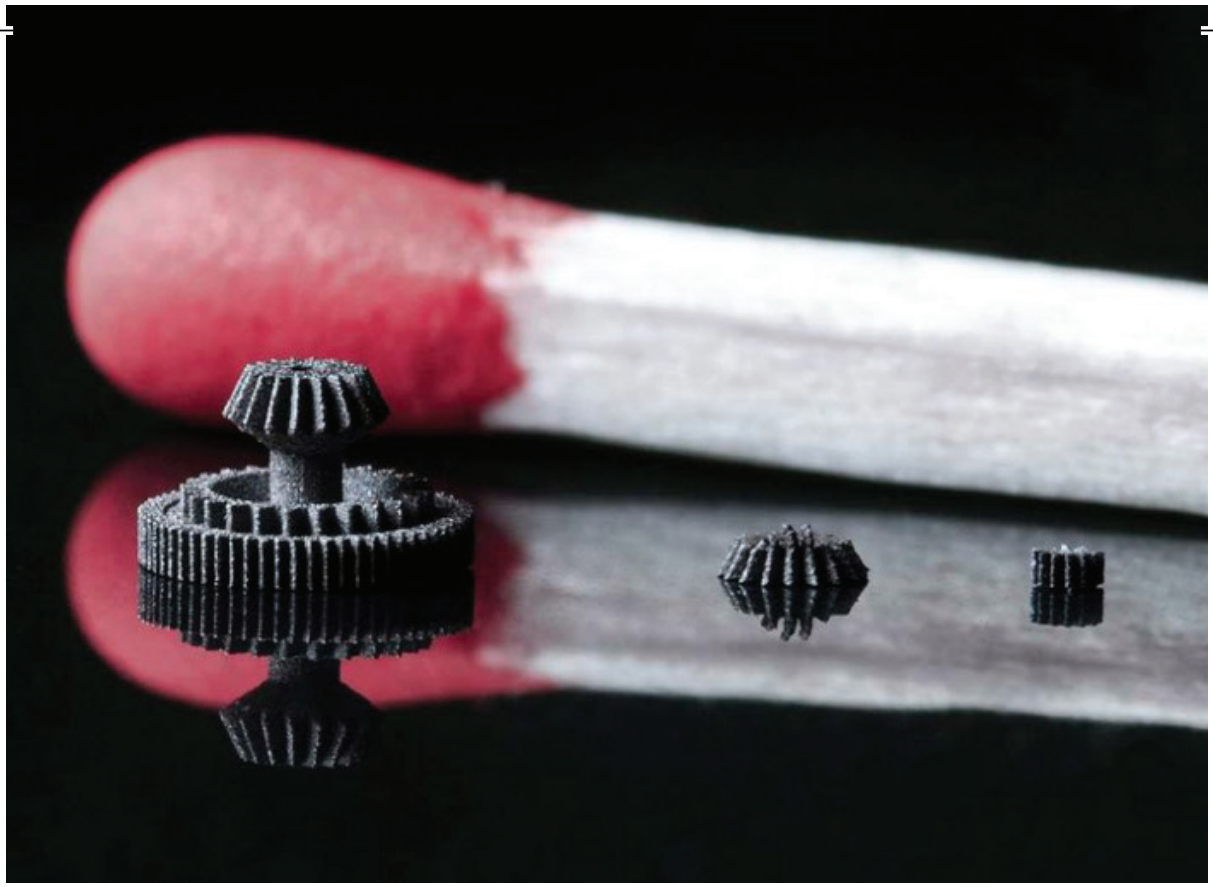
Nano Food

Engineered particles are already disbursed on food in the form of coatings to preserve the integrity of food and it’s color. Nanosilver preserve food from fungi and microbes, and other engineering feats replicate flavor and textures of food.



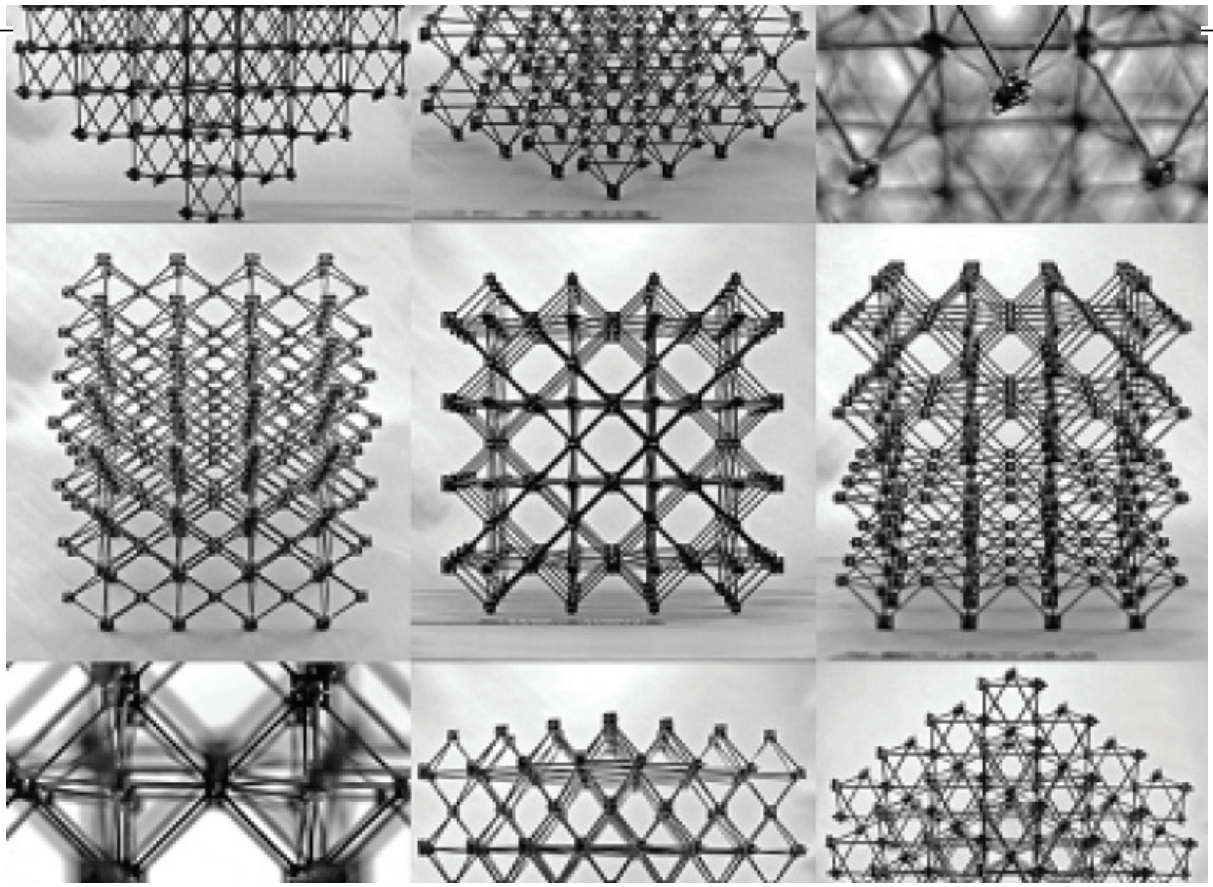
Controlled self-assembly

Machines that manipulate individual atoms with organism-like self-replicating abilities. These bottom-up, atomically precise 3D printers would be able to carefully create sequences of DNA, RNA or protein



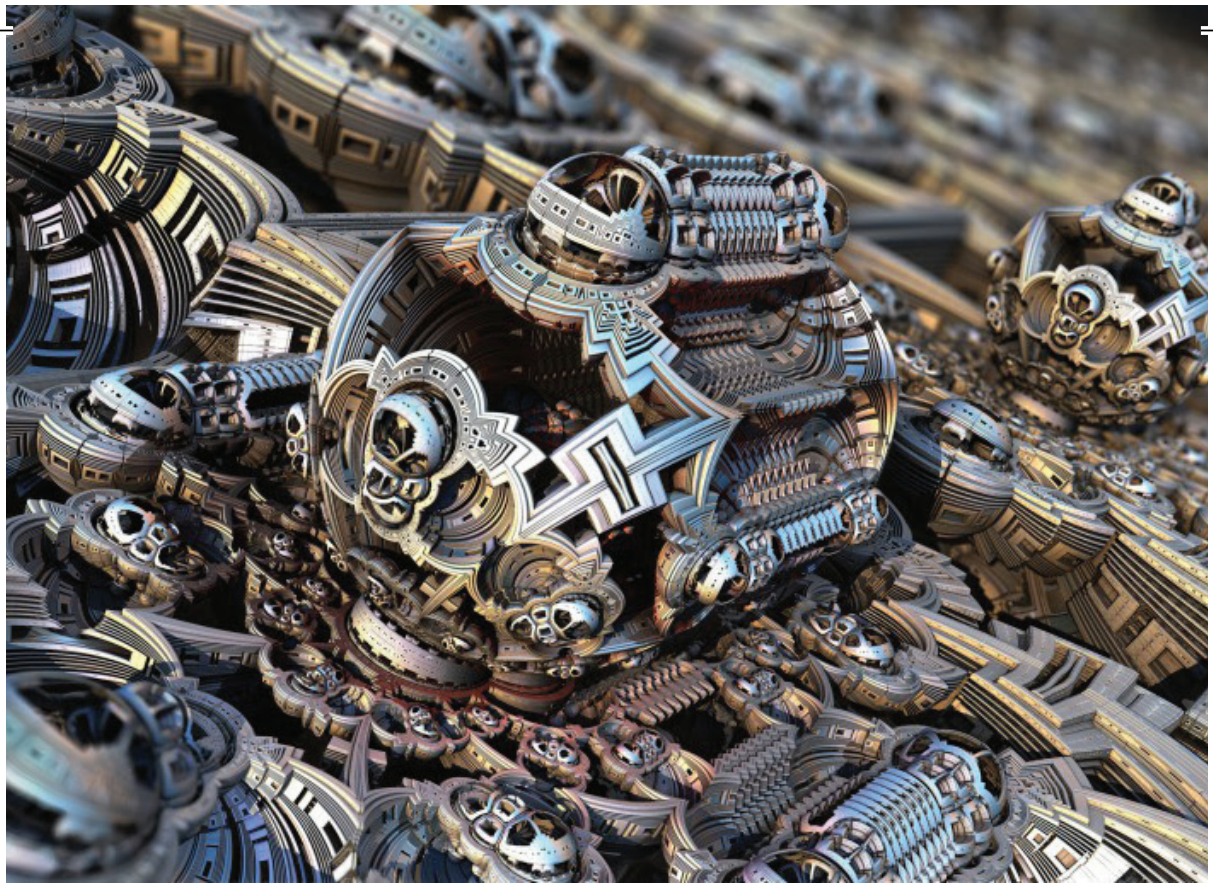
Microscale 3D Printing

3D printing that uses multiple materials to create objects such as biological tissue with blood vessels.



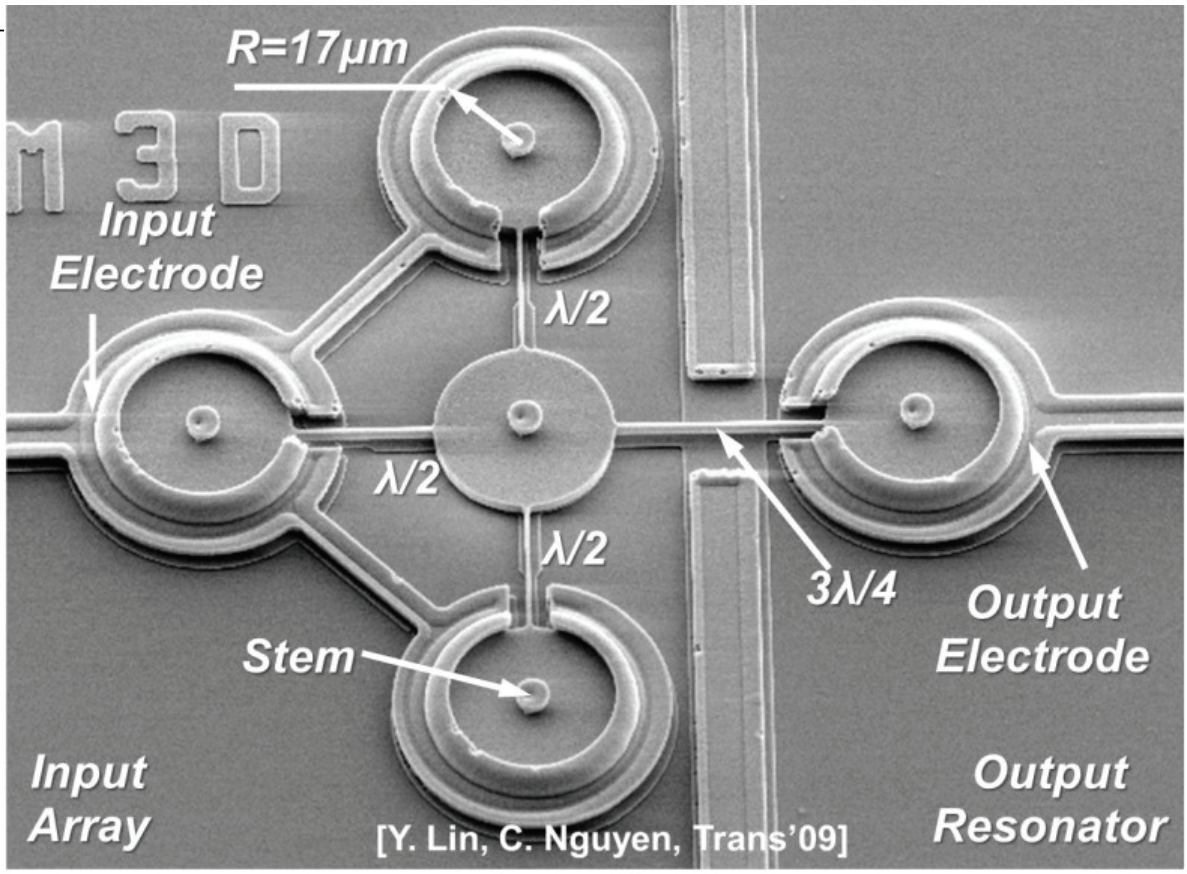
Nano-Architecture

Materials whose structures can be precisely tailored so they are strong yet flexible and extremely light. Lighter structural materials would be more energy-efficient and versatile.



