The 2016 Create the Future Design Contest — sponsored by COMSOL, 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 over 1,100 new product ideas submitted from a record 71 countries. To view all of the entries online, visit www.createthefuturecontest.com.
The Hyliion team is honored to be the Grand Prize winner of the prestigious Create the Future Contest. It is a tremendous validation of the impact the Hyliion Intelligent Electric Drive Axle System will have on the trucking industry, and the environment.

HYLIION - HYBRID TECHNOLOGY FOR SEMI-TRAILERS AND THE TRUCKING INDUSTRY


Hyliion
Pittsburgh, PA

Hyliion is bringing hybrid efficiency to the trucking industry by replacing a semi-trailer’s passive axle with the Intelligent Electric Drive Axle System. The system can decrease fuel consumption and reduce emissions by capturing wasted energy and storing it in a battery pack to help propel the trailer when needed. Currently, tractor-trailers get 6.5 miles per gallon, and on average use $48,000 of fuel annually (per tractor). The trucking industry in the U.S. spends $150B per year on fuel; 6.2% of all emissions in the U.S. comes from trucks.

The Hyliion hybrid technology focuses on the trailer, as opposed to the truck. The technology uses regenerative braking to capture power when the vehicle is slowing down or going downhill, and then reuses it upon acceleration. The result is an average 30% reduction in fuel consumption. In addition to fuel savings, the technology can significantly reduce emissions. One Hyliion-equipped trailer can eliminate the equivalent of CO2 emissions from 13 cars. It’s estimated that there are 6 million trailers in the U.S. that could use the Hyliion system; that number rises to 24 million worldwide.

The Intelligent Electric Drive Axle System includes a built-in auxiliary power unit (APU), enhanced stability control, and improved trailer analytics. It can be installed on nearly every trailer type in less than one hour. The system replaces the existing trailer passive axle, and can be retrofitted to work with any box trailer without changing trailer height or length, and cab height or length.

Everything in the Hyliion system was designed to handle over-the-road wear and tear. The system, which operates autonomously, resides in a steel enclosure, and all electrical wiring is double-protected in conduit. If there is a problem with the system, it does not stop or inhibit the performance of the truck. Instead, it reverts back to a passive axle.

The controllers, motors, and batteries are all water- and oil-cooled, and have their own set of built-in failsafes. Acceleration and regenerative current limits are programmed in to prevent the system from being permanently damaged in the event of a surge. Temperature and stability maximums are also programmed into the system so the various units limit themselves or shut themselves down when approaching dangerous conditions.

When stationary, the Hyliion system turns its battery pack into an APU that powers the cab of the truck while the driver is at a rest stop. It can power a truck cab for up to 20 hours, so the diesel engine does not have to run during the night, saving fuel. It’s estimated that a truck idles 2,500 hours at rest stops each year, or a little over eight hours a day, 300 days a year. This idling burns about 1.2 gallons of fuel every hour; resulting in 3,000 gallons of diesel fuel (13.5% of total fuel consumed) being wasted at rest stops each year.

The Hyliion system performs trailer analytics, and records data such as fuel reduction, vehicle speed, location, and trailer weight and stability. All of this information is available to the driver through a mobile dashboard application. The data analytics package also can prevent theft by locking up a trailer’s rear wheels when notified.

For more information, visit http://contest.techbriefs.com/grand_prize2016
The evolution of computational tools for numerical simulation of physics-based systems has reached a major milestone.

Custom applications are now being developed by simulation specialists using the Application Builder in COMSOL Multiphysics®.

With a local installation of COMSOL Server™, applications can be deployed within an entire organization and accessed worldwide.

Make your organization truly benefit from the power of analysis.

comsol.com/application-builder
CASTROL REINVENTS THE OIL CHANGE WITH NEXCEL
Krishan Arora, Mike Baker, Glenn Barber, Peter Brett, Ross Dewhurst, Melvyn Dover, John Gamston, Steven Goodier, Annie Leeson, Vincent Panel, Ben Russell, Alessandra Scotese, Oliver Taylor, Julian Von Thungen-Reichenbach-Evans, Chris Wilks, John Ward-Zinski, and Roy Williamson
Castrol, Oxford, UK

Castrol’s NEXCEL system is a sealed oil cell that contains both the engine oil and the oil filter; so it can be easily removed and replaced by hand in about 90 seconds versus 20 minutes for a conventional oil change. The sealed cell ensures that used oil is collected and handled safely, facilitating enhanced recycling and reuse of the waste oil into high-quality lubricants through a dedicated re-refining process.

