The 2014 Create the Future Design Contest – sponsored by COMSOL, Inc., Mouser Electronics, and Tech Briefs Media Group (publishers of NASA Tech Briefs) – recognized innovation in product design in seven categories: Aerospace & Defense, Automotive/Transportation, Consumer Products, Electronics, Machinery/Automation/Robotics, Medical, and Sustainable Technologies. In this special section, you’ll meet the Grand Prize Winner, as well as the winners and Honorable Mentions in all seven categories, chosen from more than 1,000 new product ideas submitted from 61 countries. To view all of the entries online, visit www.createthefuturecontest.com.
Contour Crafting (CC) is a computerized construction method that 3D prints large-scale structures directly from architectural CAD models. Walls are built up by forming their outer surfaces via extrusion of a paste-like material such as concrete, and the use of a robotic trowel to provide a smooth, contoured surface. CC is a very flexible technique, capable of constructing aesthetically pleasing “organic” curvilinear shapes as easily as “boxy” rectilinear shapes; as such, it has attracted strong interest from leading architects.

Contour Crafting is the first and only large-scale 3D printing technology that can rapidly construct complete buildings. Contour Crafting is a major innovation that automates the construction of whole structures, and radically reduces the time and cost of construction. The result would be a revolution in the construction industry that would lead to affordable construction of high-quality, low-income housing; the rapid construction of emergency shelters; and on-demand housing in response to disasters.

The Contour Crafting technology has the following unique features:

- Reduces construction cost to about 30% of current cost
- Speeds up the construction process by a factor of at least 50
- Reduces construction injuries and fatalities (400,000 and 6,000 per year, respectively, in the US, and more severe in developing countries)
- Provides emergency shelter to the more than 37 million annual victims of war and natural disasters
- Provides dignified housing to the low-income population of the world
- CC eliminates construction waste, as the computer precisely adds material where it is needed
- Dramatically reduces construction energy usage (by 90%) and CO2 emission (by 70%)
- Promises limitless architectural features such as curved walls
- CC is ideal for lunar and Martian construction using in-situ resources

Since the early days of 3D printing, I have been fascinated by the possibilities that these technologies could offer, so I started thinking about novel new ways to 3D print. This win is a tribute to the thousands of hours of effort it took to develop this over the past two decades. The recognition from Tech Briefs Media Group and the prestigious companies that sponsored the contest provides a valuable vote of confidence that the Contour Crafting technology is going to make an important impact on creating a better future for humanity and our planet.”
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The Polariton Interferometer —
A Novel Inertial Navigation System

Frederick Moxley
Louisiana State University
Baton Rouge, LA

Chances are, you have been routed incorrectly by your Global Positioning System (GPS), but many of us would be lost without GPS navigation. GPS technology relies on a combination of signals from a complex satellite and ground station network. This is problematic in aerospace and defense, as GPS signal jamming is prevalent. Other technologies, such as Inertial Navigational Systems (INS), can operate independently from GPS satellites, but rely on GPS satellites to correct measurement errors. These errors are often due to limitations of an interferometer device within the system, known as a gyroscope.

By utilizing the quasiparticles known as exciton-polaritons, a new patent-pending gyroscopic device called the Polariton Interferometer provides measurement sensitivities far superior to optical technologies such as the ring laser gyroscope. The Polariton Interferometer will enable aerospace and defense teams to maneuver while remaining immune to jamming, remove orientation vulnerability to inclement weather conditions, and provide a stealthy INS, as it cannot be detected by radar. Unlike the optical interferometer, the Polariton Interferometer’s measurement sensitivity is not proportional to the area it occupies. This enables a more sensitive device that occupies much less space than a bulky optical interferometer.

The performance capability of this new technology is independent of scale, and readily manufactured as a photonic integrated circuit, achieved on a microchip smaller than a dime.

For more information, visit http://contest.techbriefs.com/aerodef_winner

“Winning this category in the 2014 Create the Future Design Contest asserts this disruptive technology as a leading design for the industrial and academic community. The worldwide recognition will assist in reaching investors. By obtaining the necessary funds and industrial partnerships as a result of this award, the Polariton Interferometer will be a key player in the global inertial sensor market, projected to reach $8.5 billion USD by 2018.”