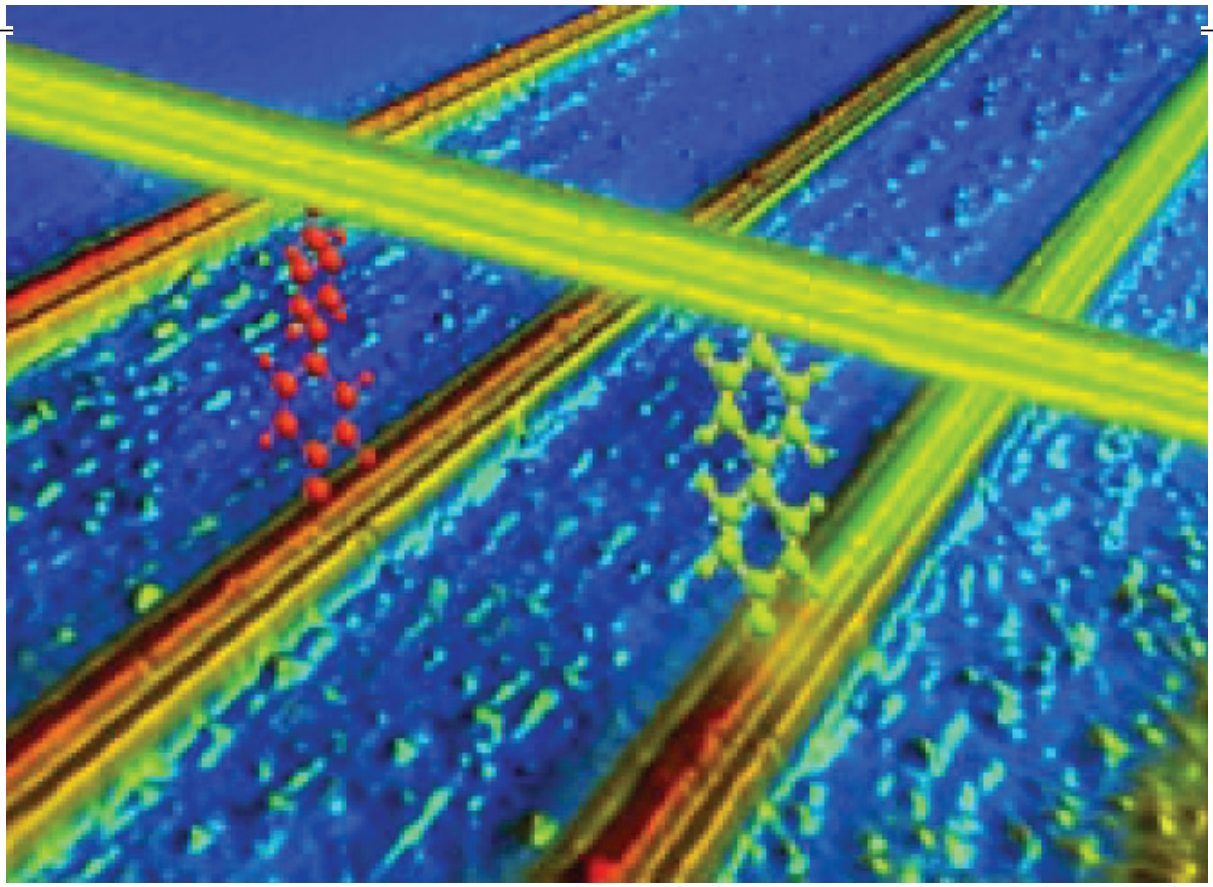
Nanofactories

A proposed system in which nanomachines would combine reactive molecules via mechanosynthesis to build larger, atomically precise parts. These, in turn, would be assembled by positioning mechanisms of increasing size to build macroscopic (human-scale) products that remain atomically precise.



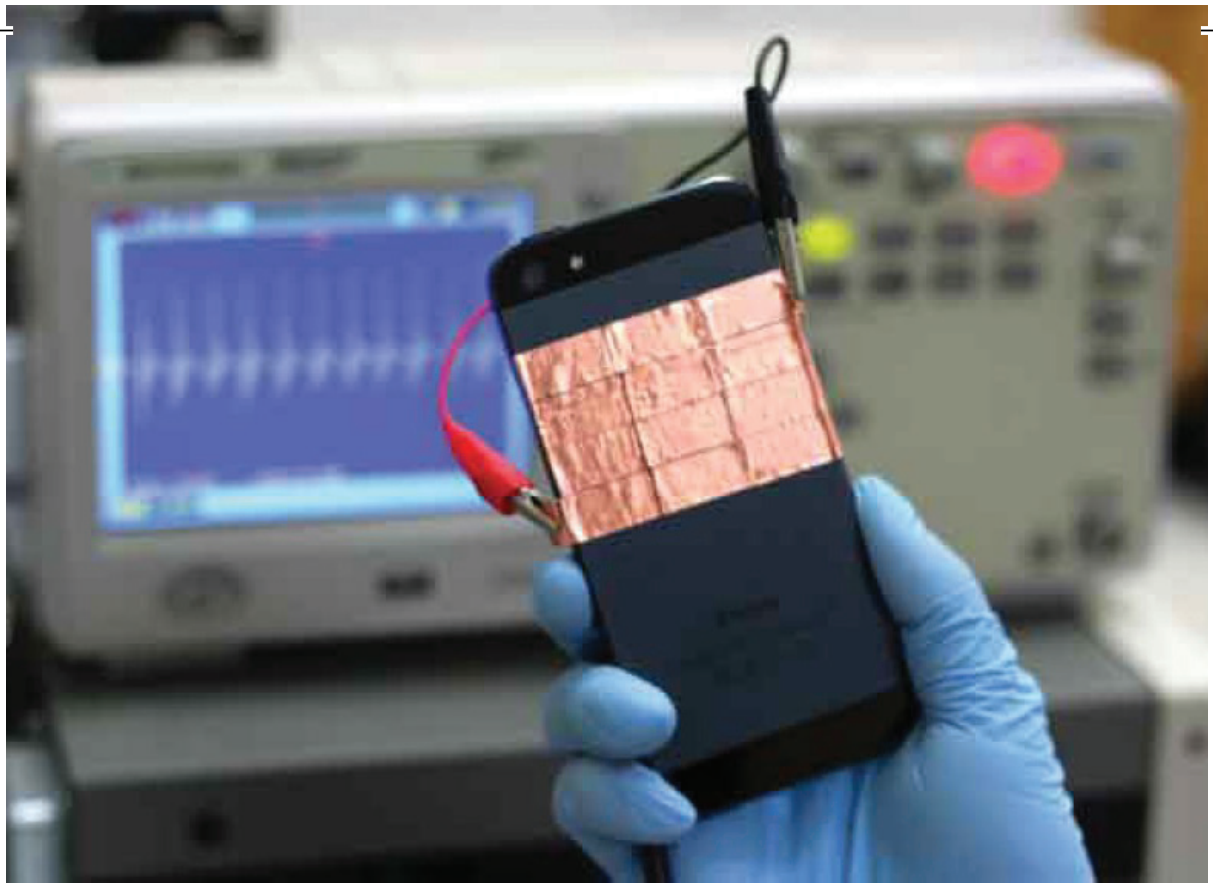
Nano ElectroMechanical Systems

Devices integrating electrical and mechanical functionality on the nanoscale. NEMS typically integrate transistor-like nanoelectronics with mechanical actuators, pumps, or motors, and may thereby form physical, biological, and chemical sensors.



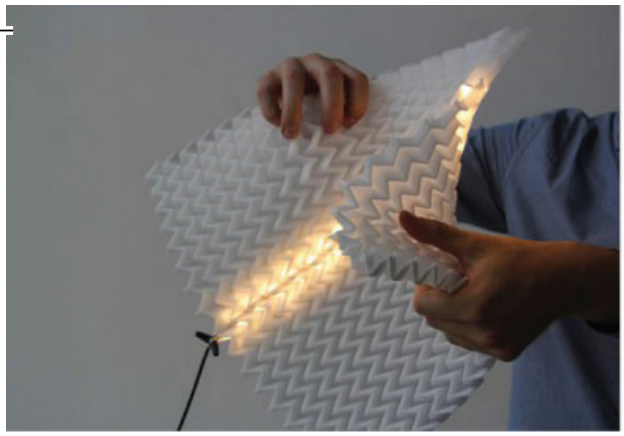
Nanoelectronic Devices

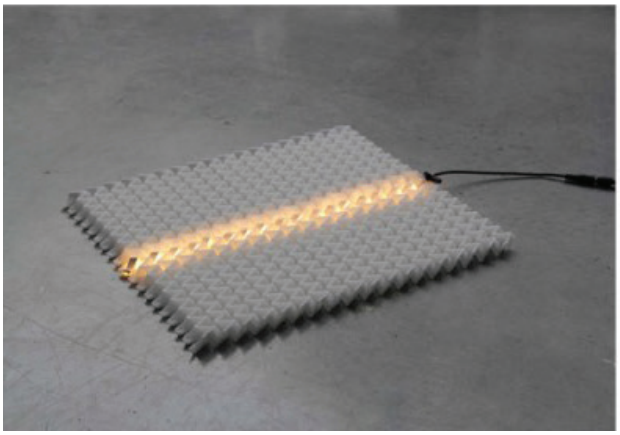
These devices are designed on the molecular level taking into account atomic interactions at very close proximities; and, has dynamic materials dependencies while creating non-traditional circuit systems.



NanoGenerator

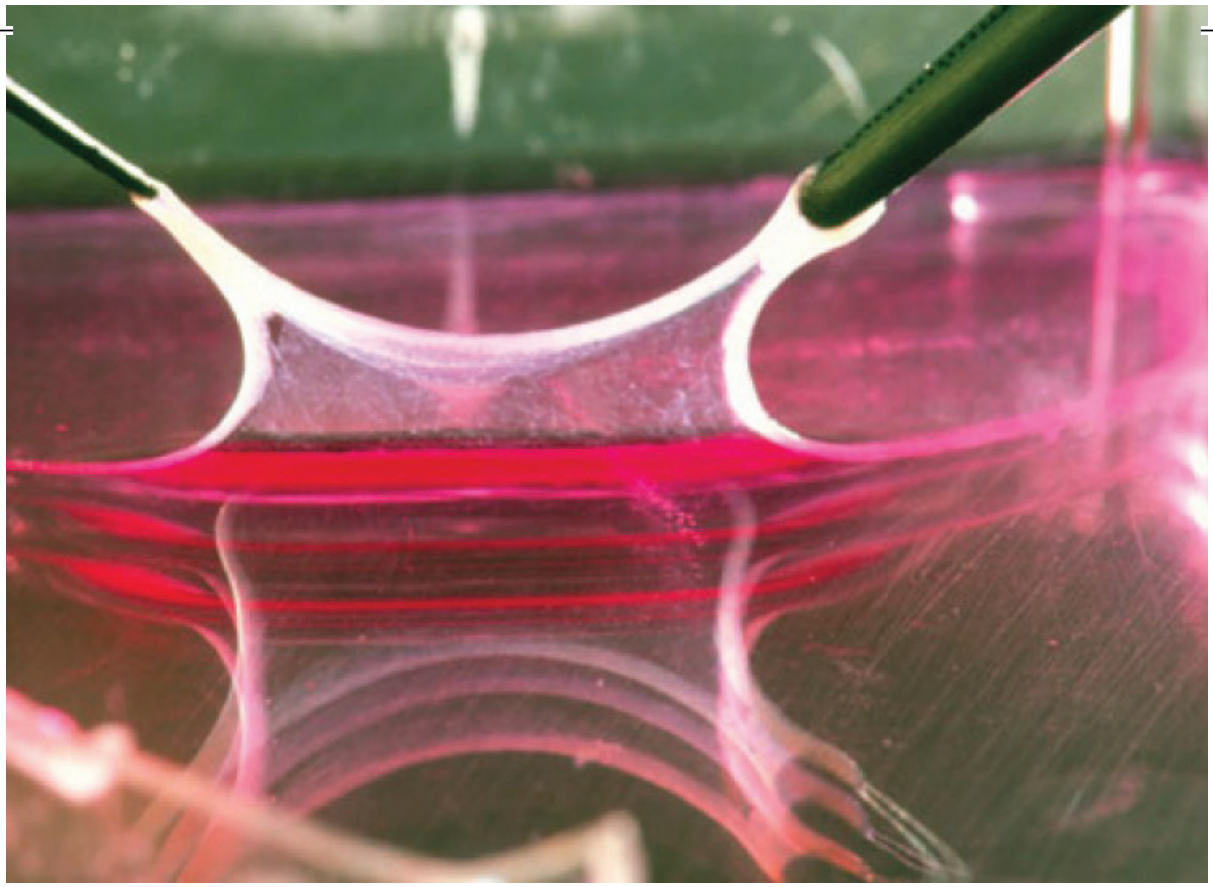
Converts mechanical/thermal energy as produced by small-scale physical change into electricity.





Auxetic Materials

When stretched, auxetic materials become thicker perpendicular to the applied force. This occurs due to their hinge-like structures, which flex when stretched. Auxetics may be useful in applications such as body armor, packing material, knee and elbow pads, robust shock absorbing material, and sponge mops.

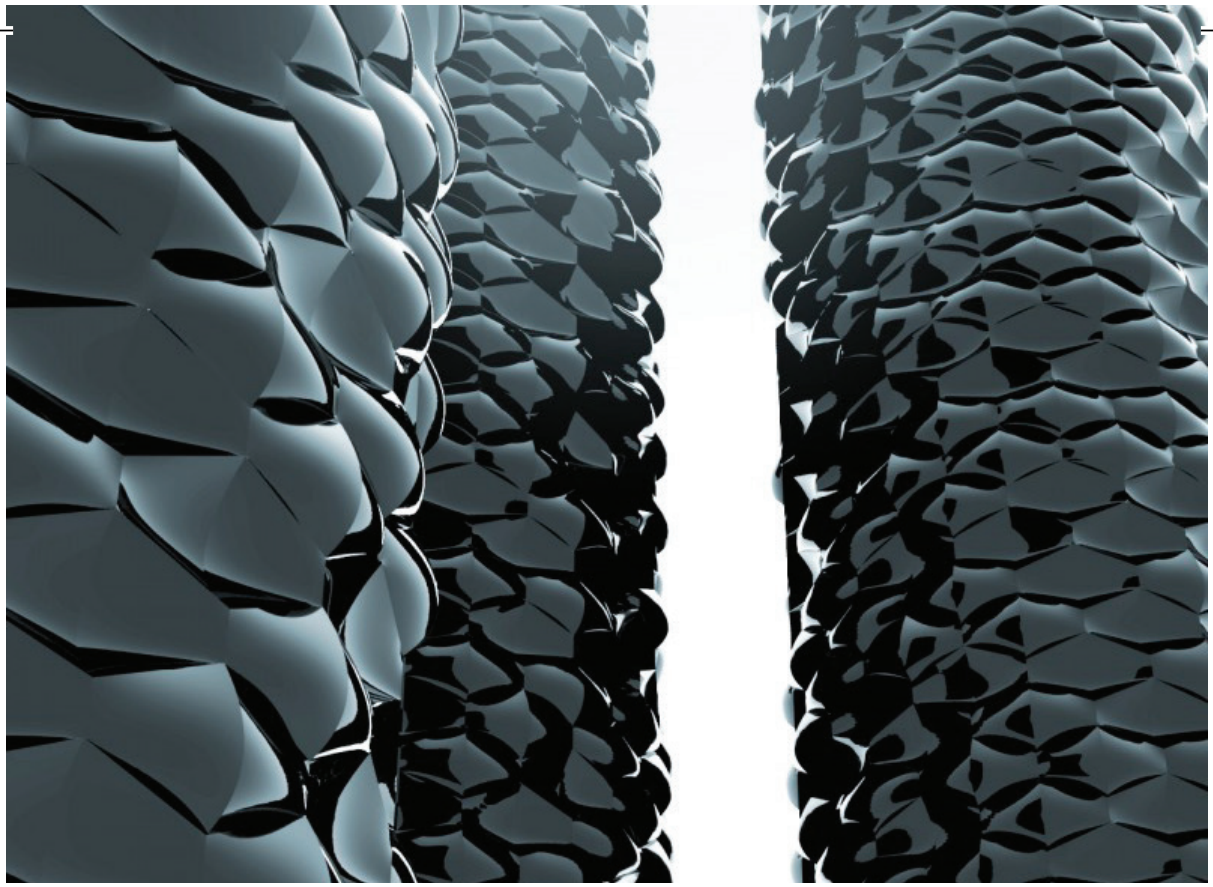


Biomaterials

Derived either from nature or synthesized in the laboratory, biomaterials can be used to enhance or replace natural functions in the body.