Castrol has demonstrated that NEXCEL reduces CO₂ emissions on modern engines through improved thermal management. The technology also paves the way for a new generation of precision-engineered oils to further improve engine performance and emissions.

NEXCEL makes the oil change extremely quick and clean for workshops, allowing them to offer more service options to customers. The sealed system ensures no spillage of used engine oil, resulting in improved safety for technicians servicing the vehicles. Moreover, it does away with the requirements for a large and often dirty tank for bulk storage of used oil.

After use, the oil cells are collected and the oil can then be re-refined back into high-quality lubricants. NEXCEL oil cells are designed from materials that will enable them to be re-used up to five times. Use of an engineering thermoplastic in the design supports scalable manufacturing in line with the requirements of the automotive manufacturing industry. Furthermore, the oil cells are capable of being fully recycled at the end of their useful life. If NEXCEL were fitted onto every car in the world today, it would save more than 200,000 road tankers of virgin oil from being produced every year.

The NEXCEL system — which includes the oil cell, oil cell dock, and lubricant — is integrated into vehicles at the design stage. Currently, the system is fitted as standard in the new Aston Martin Vulcan track-only supercar. Road cars fitted with NEXCEL are expected to go into production within five years. The technology also has potential use in heavy-duty and off-highway vehicles.

For more information, visit techbriefs.com/auto_winner2016

HONORABLE MENTIONS

The “Lighting Bug” Technology
Marcus Boykin, B-G Innovative Safety Systems, Lexington, TN
The Lighting Bug technology sustains two working headlights on vehicles at all times. It offers plug-and-play installation to an automobile’s existing wiring harness that plugs into the headlight bulbs. There are no tools required, and it usually installs in less than five minutes. The Lighting Bug monitors for failed low beam lights and automatically converts the high beam into a low beam state until the failed bulb can be replaced.

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

Ultralight Electric Bus
Bruce Emmons, Auokinetics Inc., Troy, MI
The Auokinetics AK12EV Ultralight Electric Bus is a full-size city bus that achieves the equivalent of 32 mpg, while a standard diesel bus gets only 3.5 mpg. The unibody structure, which is made entirely of lightweight high-strength stainless steel, allows downsizing of the motor, battery, wheels, tires, and other components.

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

InnoCat
Berker Hüsam and Elf Hüsam, Berker Nanoteknoloji Ltd., Odunpazari, Eskisehir, Turkey
The InnoCat catalytic converter is a low-cost structure that can be used in both new and old cars. The converter’s filter, or skeleton, is made of carbon, unlike existing ceramic converters. This makes the structure light-weight, durable, and low-cost. InnoCat has four times lower NOx emission compared with current commercial converters.

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

GlidePath — Intelligent Driver Assistance System at Traffic Signals
Matthew Barth, Guoyuan Wu, Kanok Bonbaltjomjinda, Peng Hao, Xuewei Qi, Osman Altan, and John Stark, University of California, Riverside, CA
GlidePath is an intelligent driver-assistance system that uses signal phase and timing information (SPaT) from upcoming traffic signals to determine the best driving-speed profile to pass through intersections. The system also uses GPS, radar, and digital map information. It can be implemented as an embedded system in the vehicle or as an aftermarket application on smart devices.

For more information, visit http://contest.techbriefs.com/glidepath
Now Available!
mouser.com/MultiSimBlue

MultiSIM BLUE
NI Multisim Component Evaluator Mouser Edition

Free, Easy-to-Use and Fully Integrated Circuit Simulation Tool from PCB Design to BOM

- All-in-one tool, including schematic capture, simulation, PCB layout & BOM
- Over 100,000 of the industry’s leading manufacturer components built-in
- Newest components from Mouser included with parts database updates
- Faster and more advanced autorouter
- Supports unlimited board size and layers
- FREE

Download for FREE now at mouser.com/MultiSimBlue

Authorized distributor of semiconductors and electronic components for design engineers.