Aerospace & Defense Category Winner
(Winner of an HP Workstation)

Honorable Mentions

New Class of High L/D Multi-Rotor VTOL Aircraft
Gregory Heinen, Tierra Global, Lowell, MA

Vertical Take-Off and Landing (VTOL) aircraft do not scale well to viable manned systems and lack endurance for hover and cruise. A new class of vehicles has been developed that utilizes multi-rotors, but cruise on wings. A separate, proprietary winged version uses multi-rotors, a high L/D gyroscopic wing-disk, and outboard fans for forward thrust, but without negative pitch. A multi-rotor with wings counters negative pitch to cruise, and another with fixed wings trims in cruise flight. The vehicle attitude control system is a high-speed, high-loading blade pitch control mechanism.

For more information, visit http://contest.techbriefs.com/VTOL

Intermittent Fault Detection & Isolation System (IFDIS)
Ken Anderson, Universal Synaptics Corp., Roy, UT

The Intermittent Fault Detection & Isolation System™ (IFDIS™) detects and isolates intermittent faults in electronic wiring. Its initial adaptation was to detect and isolate the intermittent faults in the F-16 AN/APG-68 Radar System Modular Low Power Radio Frequency unit (MLPRF) chassis. IFDIS testing of over 400 MLPRF chassis during the first few years of operation yielded unprecedented results. Sixty percent of the MLPRF chassis had one or more intermittent faults, and many chassis had other wiring problems (opens, shorts, miss-wiring, etc.) that were also detected and isolated by IFDIS testing.

For more information, visit http://contest.techbriefs.com/IFDIS
More new products
More new technologies
More added every day
Automatic Eye Finder & Tracking System
Rikki Razdan, Alan Kielar, Pat Stearns, and Melissa White
ISCAN Inc.
Woburn, MA

The intrinsic speed and precision of the human ocular-motor system makes the eye an ideal pointing device for human-machine interface. Eye tracking has not yet been exploited as a robust human interface with computers due to many technical problems, such as viewing a human face under real-world conditions, robustly identifying the eyes over a diverse population range, and the complexity of the real-time image processing tasks involved. Conventional high-accuracy eye tracking systems require the presence of an operator, and/or require the user to use a chin rest or wear an identifying marker so the eye tracking system can find the user’s eyes.

The Automatic Eye Finder & Tracking system automatically finds and accurately tracks both eyes of computer users, and calculates their precise point of gaze as they naturally view a computer screen. The functioning prototype consists of a face and eye image acquisition assembly mounted in front of and below a standard computer monitor. This imaging unit is connected to real-time parallel control hardware processors residing in a PC chassis. The imager is comprised of a high-resolution array, a wide-field-of-view infrared illuminator, and optics to obtain a clear in-focus image of the user’s face.

The real-time information can be used to speed up conventional mouse data entry tasks, as an input device for individuals with neuromuscular impairment, and for rapid target selection in moving environments.

For more information, visit http://contest.techbriefs.com/machinery_winner

Pars Rescue Robot
Amin Rigi, RTS Lab, Tehran, Iran

The Pars Savior aerial robot quickly moves toward drowning victims by user guidance and the activation of its savior system, which releases life tubes. The waterproof robot, with multiple life tubes, has the ability to save more than one person simultaneously. The robot lands on the sea surface, and uses artificial intelligence for accurate analysis of one’s condition. A FLIR heating camera and LEDs recognize victims at night, and the intelligence system activates when a person shouts for help.

For more information, visit http://contest.techbriefs.com/pars

Mosolver = Motor + Resolver
Donald Labriola, QuickSilver Controls, Covina, CA

The Mosolver — a combined motor and resolver — senses position by adding a patented passive sensing circuit to the interior of the existing motor magnetic structure. The ripple current from the existing motor PWM drive provides the flux variation that allows the sensor to continue operation even when the motor is stationary. The sensor consists of a novel sense coil pattern on a polyamide flex circuit, and provides position feedback at 32,000 counts per revolution. The polyamide flex circuit material covers a wide range of temperatures, and is available in low outgassing as well as radiation-resistant formulations.

For more information, visit http://contest.techbriefs.com/mosolver

“This win for us is a great way to introduce our technology to a wider audience. We have been making eye-tracking systems since 1980, and we have been pioneering the technology. When we read about the contest in NASA Tech Briefs, we felt we were at the point where our years of methodically solving important problems to attain real-world eye-tracking were in a suitable form to present to the public.”
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An aerial vehicle model that provides behaviour insights not possible with traditional tools.