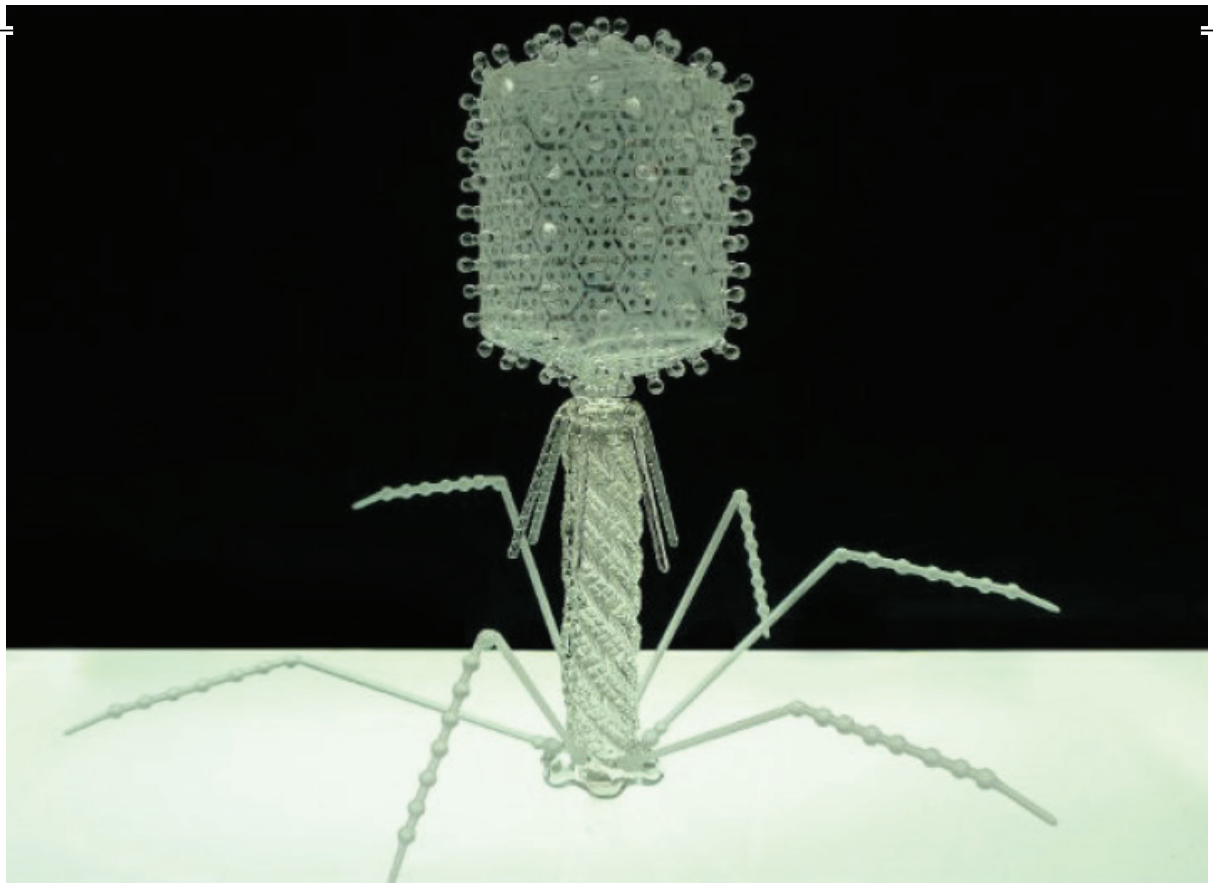
Invisibility Cloaks

A material system which creates an optical illusion showing what is on the other side with enough clarity to effectively hide an object in plain sight.



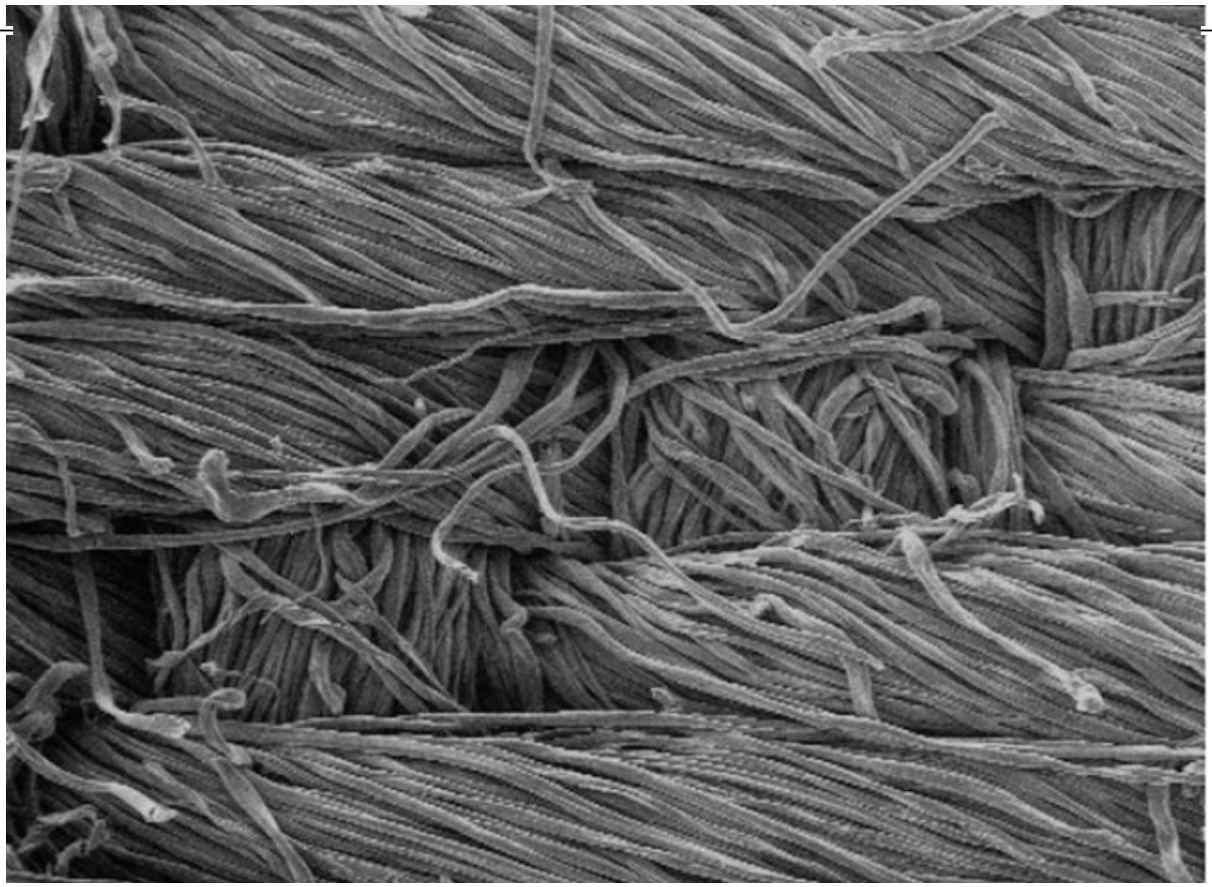
Morphing Materials

Materials that change shape and return to their initial form. Morphing materials might be metals or polymers that have a ‘memory’; or are covered with a ‘skin’ that will instigate a shape change.



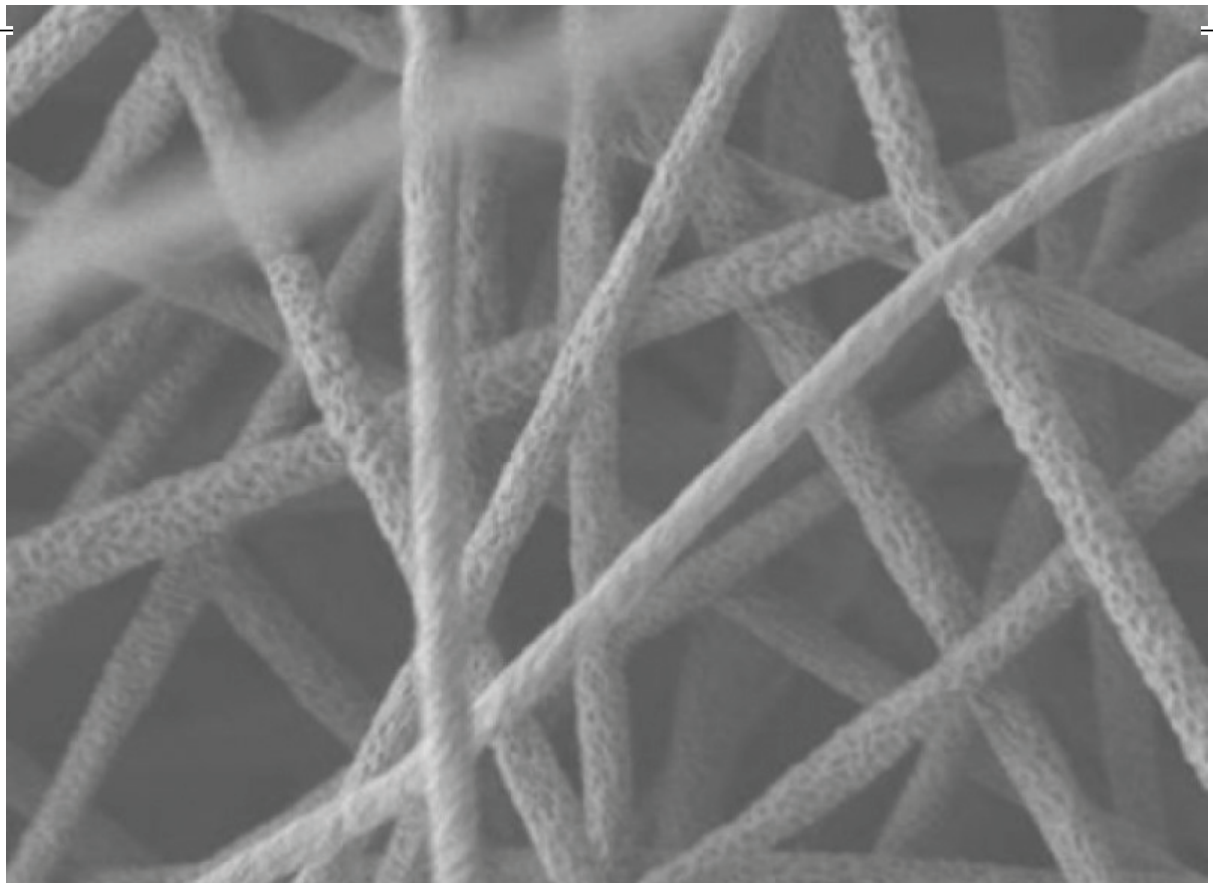
Nano Glass

Coatings to composition; nanotechnology is providing hydrophoobic and repellent static functionality; as well we increased optical performances.



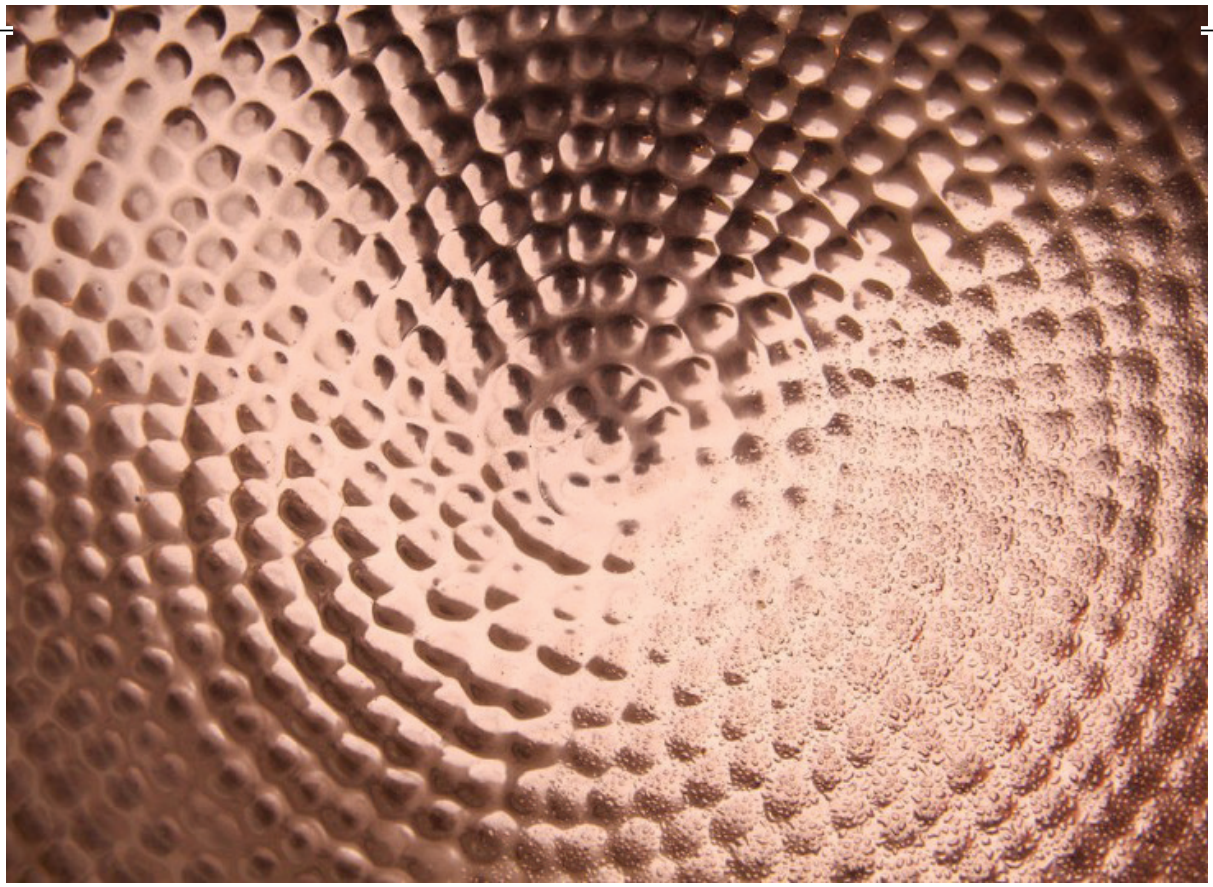
Nano Textiles

Nano textiles are providing anti-microbial and hydrophobic features.



Nanocomposite Plastics

Nanocomposite plastics and polymers have multiple applications from faster biodegradation to increased flame retardancy, and higher structural performances.