Free Info at http://info.hotims.com/61067-711

Mouser and Mouser Electronics are registered trademarks of Mouser Electronics, Inc. Other products, logos, and company names mentioned herein, may be trademarks of their respective owners.
By limiting heating time, the natural steel is quenched with a water spray or to 1200 °C seconds) to temperatures of about 1070 to 1200 °C. Within a few seconds, the heated steel is quenched with a water spray or bath. By limiting heating time, the natural heterogeneity of the steel is preserved to create a highly complex, multi-phase, multi-chemistry steel that combines the ductility of bainite and the strength of martensite. The process creates an engineered micro-segregation of both the chemistry and microstructural phase at the micron level. With low total elongation, Flash steels exhibit excellent bendability, minimal thinning, and high energy absorption when formed into complex OEM geometries. Costly alloying and time-consuming, capital-intensive, thermomechanical processing are not required. Using industrial induction-heat and water-quench equipment configured and tuned for Flash processing parameters, off-the-shelf steel is rapidly heated (2-3 seconds) to temperatures of about 1070 to 1200 °C. Within a few seconds, the heated steel is quenched with a water spray or bath. By limiting heating time, the natural heterogeneity of the steel is preserved to create a highly complex, multi-phase, multi-chemistry steel that combines the ductility of bainite and the strength of martensite.

Flash Bainite made from AISI 1020 is 1500 MPa, which is comparable to DP1000. Because of its higher strength, less Flash Bainite material is needed, and the end product/part weighs less. Off-the-shelf sheet, plate, and tubing can be made into Flash Bainite. It’s formable to 1T/Zero-T bend radii up to 1600MPa, and can be welded with spot, laser, and gas metal arc welding (GMAW) using standard factory techniques.

“This award provides small-scale manufacturers, the largest steel mills, and all in between the Flash knowledge to make everyday steel components stronger than titanium, lighter than aluminum, yet able to fold almost like paper. Migrating Flash Armor Technology to civilian markets will allow automotive, agricultural, architectural, shipping, and oil/gas infrastructure to be lightweight, yet stronger.”

---

**CATEGORY SPONSOR**

Dymax®

**HONORABLE MENTIONS**

**New Wing Design Exponentially Increases Total Aircraft Efficiency**

Albion (A) Bowers and Peter Uden, NASA Armstrong Flight Research Center, Edwards, CA

An innovative, non-elliptical wing design employs fine wing adjustments to remove adverse yaw and increases aircraft efficiency by reducing drag. It optimizes the overall aircraft configuration by reducing the size of — or even removing entirely — the vertical tail and by reducing structural weight.

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

**SuperCritical Air Mobility Pack (SCAMP)**

Harold Gier and Terence Gier, Nivot Technologies, LLC, Longmont, CO

The SuperCritical Air Mobility Pack (SCAMP) provides breathing air and full-body cooling for hazardous materials workers, firefighters, and others. SCAMP which uses cryogenic technology is a one-hour breathing/cooling apparatus in a package weighing less than 30 pounds, compared with up to 60 pounds for a conventional system.

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

**InSpec Snapshot Surface Gauge**

Erik Novak, Tim Horner, Joseph Moore, Brad Knimbridge, Mike Keel, Dmitry Kiselev, and Shawn McDermed, 4D Technology, Tucson, AZ

The InSpec Snapshot Surface Gauge is a compact, vibration-immune 3D surface measurement system with micrometer-level resolution. The system’s polarization-based methods acquire all data in a single frame.

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

**Automated Software System for the Simulation of Arcing in Spacecraft**

Vasily Kazhevnikov, Vadim Kuraban, Denis Kosov, Andrey Kozyrev, Alexander Batrakov, Natalia Semeniuk, and Larisa Zjulkova, HCEI, Tomsk, Russia

An automated software system predicts the risk of electrical arcing in high-voltage onboard electronics intended for use in long-term, self-contained conditions, such as in spacecraft. The software reduces processing time by turning a large-scale 3D simulation into a limited set of fast 2D simulations.