Biomechanical Walking Robot
1 month to 5 days
A dynamic model of a walking robot which incorporates both kinematic behaviour and ground contact interactions.
Continuously Variable Displacement (CVD) Engine
Steve Arnold
Engine Systems Innovations, Inc.
Rancho Palos Verdes, CA

Passenger car engines are sized to produce very high horsepower to suit the consumer’s demand for drivability and performance. Unfortunately, engines run most efficiently at high load conditions and very inefficiently at the low loads where they spend most of their time. This results in poor fuel economy and high CO2 emissions.

The patented CVD engine mechanism fundamentally changes the geometry in the crankcase of the engine that has remained essentially unchanged since the advent of the internal combustion engine.

“The CVD engine is the result of six years of continuing research and design work. Receiving such a prestigious award helps us realize that we are on the right track, and stiffens our resolve to get this game-changing technology into the marketplace. NASA Tech Briefs reaches key technical and business professionals at all levels within many, if not all, of the organizations that we hope will become adopters of our CVD technology.”

3000-Mile Capacitor-Powered Electrical Vehicle
Denny Wheeler, Crystalline Energy Research, Nampa, ID

A new Capacitor Energy Pack (CEP) for electrical vehicles uses Multi-Layer Ceramic Capacitors (MLCCs) that include dielectric materials that have K (dielectric constant) factors in excess of 300 million. Utilizing a charging system that converts 240 Volts AC (VAC) to 336 Volts DC (VDC), the CEP could store 1,000 Kilowatt Hours (KWh). With the energy pack, the range of EVs and hybrids will increase above lithium-ion battery or ultracapacitor options. Expanding the CEP size or adding additional CEPs will further improve driving range and vehicle power functionality.

For more information, visit http://contest.techbriefs.com/energy_pack

Transmission Lestrans Orbital IVT™
Hans Peter Hemmer, ASTREMO, Sankt Augustin, Nordrhein-Westfalen, Germany

The Lestrans Orbital IVT™ transmission design transmits mechanical power via oscillating torque, rather than traditional speed ratio methods. The approach combines the mechanical efficiency of a fixed gear ratio transmission with the engine efficiency obtained using a Continuously Variable Transmission (CVT).

The power from the centrifugal forces of rotating eccentric masses is harnessed to create the oscillating torque. Infinitely variable torque, from zero torque to the full capability of torque output, can be produced with no clutching or conversion required at the input.

For more information, visit http://contest.techbriefs.com/transmission

Automotive & Transportation Category Winner
(Winner of an HP Workstation)
NanoFab Lab … In a Box!™
Michael Zach, Anirudha Sumant, and Jonathan Moritz
EChem Nanowires
Stevens Point, WI

NanoFab Lab … In a Box!™ is a shoebox-sized kit that allows high school students to manufacture hi-tech patterned nanowires in the classroom. The educational kit provides a connection between the students’ curriculum and the emerging field of nanotechnology and nanomanufacturing. Unlike traditional nanomanufacturing, this technology is a simple electroplating bath, power supply, and reusable Ultrananocrystalline Diamond Template (UDT) electrodes, designed to produce any pattern desired.

Normally, the types of patterned nano and microwires that this kit can produce requires millions of dollars to reproduce. This technique can be performed for under $1,000, and the kit includes everything but the water and the widely available, inexpensive specific chemicals needed. The goal of this kit is to engage students with cutting-edge science, and provide pathways for their future success and their contribution to society.

Both the potentiostat and the microscope connect to an included 10” Android tablet for uploading data, images, and videos through a secure Web portal. The Web site documents progress and gives feedback on how to improve the quality of wires.

For more information, visit http://contest.techbriefs.com/consumer_winner

Honorable Mentions

Quikiks™ — The First Totally Hands-Free Supportive Footwear
Steven Kaufman, Hands-Free, LLC, New York, NY

There are 50 million people in the US with physical or cognitive challenges that greatly limit their ability to don their own footwear. Quikiks footwear allows the wearer to step easily into the shoes and in the same motion, effortlessly and securely lock their feet comfortably in place. Using a patented Step-in-Go™ Technology, Quikiks provide hands-free operation for people lacking the ability to use traditional shoe fasteners such as laces, buckles, straps, or snaps. The shoes will not slip off of the feet, and provide medically necessary heel and ankle support required for orthopedic footwear.