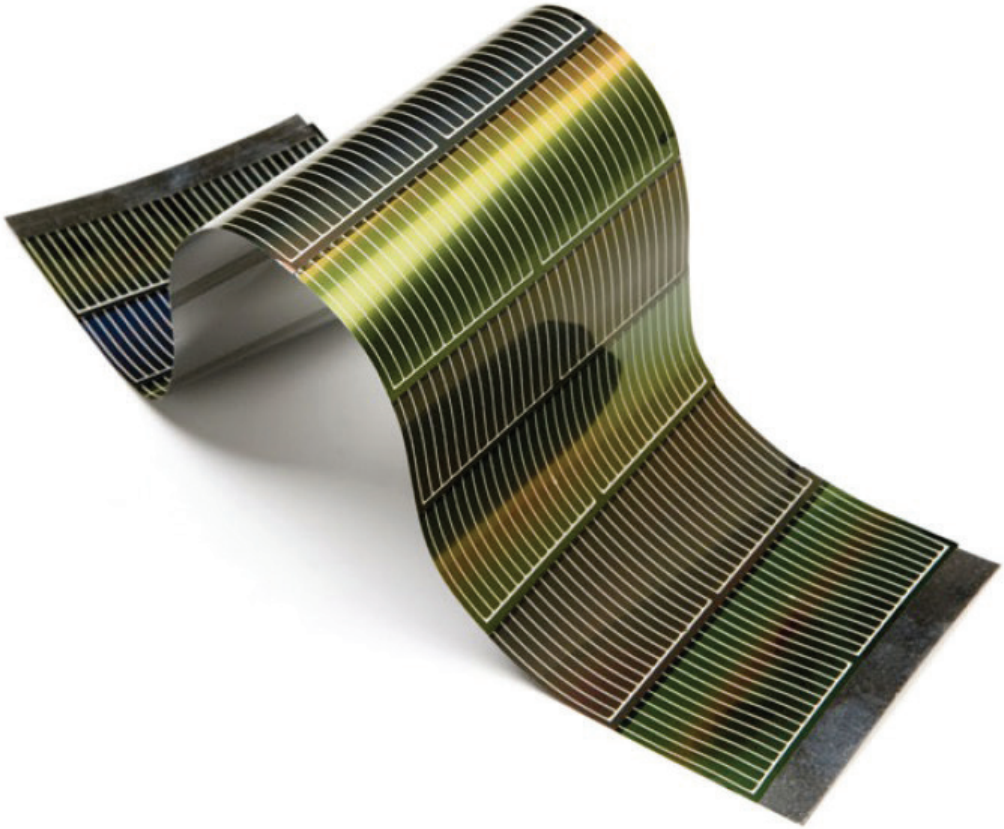


Nanoengineered Copper

Ultraconductive materials with thermal management to dissapate heat at a higher rate.

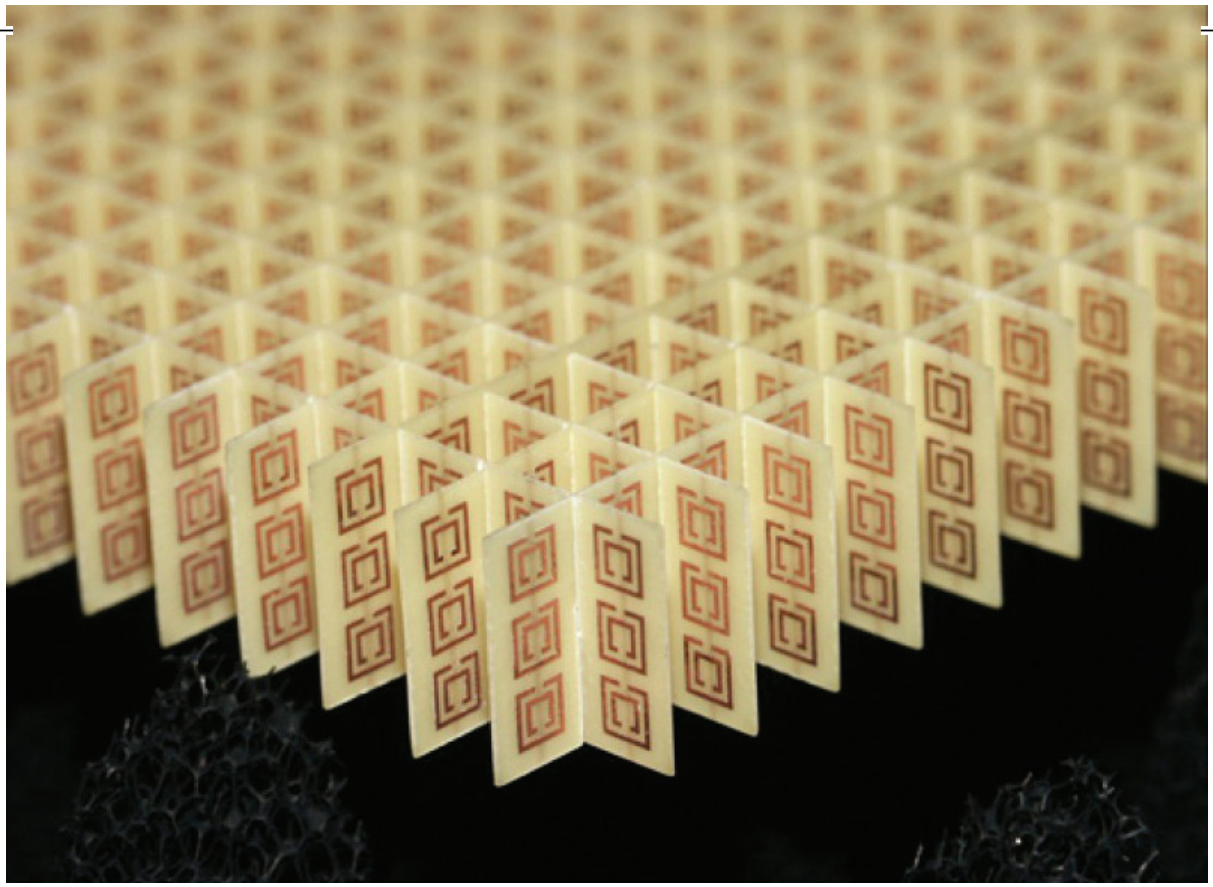
Nanophase Titanium Alloys

Reduction in bacteria and microbial growths for metal use in the medical field, as well as optical property uses.



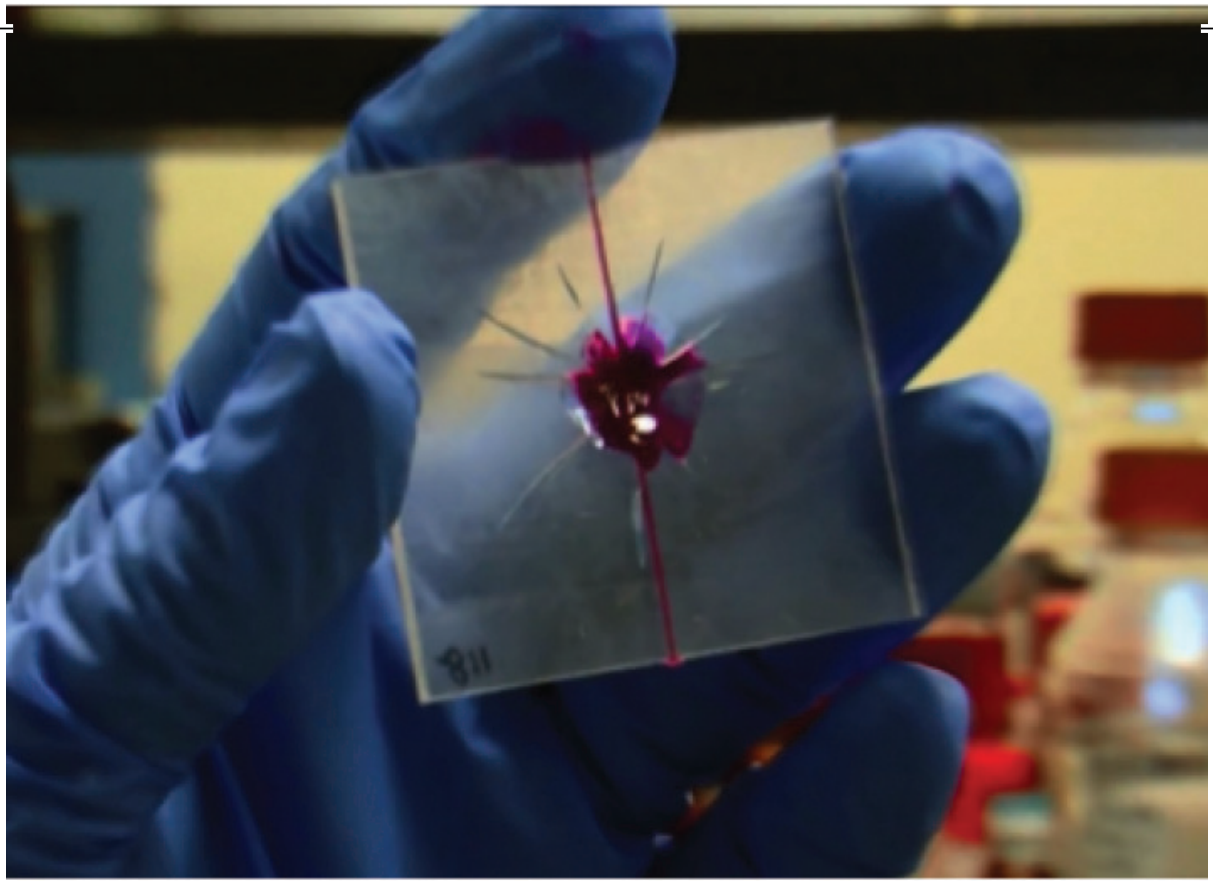
Nanotechnology Solar Cells

Efficiency improvements in solar technology through innovative uses of nanotechnology.



Negative Index Material

Negative phase velocity & Negative Refraction; perfect lense & optical communications. Negative permeability and negative permittability.

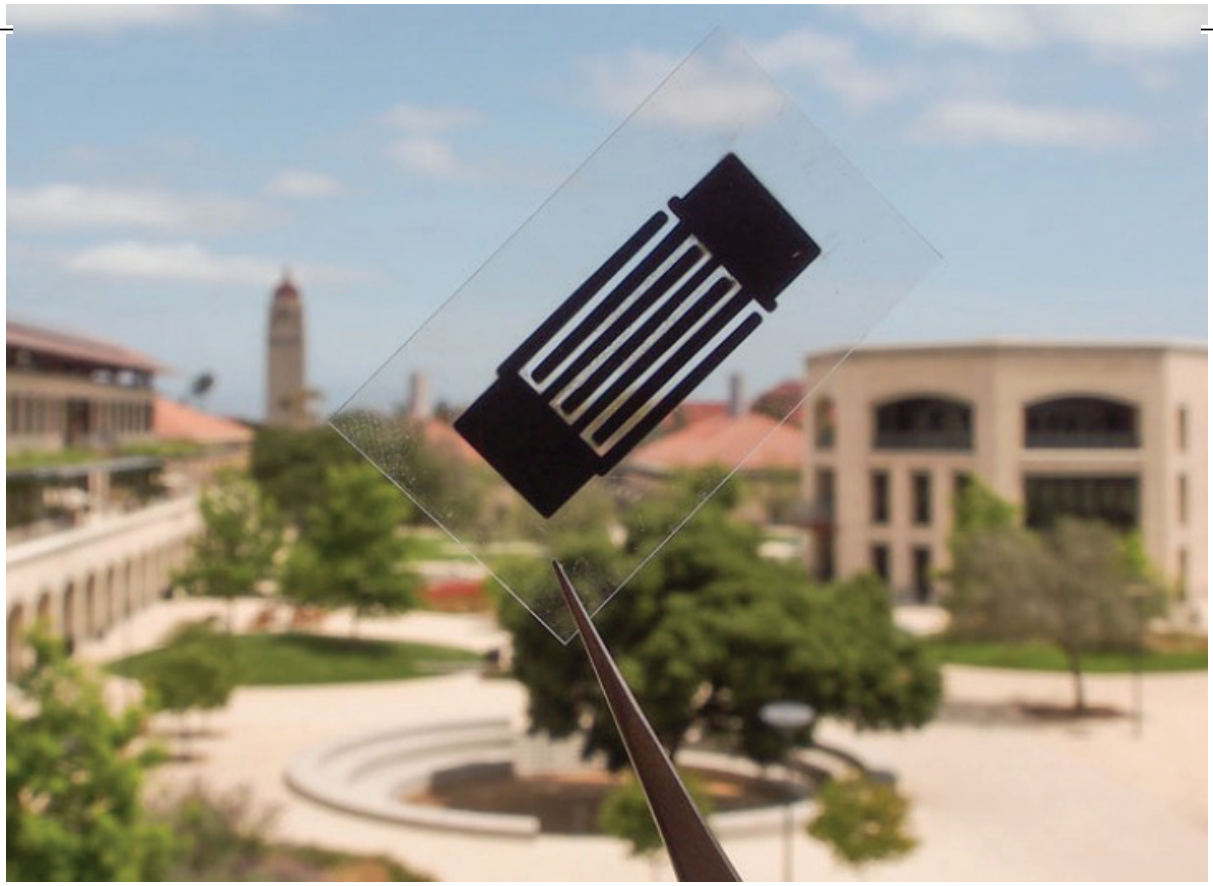


Self-healing Materials

A class of smart materials that have the structurally incorporated ability to repair damage caused by mechanical usage over time. The inspiration comes from biological systems, which have the ability to heal after being wounded.

Colloid Camouflage

Photo-Thermal Camouflage; a material that is reactive to the thermal transfer of photons.

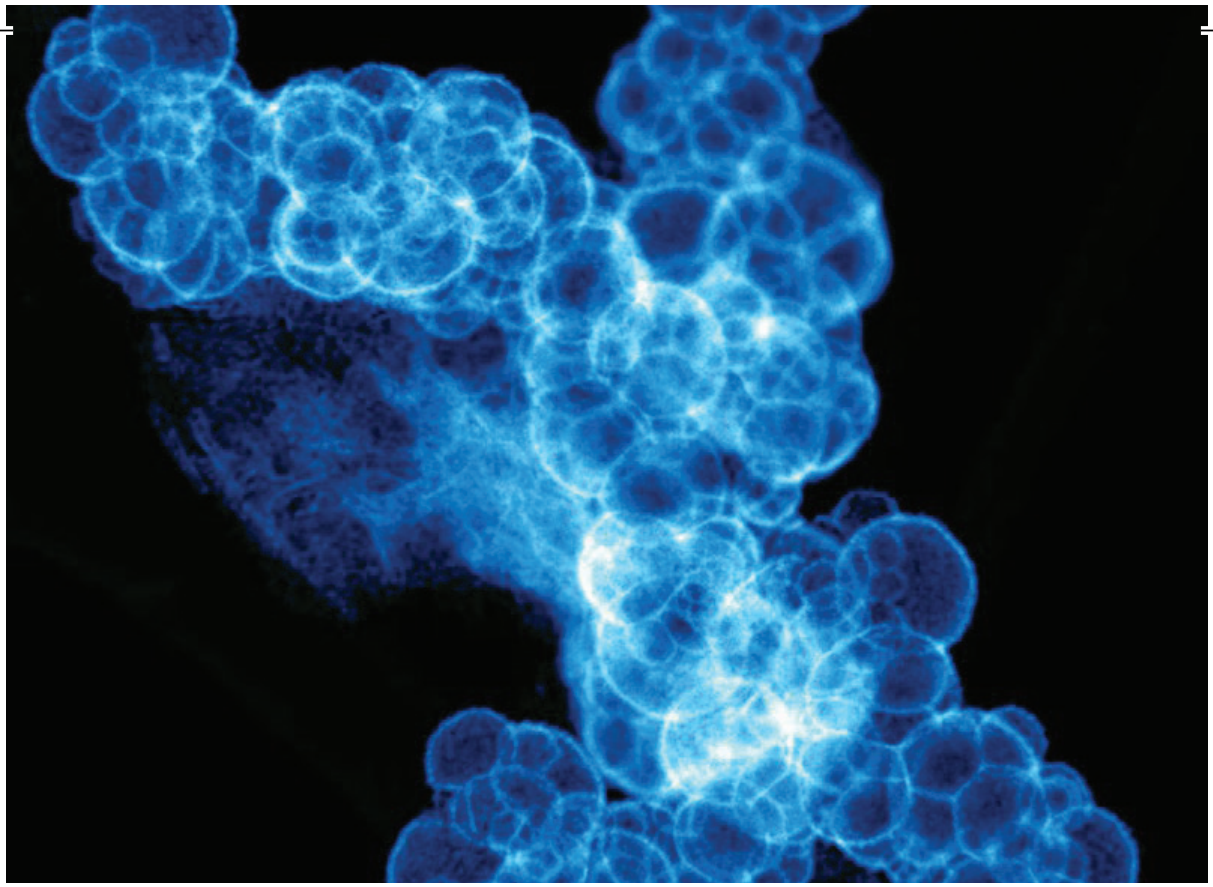


Designer Carbon

Material that can be adjusted to make energy storage devices, solar panels, and potentially carbon capture systems more powerful and efficient. It matters since energy storage breakthroughs are needed for electric vehicles, renewables on the grid, and other clean-tech advances.