For more information, visit http://contest.techbriefs.com/arcing
SpeedMask® from Dymax. Masking resins that are easy to apply, easy to remove, and cure in seconds. So your team gets more done in less time — increasing throughput and reducing labor costs. When you choose SpeedMask, you also get:

- A resin that's solvent free and environmentally friendly
- A partnership with a company that can help you become more cost-effective
- The combination of light-cure technology, dispensing systems, curing equipment, and support you need to gain an advantage over your competitors

ONLY FROM Dymax. THE COMPANY THAT HELPS YOUR COMPANY PERFORM BETTER.

dymax.com/mask-it
1,000X BETTER DATA COMPRESSION AND REAL-TIME DECODING OF HIGH-RESOLUTION MAPS
Shaun McWherter, Mark Skoog, and Jamie Willhite, NASA Armstrong Flight Research Center, Edwards, CA; and Loyd Hook, University of Tulsa, OK

This NASA-developed data-compression technology is capable of encoding massive amounts of data into a package more than 1,000 times smaller than with standard compression, which can transform the use of digital terrain maps (DTMs) in restricted environments such as tablets, smartphones, and embedded systems. Created at NASA’s Armstrong Flight Research Center, the software system integrates innovative encoding and decoding algorithms to provide a 5,000:1 compression ratio and rapid/continuous decompression in constrained computing situations. It enables users to access and create customized DTMs from a variety of data sources using a single graphical user interface.

Standard compression methods provide only a 4:1 compression ratio—the original file size is reduced by one-fourth. In an aircraft or other computing-constrained environment, this shortcoming in compression capability limits the number of DTMs that can be stored locally at any one time. In the case of an airplane, technicians must swap out the DTMs in between flights, which introduces the opportunity for human error and requires extensive manual quality-control work.

NASA’s technology can compress extensive DTMs at the highly efficient ratio of 5,000:1. For example, a 22-Mb DTM that previously could be compressed only down to 5.5 Mb can now be shrunk to 4.4 kb. Although aviation was the original target for this technology, the software has uses in applications where line-of-sight needs to be rapidly computed, continual surfaces need to be analyzed, or terrain routes need to be planned. Potential applications include automotive GPS, geographical prediction and planning, marine charting systems, geospatial/geographic information systems (GIS), medical software, Earth science data collection, and gaming systems. In one example, the software is forming the basis for an intelligent cruise control that would achieve better fuel economy in cars.

“Our team is honored to receive this award. Our improvements to data handling and compression will hopefully go on to save many lives in the future. This award will help garner the attention of potential licensees and build interest in this advancement. We are very grateful to NASA Tech Briefs and the judges for their consideration.”
Congratulations!

Imagineeering is proud to sponsor this year’s Annual Create the Future Contest and would like to congratulate all the winners and encourage those who did not win this time…keep it up.

Our long term goal has always been to encourage new ideas and innovations, no matter where it originates, in classrooms across the globe or in someone’s garage. So don’t give up!

The foundation of all electronic products is a printed circuit board. Whether machines that make smart manufacturing possible or robots and even robotic arm, all require fully assembled Circuit Boards.

For 30 years Imagineeering, Inc. has been using cutting edge technology to produce some of the most complex PCB & PCB Assemblies with HDI capabilities like 3mil laser drilling, blind/buried vias, sequential lamination & staggered microvias.

Let us help you speed up your project.

Imagineeering Inc
847-806-0003
sales@pcbnet.com
The SMA actuator and the indicator (for example, LED or buzzer) could also act as current loads and drain any capacitive residual charge. When the charge is removed or depleted, the SMA actuator cools and is reset by the biasing spring, unlatching the lock and indicating to the operator that the panel is safe to access. The system may also include an optional bypass mechanism so that the system can be serviced in special situations by trained individuals.

One unit can be used with a wide range of AC or DC voltage applications, and no external power is needed for operation. The SMA Secondary Safety Latch and Lock mechanism is robust, inexpensive, and compact. Applications include safety switches for power distribution panels, industrial control panels, household HVAC, and other service panels in energy applications.

For more information, visit http://contest.techbriefs.com/machinery_winner2016
From Months to Days
Do you want to develop complex multi-domain models quickly?

Planetary Rover
3 months to 10 days
A complex multidomain model that simulates planetary rover motion, wheel/soil interaction, energy consumption, and more.

Unmanned Aerial Vehicle
1 month to 4 days
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.

Request your complimentary Robotics Information Kit:
www.maplesoft.com/RoboticsKit

© Maplesoft, a division of Waterloo Maple Inc., 2015. Maplesoft, Maple, and MapleSim are trademarks of Waterloo Maple Inc. All other trademarks are the property of their respective owners.