For more information, visit http://contest.techbriefs.com/quikiks

Gatekeeper: A Bluetooth Low Energy Proximity Lock for Your Computer
Siddharth Potbhare, CoolCAD Electronics LLC, College Park, MD

The GateKeeper (GK-Chain) is a Bluetooth Smart proximity tag that can automatically lock and unlock a computer, and keep track of valuables. Instead of typing in a password every time, the GK-Chain unlocks a computer when you approach, and locks when you leave. For additional security, the GK-Chain can be set to require both the key and password. Using a free companion app, you can find your GK-Chain with a Bluetooth 4.0-enabled smartphone, allowing you to find lost keys, wallets, or even luggage at the airport. The GK-Chain tracks the location of the key using a proprietary signal strength algorithm, and locks/unlocks your computer based on where you are.

For more information, visit http://contest.techbriefs.com/gatekeeper

“The international recognition of our NanoFab Lab … in a Box!™ educational kit will assist our non-profit organization in its mission to help students who would otherwise lack the opportunities. In addition, individuals or organizations looking to support individual kits, schools, districts, or regions are encouraged to contact our foundation. We want to help connect people who have already succeeded with their own discoveries and/or business with the most promising and innovative students.”
A Paradigm Shift for SMT Electronics: Micro-Coil Springs Interconnection for Ceramic and Plastic Grid Array Packaged Integrated Circuits
Jim Hester and Mark Strickland
NASA Marshall Space Flight Center
Huntsville, AL

Micro-coil springs (MCS) provide flexible electrical interconnections and allow significant movement in the x, y, and z axes to counteract the thermal expansion and dynamic forces between a microcircuit and a printed circuit board. Micro-coil springs are able to withstand harsh thermal and vibration environments significantly better than the current state of the art.

NASA Marshall engineers have developed a novel interconnection structure for the integrated circuit packages used in aerospace avionic designs. Micro-coil springs replace ball or column grid arrays (BGA/CGA), preventing connection breaks due to thermal and vibration stresses. The innovation replaces solder balls and solder columns, preventing connection breaks due to thermal stress, and providing longer life for electronics. The technology provides flexibility in three dimensions between the ceramic package and the printed circuit board — a distinct improvement upon cast or copper-ribbon-wrapped solder column interconnects, which have limited flexibility and are less capable of withstanding shear stress. The technology offers a novel alternative, providing better flexibility in high temperatures and harsh environments.

Applications for the technology include automotive electronics, oilfield electronics, electronics for use in wet or humid environments, and area array integrated circuits for space applications.

NASA Marshall has signed an exclusive license agreement with Topline Corporation for the micro-coil technology. NASA has filed a Patent Protection Treaty, and Topline is filing foreign patent protection in several countries and plans to sell the product worldwide. Topline/Marshall are collaborating on advancing surface mount technology (SMT).

Topline assists thousands of customers to define and refine their SMT and microelectronics assembly processes. The micro-coil technology will substantially increase interconnection flexibility, offering longer life to these electronics.

For more information, visit http://contest.techbriefs.com/electronics_winner

Honorable Mentions

Wireless Bluetooth Pressure Transducer
Mark McDaniel, Transducers Direct, Cincinnati, OH

The TDWLB series certified Bluetooth pressure (with optional temperature) transducer is used for remotely measuring pressure and/or media temperature, measuring these where power isn’t available, and monitoring multiple sensors at once. The sensor can be read on a smartphone, tablet, or PC. High and low alarm set points alert the user when pressures have surpassed a programmable threshold. Applications include HVAC (residential, commercial, RV, marine), boilers, chillers, industrial, water/wastewater, and industrial and medical gases.

For more information, visit http://contest.techbriefs.com/transducer

High-Power, Medium-Voltage Compensator
Tomasz Rawinski, Electrotechnical Institute, Gdansk, Poland

This compensator protects sensitive, high-power, medium-voltage industrial installations against dips, sags, and short-duration interruptions in public power networks. The compensator is based on high-voltage supercapacitors that stand up to 1 million charge/discharge cycles. After detecting a voltage sag or interruption, a load is disconnected from the grid power supply. At the same time, a sinusoidal voltage generator is started. The converter generates supplying voltage using electric energy stored in supercapacitors. When the compensator is on stand-by, the supercapacitors are charged.