Green Concrete

Cement which acts like a sponge, and stores carbon dioxide.



Nano Catalysts

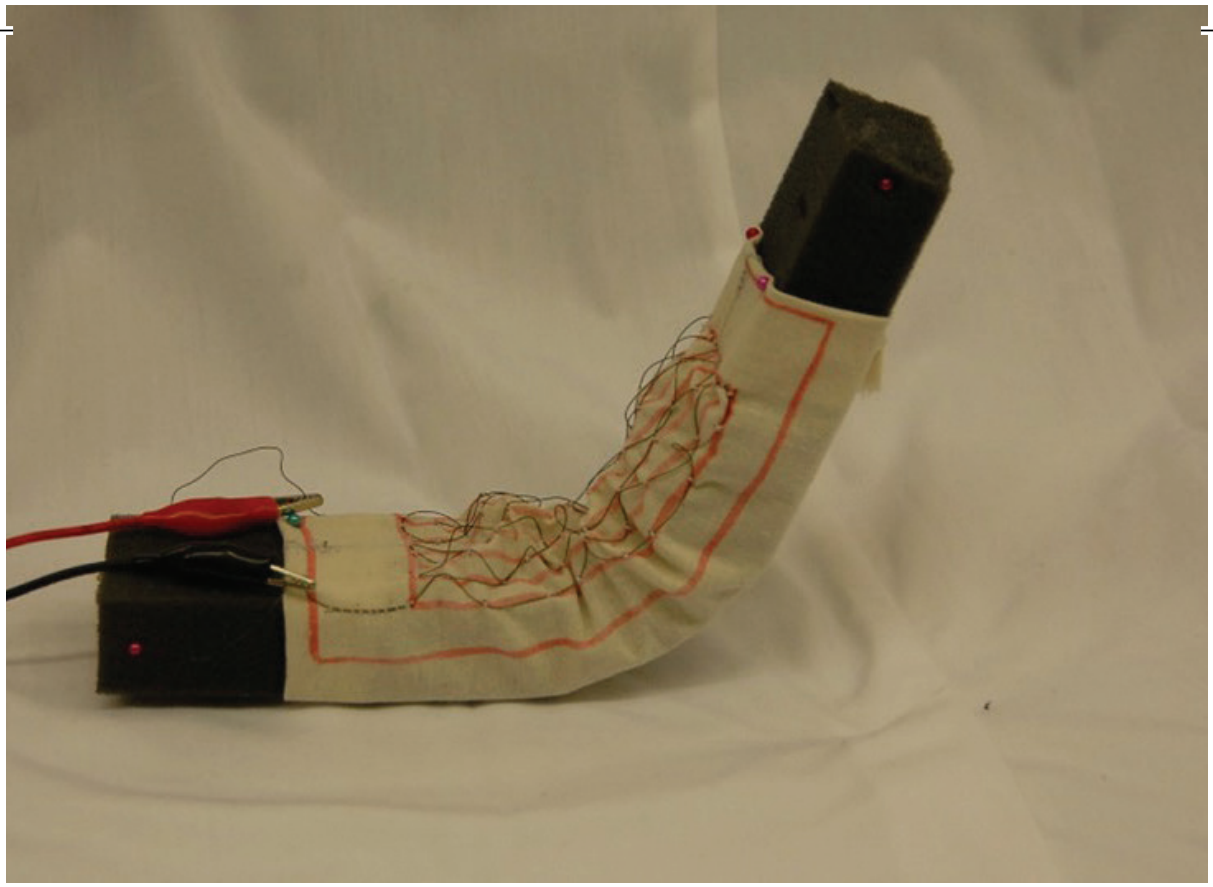
Increasing efficiency and control of chemical reactions to change the state of another substance while maintaining no permanent change itself. Nanotechnology extends these capacities with far greater precision and durability.

Nanomaterial Photocatalyst

Photo reactive based materials have applications in many areas and are useful for controlling chemical state change on demand.

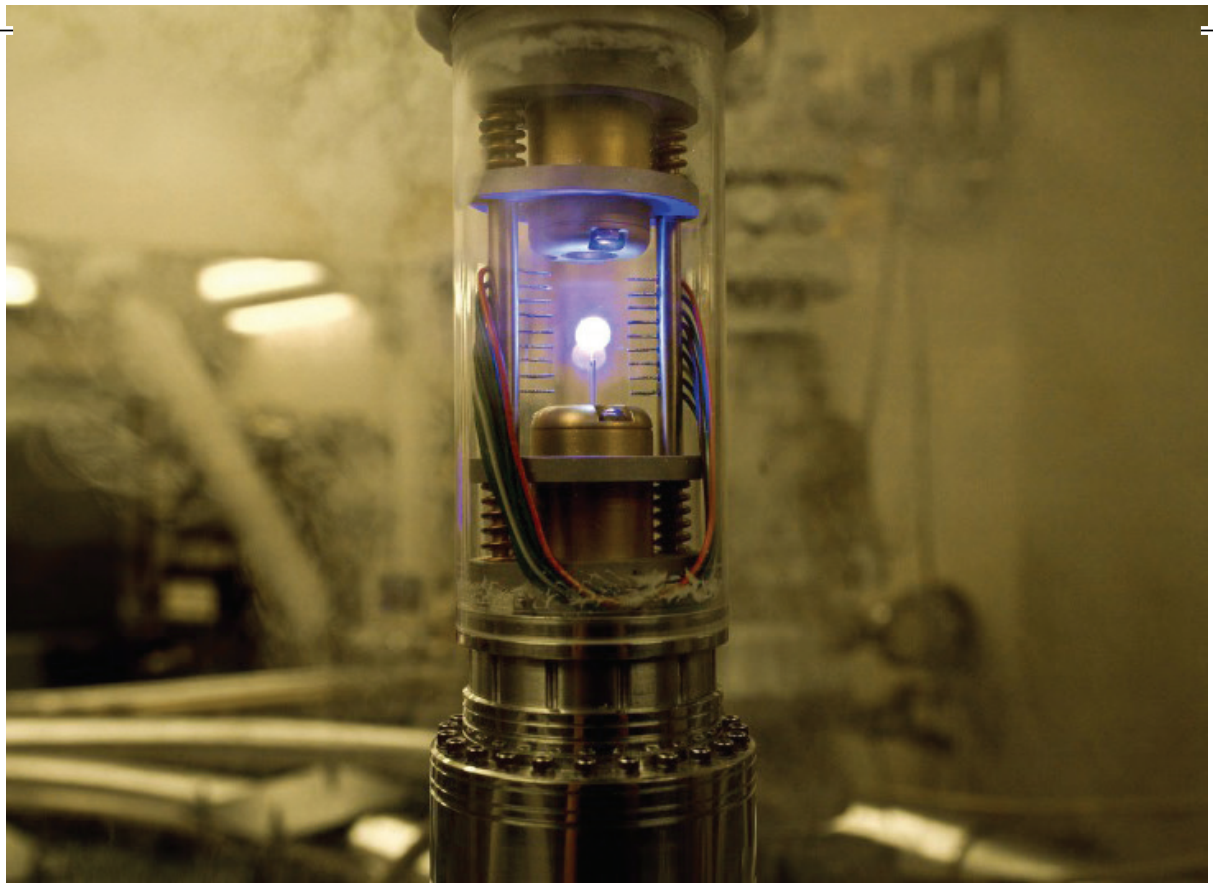
Nanoremediation and Water Treatment

Already acknowledged as being used in 44 worldwide cleanups; nanoparticles must come into contact with the contaminants for a decontamination reaction to occur. Widely used in water treatment.



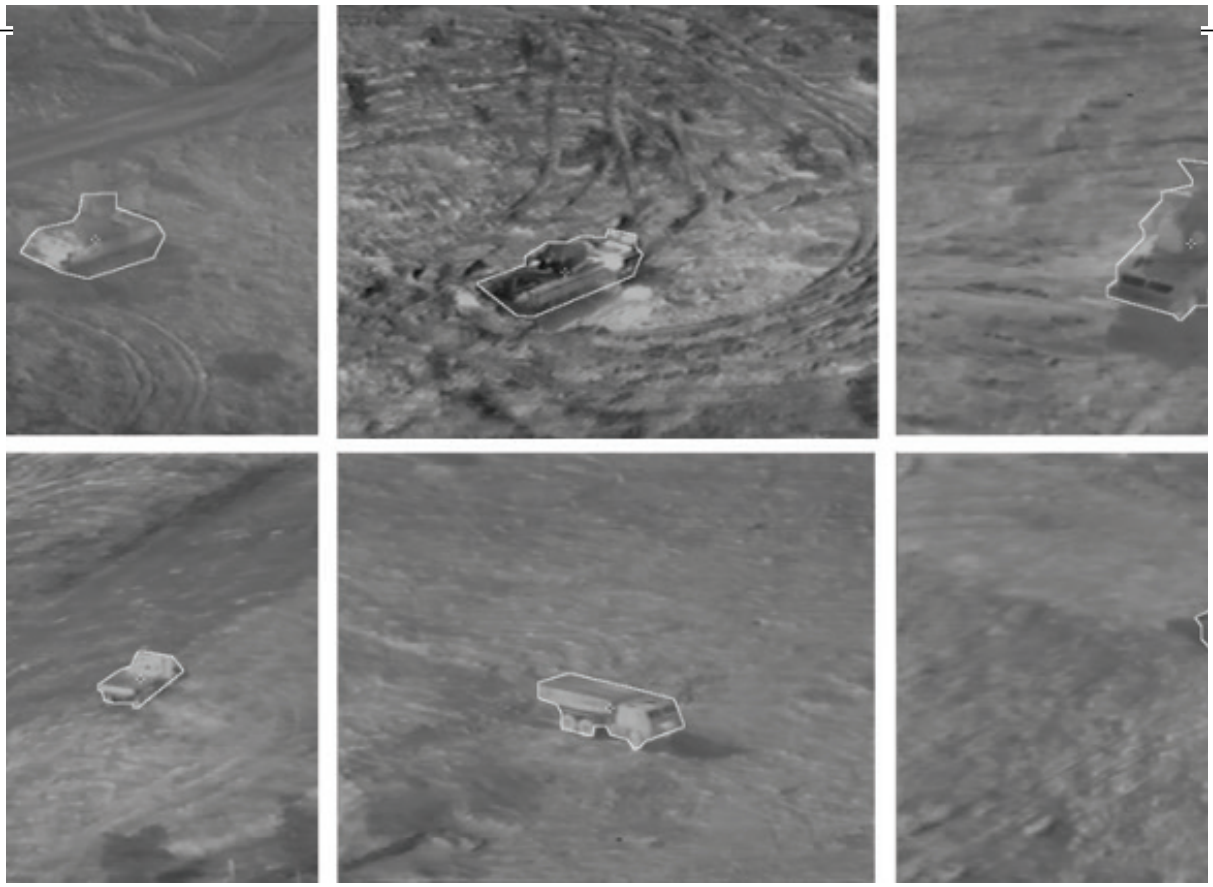
Soft Robotics

Researchers are developing a robotic fabric that moves and contracts and is embedded with sensors, an approach that could bring “active clothing” and a new class of “soft” robots.



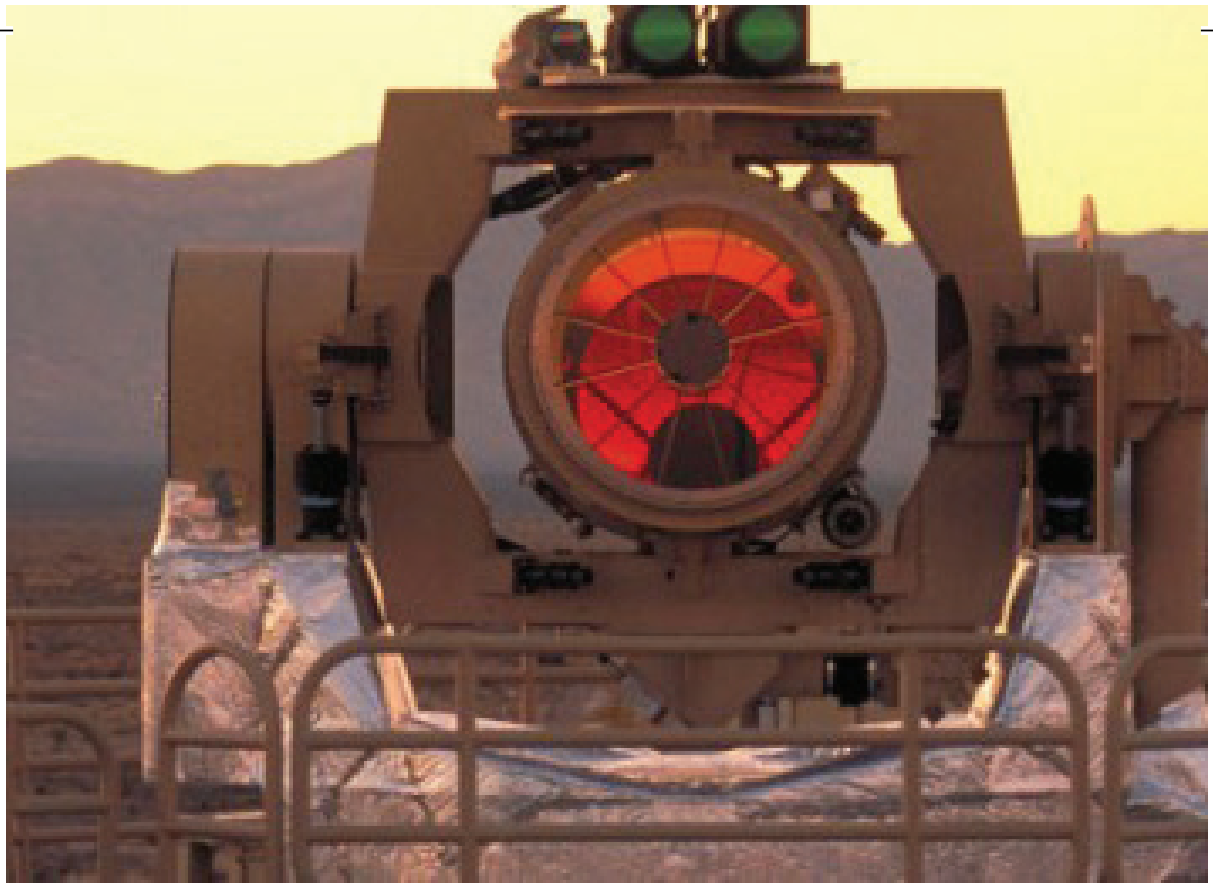
Antimatter Weapon

An antimatter weapon is a hypothetical device using antimatter as a power source, a propellant, or an explosive for a weapon. Antimatter weapons are not thought to currently exist due to the cost of production and the limited technology available to produce and contain antimatter in sufficient quantities for it to be a useful weapon.