Free Info at http://info.hotims.com/61067-714
CONTINUOUS WEARABLE BLOOD PRESSURE MONITOR

Sean Connell, Kyle Miller, Jay Pandit, and Jung-En Wu
Bold Diagnostics, Evanston, IL

Bold Diagnostics has developed a blood pressure monitoring system that is comfortable for patients and seamlessly integrates into their everyday lives. The low-cost monitor includes a set of wearable wristbands that uses optical biosensors to continuously measure blood pressure, and a smartphone application that uploads a report into the patient’s medical record for clinician review. The solution provides accurate measurements with greater frequency, enabling doctors to positively impact clinical outcomes with proper blood pressure management.

The wristbands calculate blood pressure based on Bold Diagnostics’ Differential Pulse Arrival Time (DPAT) technology. DPAT is based on the assertion that the pulse wave generated by a contracting heart arrives at the right arm before the left arm because of an inherent delay created by the anatomy of the aortic arch. Bold has further discovered that the difference in arrival times is an indicator of blood pressure. The DPAT technology has been implemented with a set of pulse waveform sensors that uses light emitting and detecting diodes to determine the difference in pulse wave arrival times between the right and left hands.

Bold has developed a working prototype and conducted preliminary clinical studies under an approved institutional review board (IRB) protocol that demonstrates proof of concept. The clinical study compared DPAT measurements at rest and in response to various environmental stressors known to affect blood pressure. The study demonstrated a consistent difference in pulse arrival times between the right and left hands, and a strong correlation between DPAT and blood pressure (±5 mmHg) in comparison to conventional blood pressure measurement devices. Study results suggest DPAT is a viable method for continuously measuring blood pressure.

The company will focus on direct distribution to tertiary care centers for a price between $155 and $195, with anticipated market entry by 2018.

For more information, visit http://contest.techbriefs.com/medical_winner2016
Qosina stocks thousands of OEM single-use components and offers excellent customer service including free samples, low minimums, and immediate delivery.

Log on to Qosina.com to order today!

All trademarks and registered trademarks are the property of their respective owners.

Qosina's product range includes:
- Female ENFit™ Syringe
- Snub Nose Adapter 3-Way Tubing Connector, MLL
- Female ENFit™ Cap
- Needleless Injection Site Swabbable FLL Side Port Connector
- Male ENFit™ with Cap on Strap
- 3-Way Stopcock Male ENFit™ with Cap on Strap
- Universal Bottle Adapter for ENPlus Cross Spike
- Check Valve Barbed Inlet MLL Outlet
- Spike Non-Vented
- FLL to Barb Connector with Wings
- Tuohy Borst Adapter Swivel MLL, FLL Side Port Connector
- Hemostasis Valve Y Connector MLS FLL Sideport
- Valved Tear Away Introducer Sheath with Dilator
- 3-Way Parallel Tubing Connector, MLL
- Elbow Connector Barbed
- Needleless Injection Site Swabbable FLL Side Port Connector

Free Info at http://info.hotims.com/61067-715
**CONSUMER PRODUCTS**

**CATEGORY WINNER**

(Winner of an HP Workstation)

---

**MIFOLD**

Jon Sumroy
Carfoldio, Ltd., Ra’anana, Israel

The mifold Grab-and-Go booster seat for children aged 4-12 is more than ten times smaller than a regular booster seat and just as safe. A regular booster seat works by lifting a child up to the position of an adult, mifold does the opposite, securing the seatbelt in the correct position on the hips and shoulder by holding the seatbelt down at three points.

“The award is a true accolade from design and engineering professionals. This means that, as well as solving a serious problem with a convenient, practical, and affordable solution, we have solved the problem in a well designed and engineered way. The credibility of the contest, and the respect and professionalism of the organizers and judges, will enhance our ability to market the Grab-and-Go Booster Seat worldwide. This will help us keep more children safer in more journeys, more of the time.”

There are belt guides on either side of the child’s hips to hold the lap belt correctly against the bones and off the soft stomach. These belt guides are adjustable to three sizes. The mifold shoulder belt positioning strap and clip is attached to the back of the mifold seat, and goes behind the child’s back. The clip is attached to the adult seatbelt chest strap, and the length of the belt positioning strap and clip is adjusted to pull the adult strap into the correct position on the child’s clavicle (collar bone).