For more information, visit http://contest.techbriefs.com/compensator
HemeChip for Early Diagnosis of Sickle Cell Disease

Yunus Alapan, Ryan Ung, Megan Romelfanger, Asya Akkus, Connie Piccone, Jane Little, and Umut Gurkan
Case Western Reserve University
Cleveland, OH

The Hemoglobin-Electrophoresis Biochip (HemeChip) can rapidly, easily, and conclusively identify the hemoglobin type in blood to diagnose Sickle Cell Disease (SCD) in newborns. The HemeChip can accurately identify hemoglobin type in a drop of blood. The ultimate goal is to reduce the footprint of hemoglobin screening for newborns down to the size of a credit card via HemeChip, which can be easily carried in a pocket together with a smartphone for mobile analysis.

A microengineered design and microfluidic approach are used in HemeChip. Microfluidic technology allows small sample volume (<20µL, fingerpick/heelprick blood), portability, ease of use, and low power consumption. The microchip system allows rapid manual assembly and is single-use, preventing potential cross-contamination between patients.

A mobile imaging and quantification algorithm will be integrated to achieve reliable and repeatable results, even in resource-poor settings. The quantification algorithm will automatically plot intensity histograms along channels, and highest intensity locations will be evaluated. Positions of healthy/sickle hemoglobin will be determined using the histogram plots, and results will be displayed on the screen.

For more information, visit http://contest.techbriefs.com/hemechip

ProstaGlove
Christopher LaFarge, MedicaMetrix, Wayland, MA

ProstaGlove® is a novel medical device to measure prostate volume and enable calculation of PSA Density (PSAD), which can be used to identify men at high risk for clinically significant prostate cancer. ProstaGlove is similar to a standard exam glove used during a Digital Rectal Exam (DRE), but has a balloon around the forefinger with fiber optic sensors and a calibrated grid that enable a physician to measure the width of the palpable surface of the prostate through the rectal wall. A proprietary algorithm determines prostate volume. When the balloon is inflated during use, it creates a clean void and positions a calibrated grid on the surface of the rectal wall immediately proximate to the prostate.

For more information, visit http://contest.techbriefs.com/prosta_glove

Urocycler Automatic Bladder Management System
Dr. David Flinchbaugh, Tech Applications Int’l, LLC, Orlando, FL

The UroCycler Automatic Bladder Management System, a magnetic prostatic sphincter technology, allows the bladders of catheterized patients to function in a normal cyclic manner. The key component — a unique, low-pressure-sensitive magnetic valve — is attached to the proximal end of the indwelling Foley catheter exiting the body. The device is precision-made to critical tolerances, assembled in a cleanroom environment, and utilizes ceramic permanent magnets to hold the valve closed initially. When the urine pressure reaches a normal voiding value, the valve opens fully and the patient experiences a “normal” flow rate of urine until the bladder is empty.

For more information, visit http://contest.techbriefs.com/urocycler

Medical Category Winner
(Winner of an HP Workstation)

“Our motivation in development of the HemeChip stems from the needs of the people, as do all technological developments. We believe adaptation and translation of high-end technologies in medicine from the laboratory benchtop to the point-of-care has a lot to offer in diagnostics and monitoring of complicated diseases, such as sickle cell disease, in resource-limited settings. Our HemeChip design addresses the challenges widely encountered in these resource-limited settings. We hope this award will help us reach out to potential benefactors, investors, and companies for further support in diagnosis of sickle cell disease in newborns.”

Honorable Mentions
ecoVent Systems — Make Every Room the Right Temperature
Dipul Patel, Yoel Kelman, Nick Lancaster, Shawn Rose, and Brian Bowen
ecoVent Systems
Boston, MA

Most homes have only one thermostat, so they operate like a house with only one light switch — everything is either on or off. That leaves some rooms boiling hot while others are freezing cold. It’s uncomfortable, and it’s inefficient.

The ecoVent system of wireless vents and sensors makes any forced air heating and cooling system smarter by directing conditioned air where it’s needed most. ecoVent is easy to install, saves energy, and is ready to make millions of homes much more comfortable.