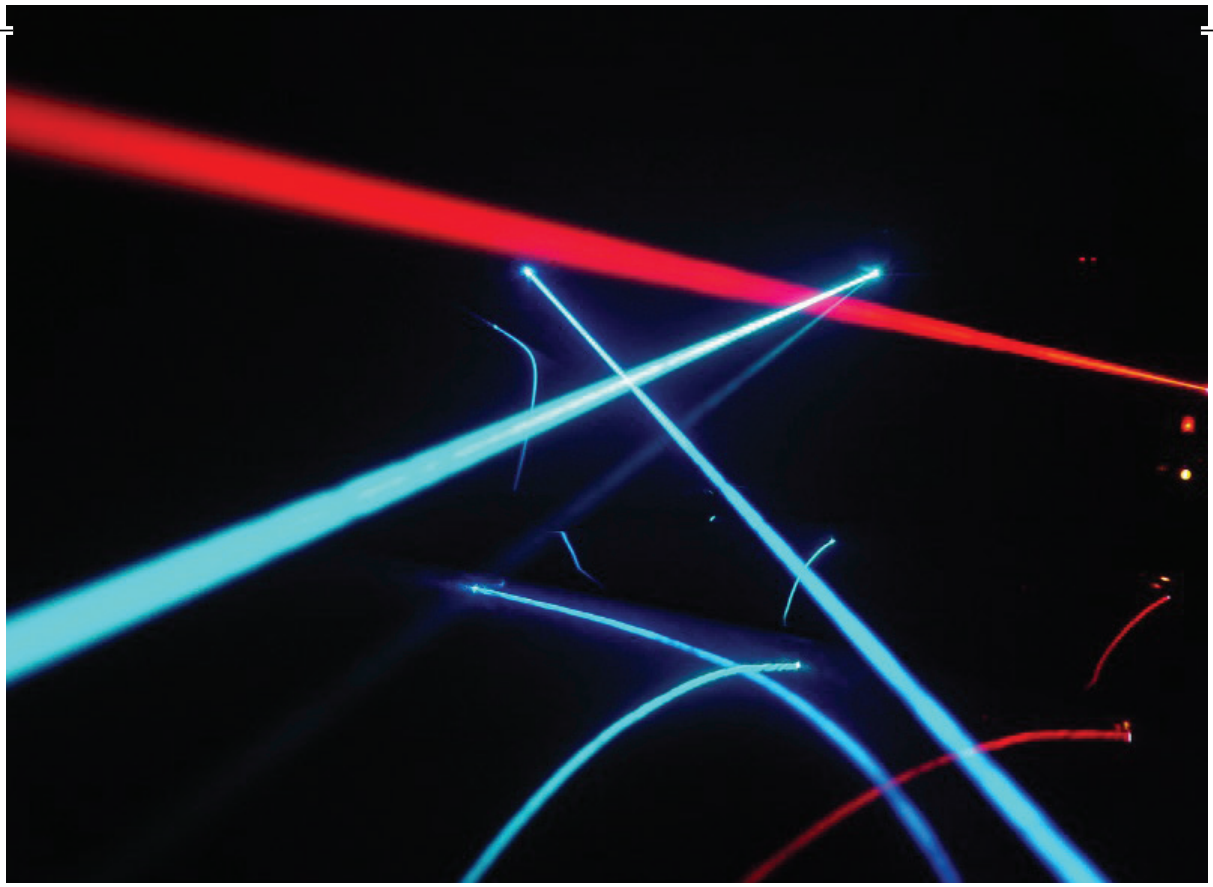
Automatic Target Recognition

An algorithmic conclusion of recognition about a specific object or target based upon data inputs from various sensors.



Directed Energy Weapon

High Power Microwave (HPM) and DEW's emit highly focused energy, transferring that energy to a target to damage it. Potential applications of this technology include anti-personnel weapon systems, potential missile defense system, and the disabling of lightly armored vehicles such as cars, drones, jet skis, and electronic devices such as mobile phones.



Electrolaser

An electrolaser is a type of electroshock weapon which is also a directed-energy weapon (DEW). It uses lasers to form an electrically conductive laser-induced plasma channel (LIPC).

Electromagnetic Rail Gun

A railgun is an electrically powered electromagnetic projectile launcher. Railguns are being researched as a weapon with a projectile that would use neither explosives nor propellant, but rather rely on electromagnetic forces to achieve a very high kinetic energy. Also known as Hypervelocity Projectile.

Electrothermal-chemical Tech

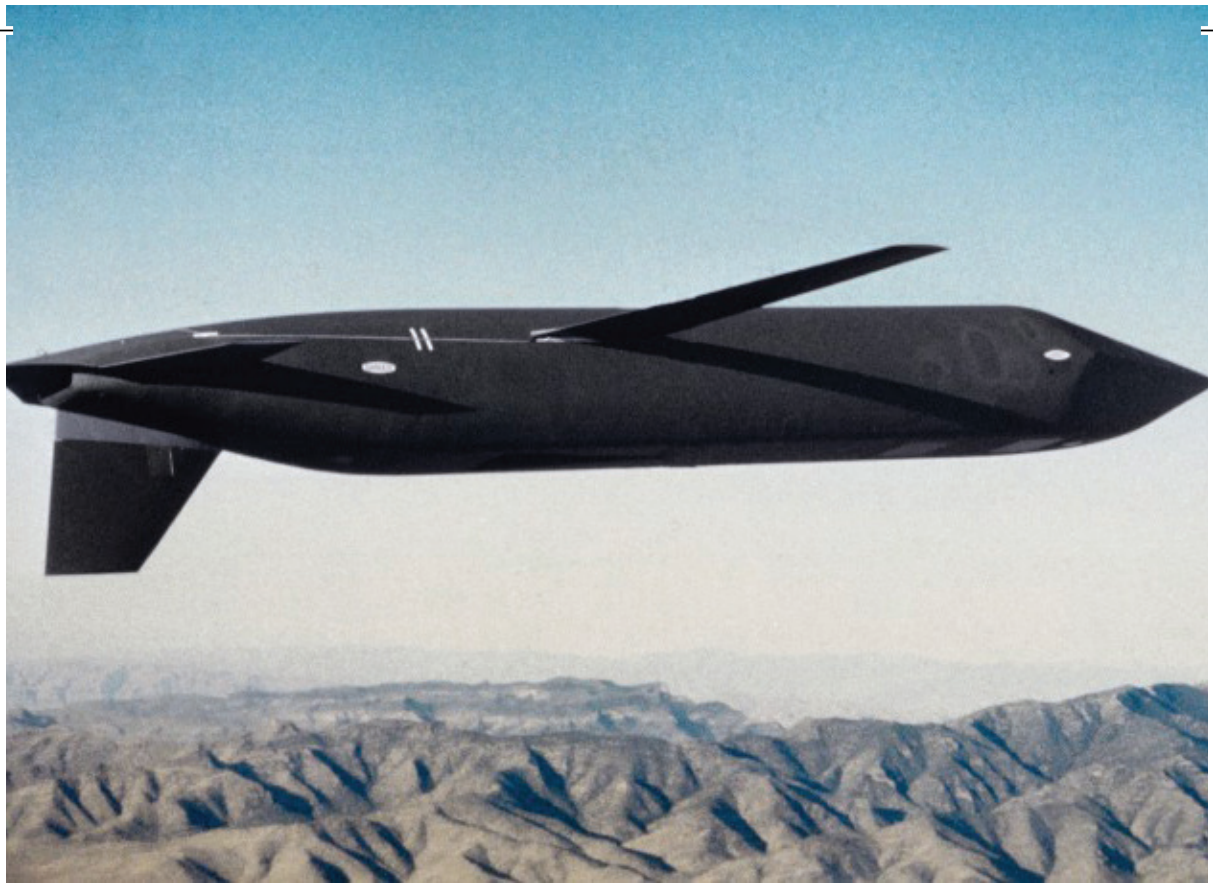
Electrothermal-chemical (ETC) technology is an attempt to increase accuracy and muzzle energy of future tank, artillery, and close-in weapon system guns by improving the predictability and rate of expansion of propellants inside the barrel. An electrothermal-chemical gun uses a plasma cartridge to ignite and control the ammunition's propellant, using electrical energy to trigger the process. Also known as: Precision Ignition.

Explosive Reactive Armor

Explosive Reactive Armour (ERA) is an add-on armour to push away & destroy incoming missile projectiles. Designed to offer additional protection to tanks against shaped charge warheads of modern anti tank guided missiles. It is a sandwich of explosive and metal plates. When the jet of a shaped charge warhead hits ERA panel, explosive in it detonates. As a result, the plates are accelerated and start moving outward in normal direction. The moving plates and the detonators render the jet ineffective which loses its penetration capability.

High-altitude Electromagnetic Pulse

A nuclear warhead detonated at or above 100,000 feet creates electromagnetic radiation from the nuclear explosion. At this altitude the nuclear blast is non-lethal, by itself; however, this would be capable of disrupting, damaging, or destroying any solid-state electronic system within its line-of-sight, including satellites.

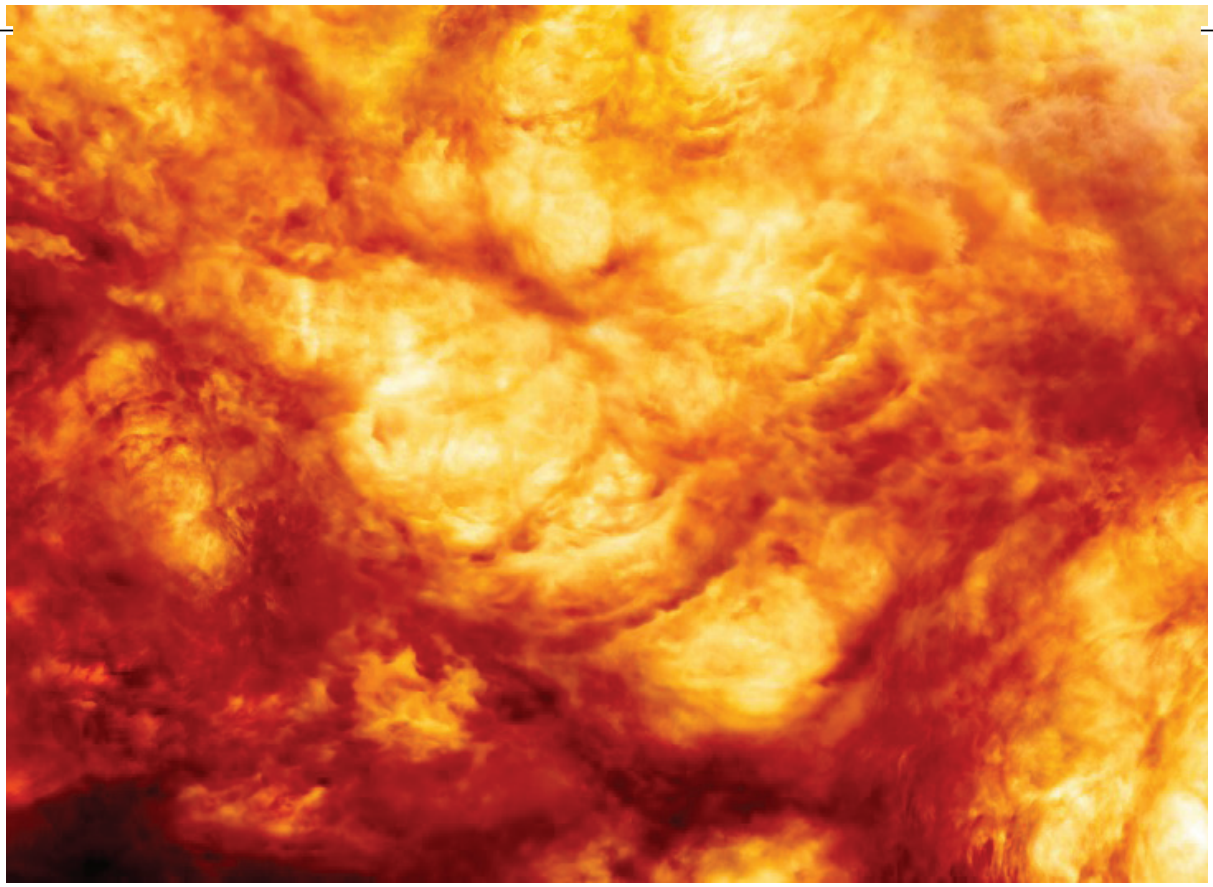


Hypersonic Missiles

HGV, Hypersonic Glide Vehicle, designed to travel five times the speed of sound. Also called skip-glide, and boost-glide; these vehicles travel in the upper atmosphere with great range and speed with unique aero-dynamic properties as well as propulsion methods.

Modular Armor

New polyethylene ballistic fibers which could form soft, supple vests that are nonetheless 20 to 30 times stronger than steel and fine-tuning ceramic armor at the nanoscale to make complementary hard protection. The Army is also making armor more modular, so soldiers can tailor it to individual missions. Resulting in armor which can easily be reconfigured.



NanoEnergetics

Nanoparticles have more surface area and, therefore, have increased contact with the other chemicals that make up a propellant or explosive. After a reaction is initiated (that is, the explosion is set off), this greater surface area causes a faster reaction rate, which makes for a more powerful explosion. This work could be useful in weapons systems that would utilize greater amounts of energy, making them more lethal.

Self-guided bullets

Use tiny sensors and fins to change direction mid flight.

Thermo-Bimetals

Thermally activated bimetals would allow for panes of glass capable of becoming shades when exposed to the sun, self-regulating energy consumption throughout the day.

Electric Airplanes Recharged by Drones

Drones serving as flying batteries could dock with an electric plane in flight, enabling the first transcontinental electric airplane journey

Hover Bike

Crowd funded then military contracted four blade personel transport vehicle.