The system consists of three main components: intelligent wireless vents, advanced sensors, and a mobile app that gives homeowners complete control over their comfort. The sensor suite monitors the real-time climate conditions in every room, and the intelligent vents redirect airflow accordingly. If rooms are unoccupied, there’s no need to heat or cool them, and homeowners can use the app to set custom temperature levels for different floors, rooms, or times of day.

Users plug a sensor suite into any electrical outlet in each room, and replace their existing vents with the ecoVent. No special tools are necessary. Once it’s installed, the system immediately begins learning the characteristics of the home and users’ heating and cooling preferences.

ecoVent can reduce heating and cooling costs by as much as 50%, and the system can pay for itself in less than three years. By reducing greenhouse gas emissions without sacrificing comfort, ecoVent will change the way people think about home heating and cooling.

For more information, visit http://contest.techbriefs.com/sustainable_winner

"Sustainability has always been a driving force for ecoVent, and winning this award is a great testament to that fact. We are passionate about helping people live more comfortably while saving energy. To us, that’s the definition of ‘creating the future.’ Saving energy shouldn’t be a chore, it should be fun — and even better than the status quo. That’s the product we’ve built and we’re glad that the voters were excited by it."

Honorable Mentions

Direct Solar Energy Conversion to Electricity with Nanometer-Scale Metal-Insulator-Metal Tunnel Diode Serving as a Rectifier in Rectenna Arrays
Nikolai Kislov, Nano CVD Co., Tampa, FL

A Metal-Insulator-Metal tunnel diode serves as a rectifier in rectenna arrays. An optical rectenna operates the same way as a well-known radio antenna at lower frequencies. Rectification, based on electron tunneling between closely positioned metal electrodes, transforms optical radiation of petahertz frequency directly into electrical power. Nano-holes through the thickness of the film substrate act as a self-alignment mask for forming arrays of nanoscale MIMTDs. The inventive design, which enables independent control of both capacitance and resistance, enables high-efficiency, low-cost solar power conversion.

For more information, visit http://contest.techbriefs.com/solar_conversion

Displacing Diesel Consumption with High-Altitude Wind Energy Using a Buoyant Airborne Turbine (BAT)
Ben Glass, Adam Rein, Chris Vermillion, Ryan Holy, and Ephraim Lanford, Altaeros Energies, Somerville, MA

The Buoyant Airborne Turbine (BAT) is a tethered, helium-inflatable shell, adapted from military aerostats, that lifts a three-blade, horizontal-axis wind turbine. The rapidly deployable BAT, which generates 2-3 times the electricity of competing turbines, lifts a wind turbine into stronger, more consistent winds beyond the reach of conventional tower-based turbines.

For more information, visit http://contest.techbriefs.com/turbine
Top Ten Most Popular Entries

Visitors to the Create the Future Design Contest Web site were invited to vote for their favorite entries. The top ten most popular entries, listed below, were winners of a Sphero robotic gaming ball provided by Orbotix.

1. **Avhiral**
   Pilato David, Poitou-Charentes, France
   This mini-computer acts as a laptop or mini-server.

2. **Survival Capsule**
   Julian Sharpe, Scott Hill, and Eddie Bernard, Survival Capsule, LLC, Mukilteo, WA
   The Survival Capsule is a personal safety system and emergency shelter.

3. **Green Cruzer**
   Thomas Tom, Joanna Joy, Thomas Chacko, and Shruthi Lokanathan, ThomasTom, Mumbai, Maharashtra, India
   Green Cruzer is a solar-powered electric recumbent tricycle.

4. **Tea Harvester**
   Ranjit Kumar Das, Guwahati, Assam, India
   This is a mechanized tea leaf harvesting system.

5. **Magnetic Engine**
   Nikhil Raj, P.K. Shahu, and Vishwa Mohan, Dehradun, Uttarakhand, India
   This engine uses magnetic force to rotate the pistons.

6. **Equipment for Iron Filing Estimation in Tea**
   Jatindra Nath Kalita, Tea Research Association, Jorhat, Assam, India
   This instrument measures iron filings in tea.

7. **A Solar Chimney Power Plant with a Pyramidal Shape**
   Dardan Klimenta, Joan Peuteman, and Jelena Klimenta, University of Priština, Kosovska Mitrovica, Serbia-Montenegro
   A solar chimney power plant features a square-based pyramidal shape.

8. **Iron Filing Extractor**
   Jatindra Nath Kalita, Tea Research Association, Jorhat, Assam, India
   This device removes metal particles from tea.

9. **Automatic Ankle Adjustment for a Prosthetic Leg**
   Saketh Sai Narayana, Hyderabad, Andhra Pradesh, India
   This device makes walking more comfortable.

10. **Gear Lever Mounted Clutch**
    Mahesh Narayan Wagh, Anil Vishal Ramteke, Shrirsh Shashank Deshpande, Vineesh Shanel Kaia, and Bhimrao Akshay Saware, JKSC, Savedi, Ahmednagar, Maharashtra, India
    This device optimizes the position of the accelerator, brake, and clutch pedals.
Meet the Judges

The sponsors of the 2014 Create The Future Design Contest thank the following judges for their participation.

Konstantinos Antonakopoulos, R&D Senior Engineer/Researcher, Aker Subsea AS, Oslo, Norway

Martin Apa, Chief Engineer, Exelis Inc., Clifton, NJ USA

Malath Arar, Staff Engineer, General Electric – Aviation, Clifton Park, NY USA

Yunus Balogun, Materials Engineer, Naval Surface Warfare Center, Crane, IN USA

Dean Barker, Senior Engineering Specialist, Fisher & Paykel Healthcare, Auckland, New Zealand

Ganesh Kumar Baskaran, Principal Engineer, Samsung SDS, Seoul, South Korea

Sabin Carpiuc, R&D Engineer, Continental Automotive Romania, Iasi, Romania

Jeff Crompton, Principal, AltaSim Technologies, Columbus, OH USA

Dennis Doane, Distinguished Member Technical Staff, Texas Instruments, Plano, TX USA

Mitch Finne, Engineering Manager, Medtronic, Fridley, MN USA

Vishnu Gandhi, Senior Design Engineer, Ontario Power Generation, Courtice, Ontario, Canada

Paul Goossens, Vice President, Engineering Solutions, Maplesoft, Waterloo, Ontario, Canada

Christoph Hamann, Dr.-Ing, Continental Automotive GmbH, Regensburg, Germany

Roger Harmon, Distinguished Member of the Technical Staff, Motorola Mobility LLC, Chicago, IL USA

Jim Hathaway, Manager, Production Programs, Northrop Grumman Aerospace Systems, Redondo Beach, CA USA

Robert Holzhauer, Senior Development Engineer, Chrysler Group, LLC, Northville, MI USA

David Jorde, Owner, Jorde Development, Design & Consulting, Fallbrook, CA USA

Pankaj Kalore, Engineer, Miller Electric Mfg. Co., Appleton, WI USA

Gary Kemp, Mechanical Engineer Staff, Lockheed Martin Missiles and Fire Control, Eielus, TX USA

Preston Kemp, Principal Engineer, GE Power & Water, Greenville, SC USA

James Lauer, Master Black Belt, Caterpillar Inc., Morton, IL USA

Dzung Le, Reliability and V&V Manager, Schlumberger, Jurong, Singapore

Yu-Tai Lee, Senior Scientist, Naval Surface Warfare Center, Carderock Division, West Bethesda, MD USA

Yong Chin Lim, RDD Manager, Dyson Malaysia, Senai, Malaysia

Edward Miesak, Scientist, Lockheed Martin, Orlando, FL USA

Scott Moore, Chief Engineer, Alliant Techsystems (ATK), Anoka, MN USA

Paul Moren, Projects Quality Manager, Valeo, Cergy Pontoise, France

Stephen Osborne, Senior Project Engineer, Stanley Black & Decker, Towson, MD USA

David Ouellette, Lead Designer, General Electric, Plainville, CT USA

Anil Pandit, Consulting Engineer, GE Industrial Solutions, Bangalore, India

Terry Partridge, Technical Advisor, Cummins Inc., Columbus, IN USA

Richard Paw, Strategic Alliance Manager, Synopsys, Mountain View, CA USA

Humberto Prettii, Senior Structural Engineer, General Motors, San Paulo, Brazil

Jeffery Puschell, Principal Engineering Fellow, Raytheon, El Segundo, CA USA

Antonio Quintieri, Senior Engineer, Procter & Gamble, Waterloo, Belgium

Niat Rahman, Project Engineer, General Motors, Pontiac, MI USA

Muriel Saccoccio, Engineer & Project Manager, CNES (French Space Agency), Toulouse, France