Long Distance UAV

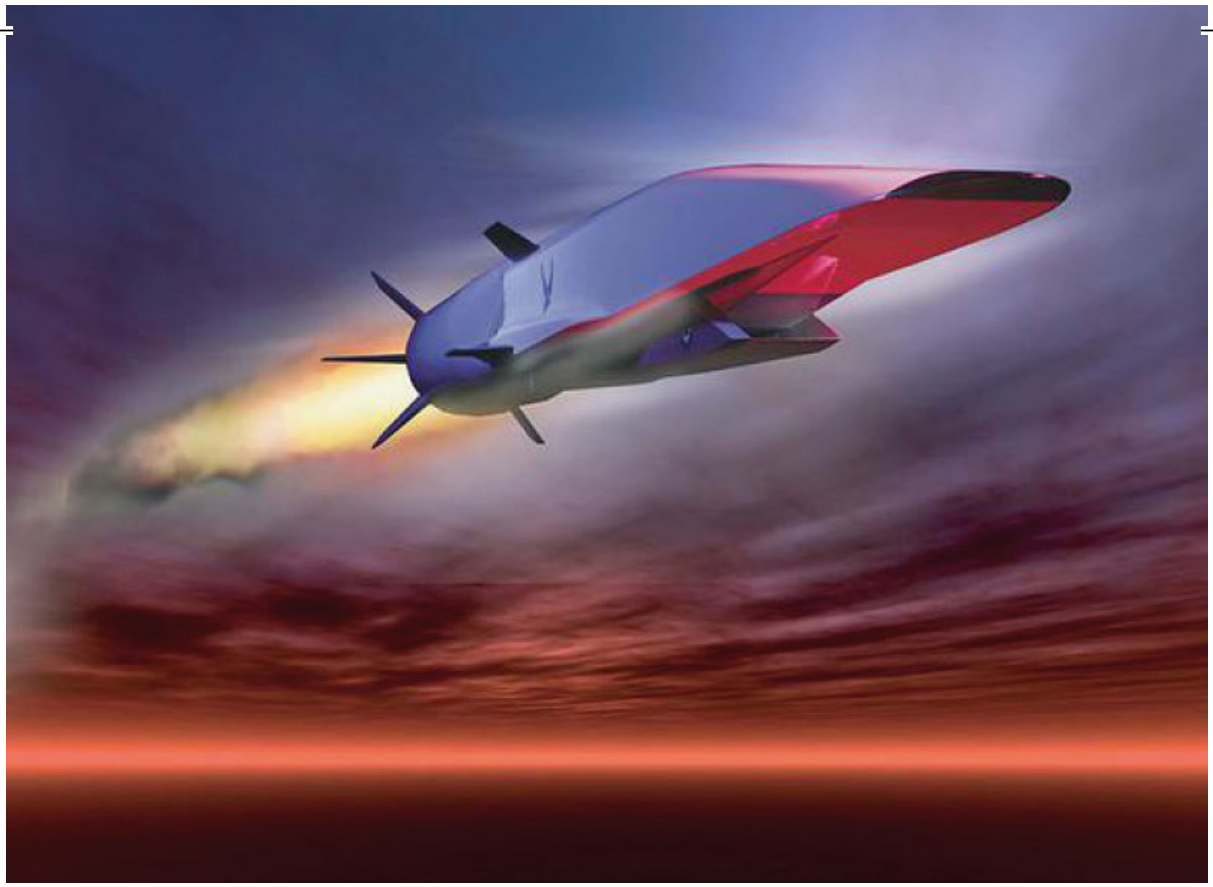
Unmanned Aerial Vehicles used for long distance monitoring and reconnaissance with increased endurance.

Pocket Drone

Small, fitting easily into the palm of a hand or a pouch pocket.Is a fundamentally simple drone: it’s a camera that flies, useful for the military as a sneaky scout. The pilot uses a one-handed controller and watches video from a chest-mounted screen.

ReLaunchable Above Atmosphere Transportation

Relaunchable commercial space flight systems being pioneered by SpaceX and other competitors.



SCRAMJet

Chemical reaction engine with no moving parts, using high pressure airflow for creation of hypersonic propulsion.

High Altitude Platforms

A quasi-stationary aircraft that provides means of delivering a service to a large area while staying thousands of feet above in the air for years.

Modular Hardware

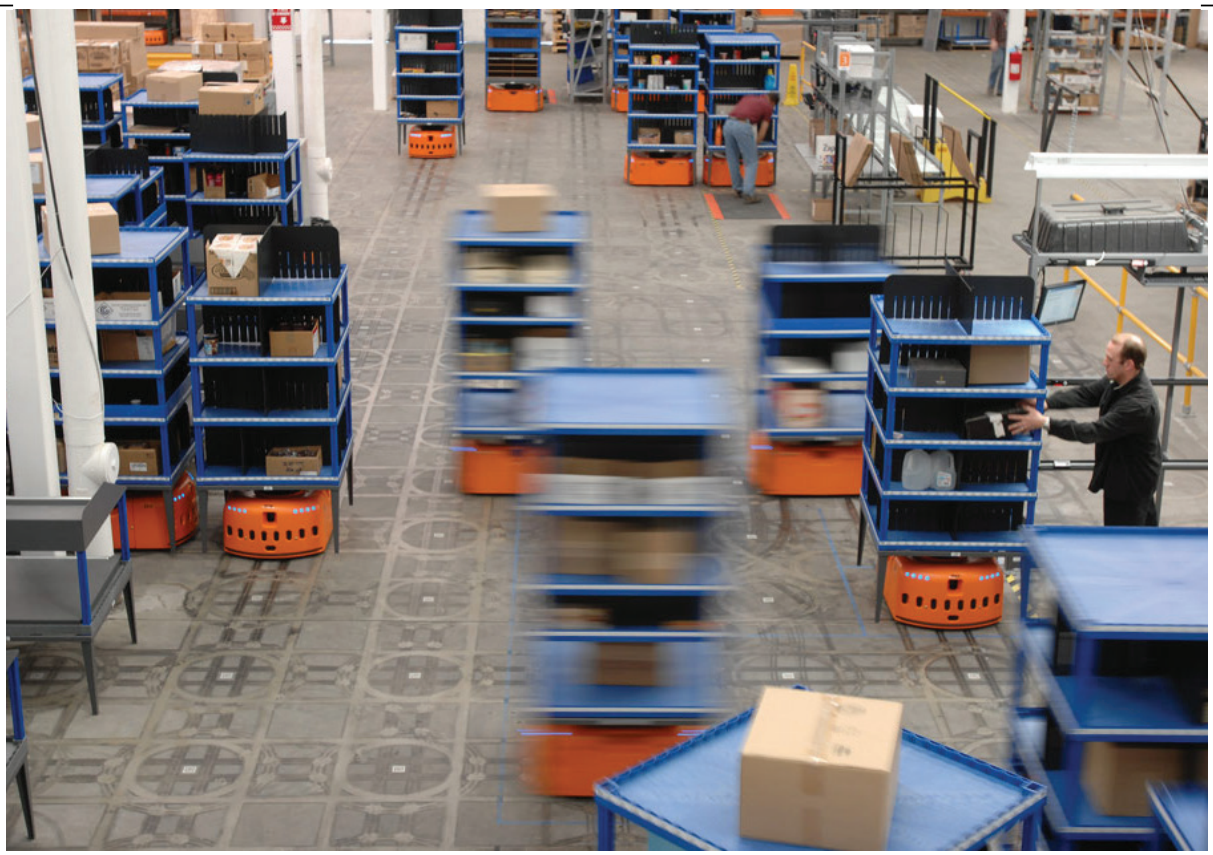
Platforms designed with common interfacing standards that allow hardware to be developed and assembled in modules. Much like software and API interfaces. This allows for customized incremental expansion units, and the ability to replace existing features and equipment on a given product (weapon, bot, drone, satellite).

Smart Structures

Structures which are designed to react to environmental context as well as usage patterns; moderating energy use, and even shape for optimized efficiencies.

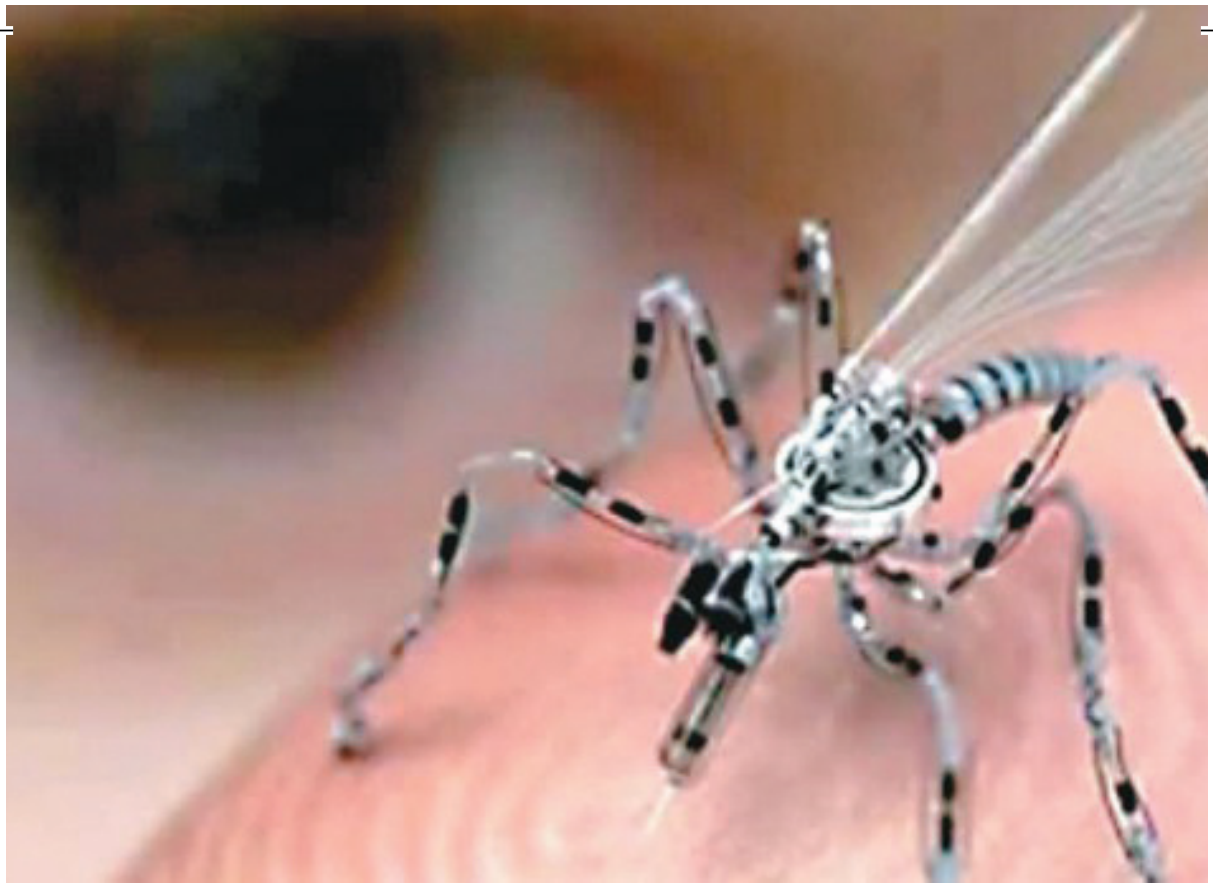
Autonomous Vehicles

Vehicles capable of sensing their environment and navigating on their own.



Deliverbots

Robot vehicle meant to carry cargo, not people. Could range from very small (and light) robots the size of a suitcase to full-sized trucks ready to haul heavy cargo.

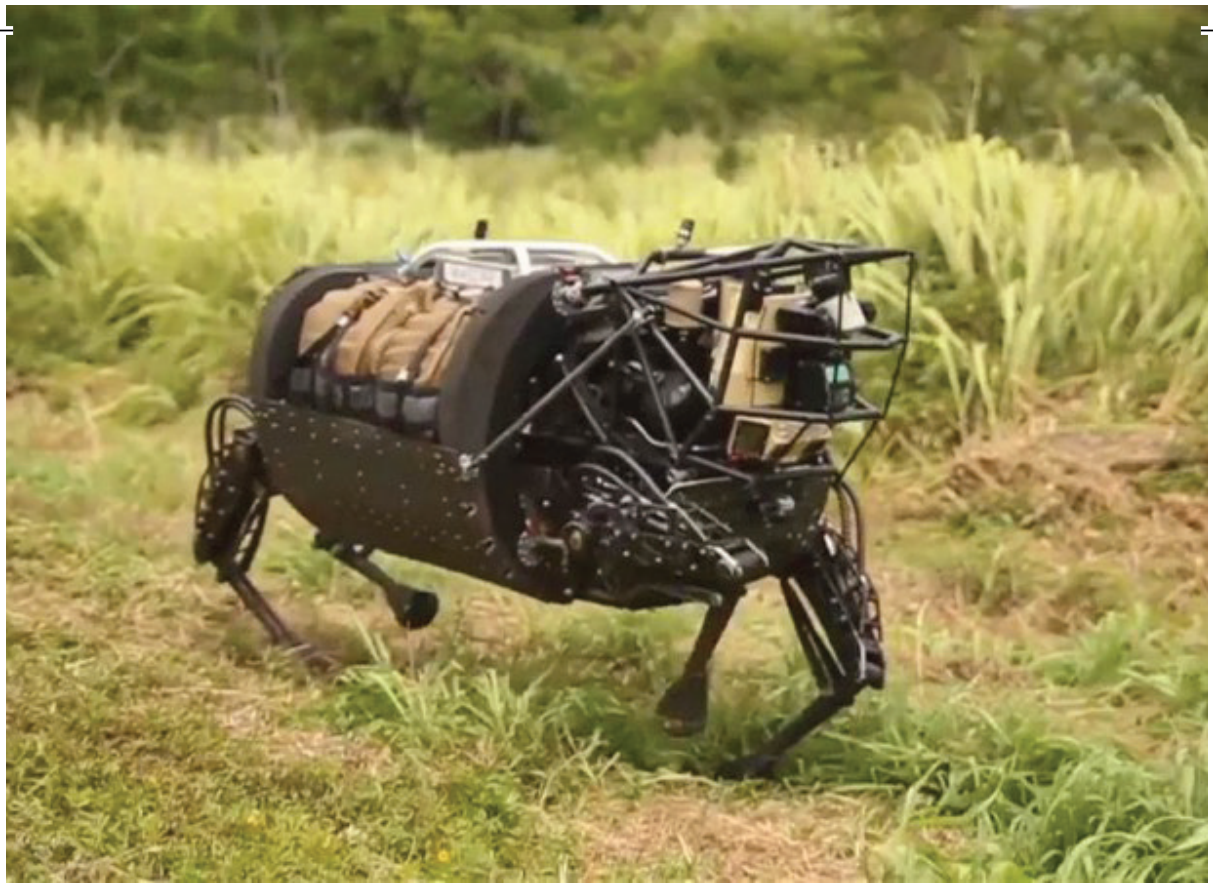


Insect Drones

The robotic insect can effortlessly infiltrate urban areas, where dense concentrations of buildings and people, along with unpredictable winds and other obstacles make it impractical.

Payload Drones

Relatively cheap drones with advanced sensors and imaging capabilities are giving farmers new ways to increase yields and reduce crop damage. Close monitoring of crops could improve water use and pest management.