Wolfgang-Michael Schulz, Dr. rer. nat., SEMIKRON, Zirndorf, Germany

Alex Selvarathinam, Aeronautical Engineer Senior Staff, Lockheed Martin Aeronautics, Fort Worth, TX USA

Susan Stanton, Principal, SBCi Ltd., Sunbury, OH USA

Michael Stokes, Design Engineer, Ethicon Endo-Surgery, Cincinnati, OH USA

Edwin Tan, Electrical Design Engineer, KLA-Tencor, Milpitas, CA USA

Petrica Tudosoa, R&D NDT, Alstom CH, Rieden, Germany

Rich White, R&D Mechanical Engineer, Agilent Technologies, Wilmington, DE

Bruce Woollard, Engineering Fellow, Raytheon, Tucson, AZ USA

Puck Yan, Principal Professional Staff, Johns Hopkins University Applied Physics Laboratory, Laurel, MD USA
COMSOL, Inc.

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Top Prizes Awarded in the
Create the Future Design Contest

On November 7, the top prizes in the 2014 Create the Future Design Contest were presented in New York City. Winners in seven categories, as well as the Grand Prize winner, received awards for their innovations in the annual contest.

The Create the Future Design Contest – sponsored by COMSOL and Mouser Electronics, and presented by Tech Briefs Media Group, an SAE International company – stimulates and rewards innovation, and has attracted more than 9,000 product design ideas from engineers, entrepreneurs, and students since 2002.

Find descriptions of all winning inventions and honorable mentions at www.createthefuturecontest.com.

**Keynote speaker Monika Weber**, Grand Prize winner of the 2011 Create the Future contest, talked about how far her technology has progressed since her win. The Fluid-Screen silicon biosensor chip technology she co-invented at Yale University brings the power of an entire lab into the palm of your hand to detect bacteria in blood and water in 30 minutes or less. Her spinoff company, Integrated Microfluidic Devices (IMD), is based in Boston, MA and New Haven, CT. Learn more at www.fluid-screen.com.

**What if you could 3D-print** emergency shelters for tens of millions of victims of war and natural disasters? And what if those shelters could be built automatically in just a day? Behrokh Khoshnevis of the University of Southern California (center) won the $20,000 Grand Prize for his answer to those questions: Contour Crafting, a computerized construction method that 3D-prints entire buildings automatically. Here, Bernt Nilsson (left) of COMSOL (contest sponsor) joins Khoshnevis and Coby Kleinjan (right) of Mouser Electronics (contest sponsor). Learn more at http://contest.techbriefs.com/grand_prize.
2014 Create the Future Design Contest winners and sponsors. Standing from left: Bernt Nilsson of contest sponsor COMSOL; Rikki Razdan, Machinery/Automation/Robotics category winner; Marilyn Cooper of contest sponsor Mouser Electronics; E. Hunt Bergen of contest supporting sponsor Analog Devices; Sumit Awasthi of Analog Devices; and Coby Kleinjan of contest sponsor Mouser Electronics. Seated from left: Jim Hester, Electronics category winner; Dipul Patel, Sustainable Technologies category winner; Steve Arnold, Automotive/Transportation category winner; Alan Kieler, Machinery/Automation/Robotics category-winning team member; Grand Prize winner Behrokh Khoshnevis; Frederick Moxley, Aerospace & Defense category winner; Yunus Alapan, Medical category winner; and Jonathan Moritz, Consumer Products category winner.
Monika Weber, Founder and CEO of Integrated Microfluidic Devices, was the Grand Prize Winner of the 2011 Create the Future Design Contest.

Mark Wagner, President of Sensorcon, Inc. Grand Prize Winner of the 2012 Create the Future Design Contest.


Salim Nasser (left), CTO and Co-Founder of Rowheels, Inc., was the Grand Prize Winner of the 2010 Create the Future Design Contest.

GRAND PRIZE: $20,000!
ACCEPTING INDIVIDUAL AND TEAM ENTRIES STARTING MARCH 1, 2015.
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