Robotic Mule

Rough-terrain robot designed to go anywhere Marines and Soldiers go on foot, helping carry their load

Swarm Capable Drones

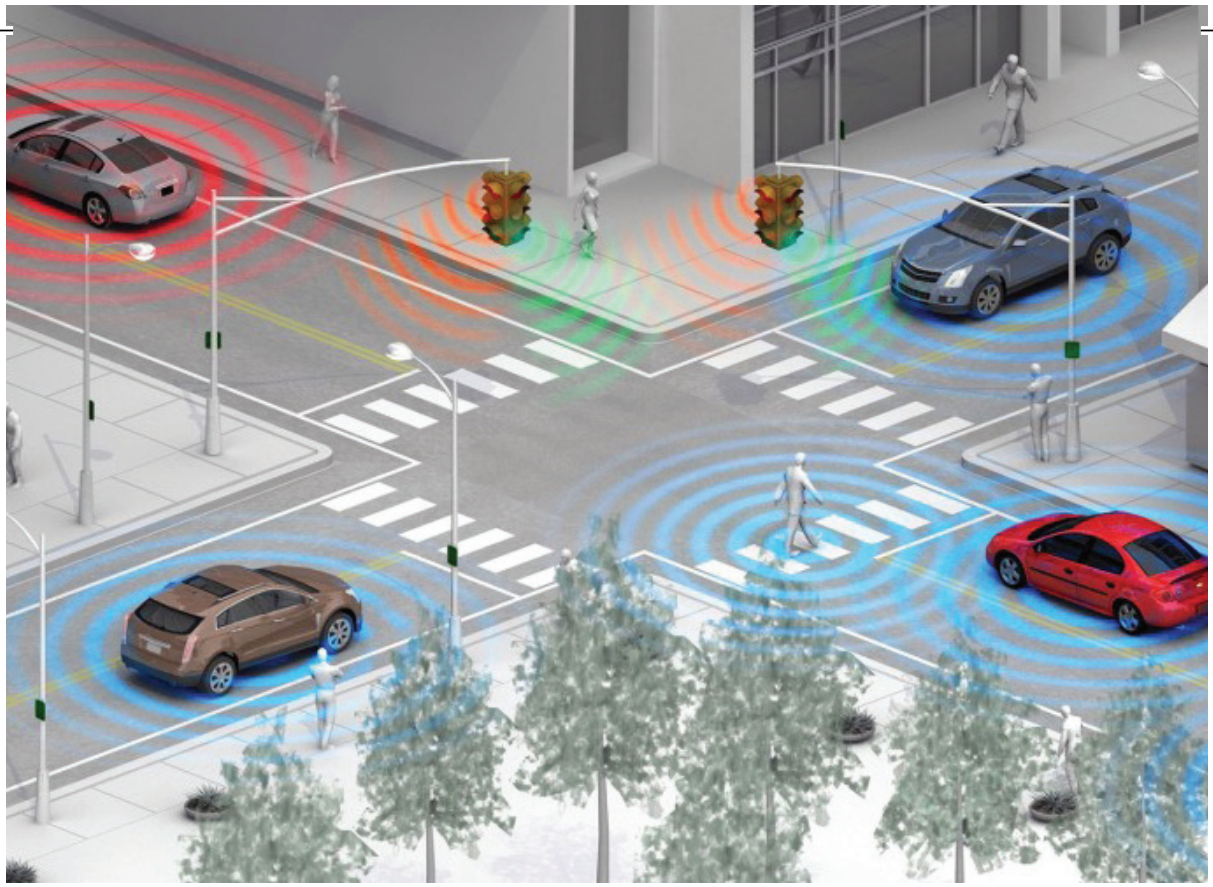
Group of drones lead by algorithms that allow them to perform actions as a swarm unity. This will allow for better coordination and possibility of maneuvers -- Algorithm Led Unmanned Vehicle Collaborative Swarm Activity with Disparate Units.

Telepresence Robots

A remote-controlled, wheeled device with a display to enable video chat and videoconferencing, among other purposes.

UAV Supply Delivery

Autonomous delivery of emergency aid; defibrillator equipped drone, and other equipment.

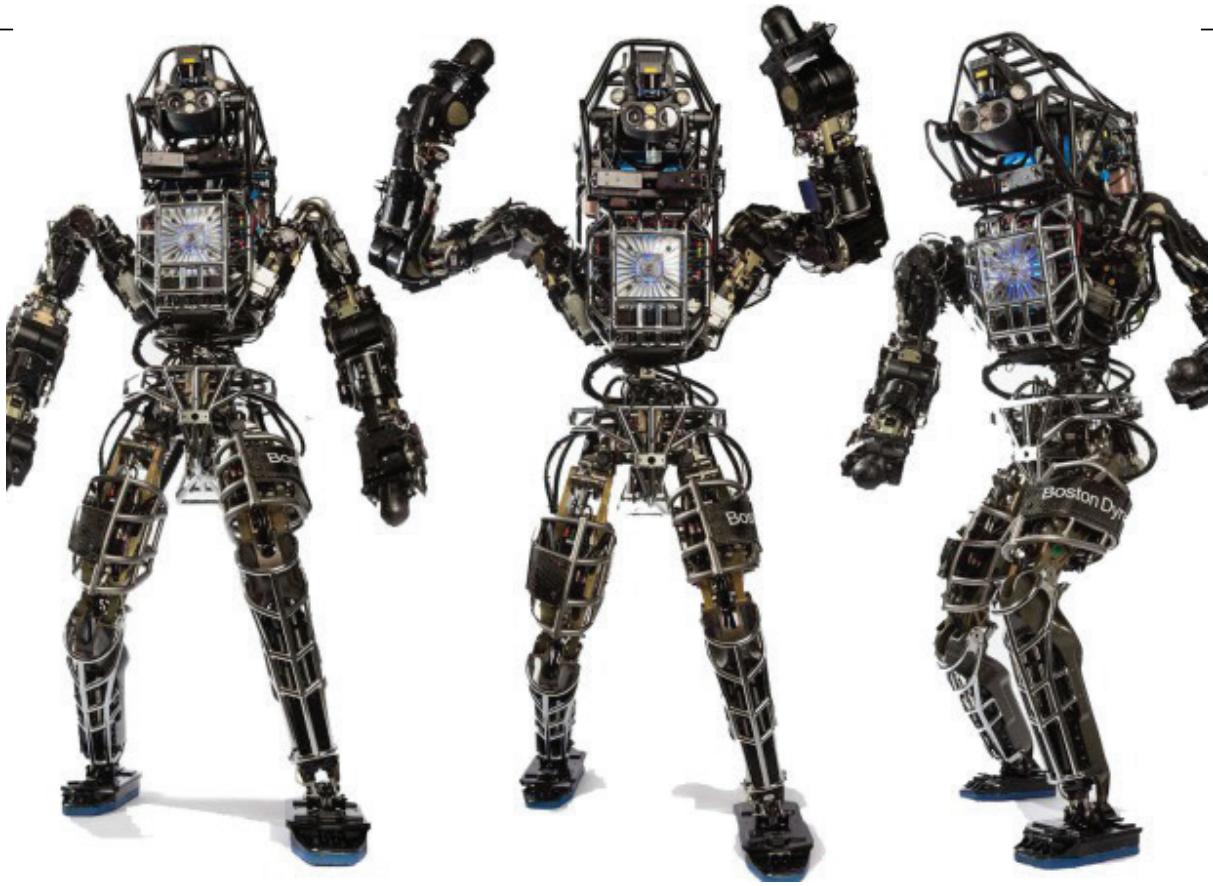


Vehicle-to-Vehicle Communication

Let's vehicles send information back and forth between one another with enabled infrastructure; for example, traffic lights. Knowing when a light was going to change would allow vehicles to give a little heads-up to their drivers. We'd then know to brake gradually; or, if there was time, a display might show what speed would be necessary to make it through.

Advanced Navigation Systems

The Precision Inertial Navigation Systems (PINS) program seeks to use ultra-cold atom interferometers as an alternative to GPS updates. This allows for the development of matter wave interferometry techniques to measure forces acting on matter, including high-precision atomic accelerometers and gyroscopes. Using this technology, this program seeks to develop an inertial navigation system, which would have greater independence from satellite navigation systems susceptible to attacks and interference.

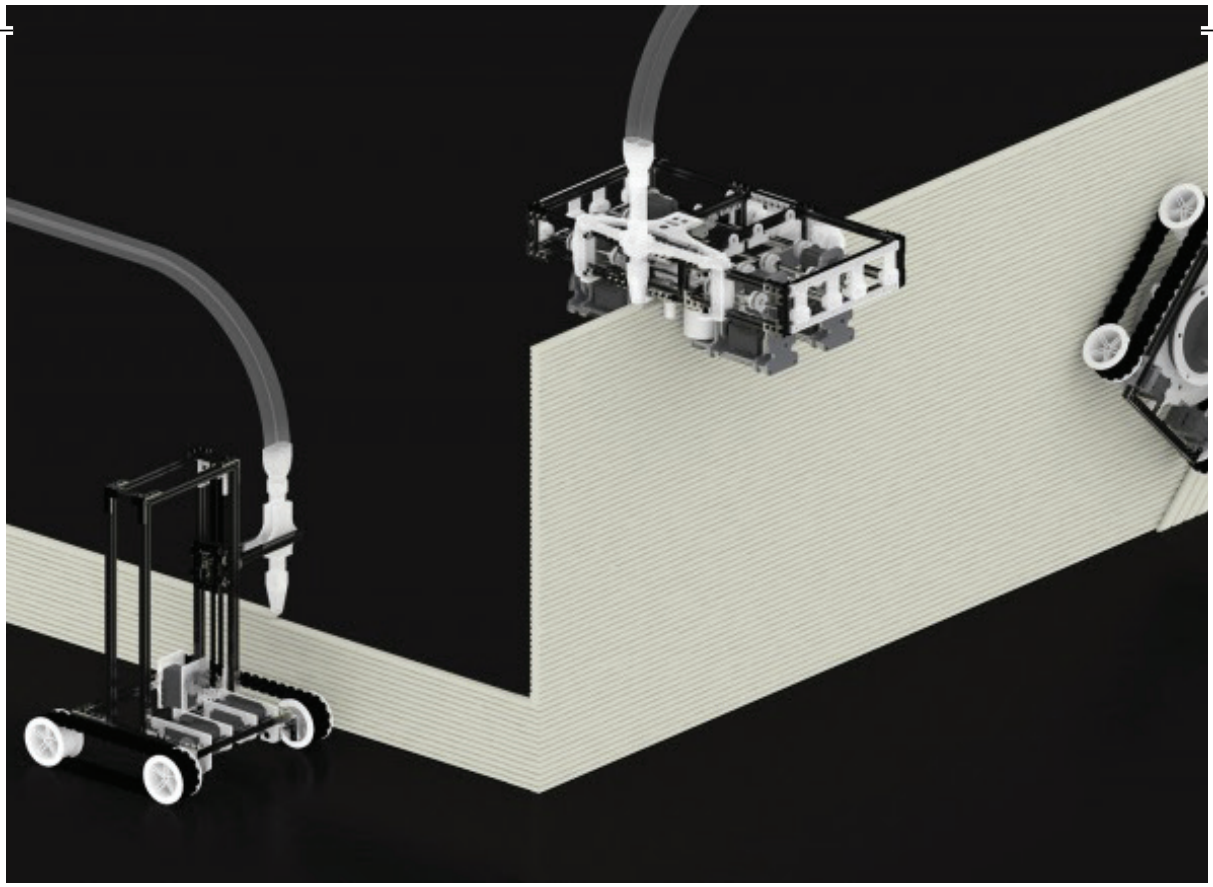


Agile Robots

Computer scientists have created machines that have the balance and agility to walk and run across rough and uneven terrain, making them far more useful in navigating human environments.

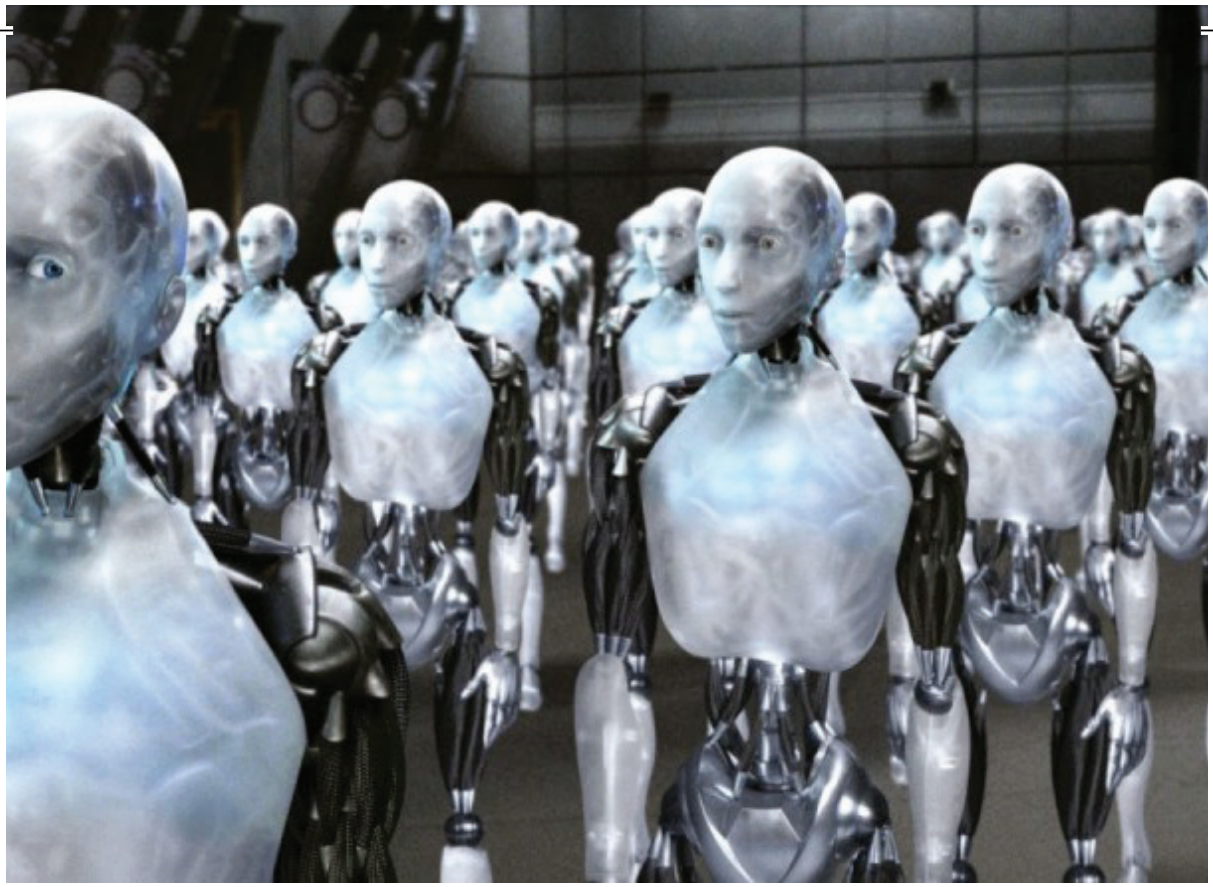
BioRobotics

Robots that look and act like animals, insects and other living beings. They replicate existing patterns in nature (movement, stealthiness, flight motion, shell structure, joints, etc.) built this way to enhance performance on determined tasks or even to mimetize within the environment.



Minibuilders

Robotic swarm that is able to construct buildings of any size, with high level of efficiency.



Personal Robotics

Robotic technology products purchased by individual buyers or families and used to educate, entertain, or assist in the home.

Robonauts

Robonauts, human-like robots designed by GM and NASA, had helped before with basic duties at the International Space Station (ISS). Advanced models of these robots (R2) are able to execute more complex activities, including climbing and mobile tasks. Future plans consider even more advanced support, especially in challenging missions like explorations of other planets.