Because mifold doesn’t need to lift the child, it doesn’t need to be big and bulky. It is flat and can be folded to create a compact, portable package measuring 10 x 5 x 2 inches. The product is built with 6061 aircraft-grade aluminum and Dupont™ Delrin® 100ST, a super-tough plastic polymer with excellent impact resistance. The entire seat weighs 1.6 pounds.

In a collision, the child is protected in the same way as they would be with a conventional booster seat. mifold meets or exceeds the requirements of FMVSS 213 in the USA, R5R in Canada, and ECE R44.04 in the EU.

For more information, visit http://contest.techbriefs.com/consumer_winner2016

---

**Advanced 3D Volumetric Display**

Diji Jayakaran, Prajna-Vaishnavi-Shakti Research, Ernakulam, Kerala, India

The 3D Volumetric Display delivers a clearer and more realistic 3D picture using individual picture cells called sphexels (spherical picture cells). The sphexels control the direction of light to be emitted, and provide occlusion and opacity without losing perspective or parallax. Target applications include R&D and medical imaging.

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

---

**X-Drive: Powered Wheelchair Conversion**

Alexander Shortt, Lukas Perez, and Badri Srinivasan, McMaster University, Ontario, Canada

X-Drive provides a way to convert conventional wheelchairs into powered wheelchairs on a permanent or temporary basis. The conversion kit includes a universal adapter bar; a hub-mounted, direct-drive DC motor used on an all-terrain tire; a battery; and an Arduino microcontroller. The system is controlled by a smartphone using joystick technology.

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

---

**Non-Contact Tire Pressure Reader**

Jingxi Zhang, Siglamps, Foster, CA

This non-contact tire pressure reader is operated using a smartphone. A 3 x 3-mm combined pressure sensor and MCU is embedded in a special tire cap with a tiny LED in the top. The pressure information is coded in the LED’s blinking light emission, which is then captured by the smartphone’s video camera and interpreted by the decoder of a phone application.

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

---

**HONORABLE MENTIONS**

---

**CATEGORY SPONSOR**

**Imagineering inc.**

Contact Manufacturing since 1983.
The SunSaluter
Eden Full Goh, Phil Hannam, Rachel Han, Victor Liu, Victoria Alleyne, Anuradha Dhavala, Serena Xu, Andie Goh, Sambit Sasmal, Santosh Ku Jha, and Promise Daniel Chidothe, SunSaluter, New York, NY

The SunSaluter enables a solar panel to rotate and follow the Sun throughout the day, boosting efficiency by 40%. It employs a simple water clock to control the flow of water from a container suspended from the solar panel. As the water empties and one side gets lighter, the panel slowly rotates.

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

Highly Effective Personal Water Filters Using Nanotechnology for Worldwide Markets
Corinne Clinch, Uriel Eisen, Kyle Henson, Jay Kuchta, and Annie Black, Rorus Inc., Pittsburgh, PA

This personal water-purification system is a nanotechnology-powered, gravity-fed, multi-layered design. While most filters use tiny holes to catch and remove pathogens, the Rorus filter media physically attracts contaminants like a magnet. As a result, these filters have 100x larger filter pores and therefore exhibit faster flow.

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

Fluid-Driven Emergency Lighting
Jung Huang Liao, Industrial Tech. Research Institute, Chutung, Hsinchu, Hsinchu Hsien, Taiwan

This emergency lighting combines a water turbine micro-generator with an LED light engine to form the Fluid-Driven Nozzle Light (FDNL) and Fluid-Driven Sprinkler Light (FDSL). At fire sites, they provide illumination and indication without outside electricity.

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

UMotor — Over-Expanded Engine
Jorge Martins, Tiago Costa, Helio Silva, and Guilherme Capela, Universidade do Minho, Guimarães, Braga, Portugal

The UMotor aims to change the way small engines attain high efficiency. It uses an innovative crankshaft that enables the over-expansion of the exhaust gases. An expansion/compression ratio of 2:1 means that most of the enthalpy of the burned gases can be converted into useful work.

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

DESOLENATOR — WATER FROM SUNSHINE
William Janssen
Desolenator, London, UK

The Desolenator is a water-purification technology that decontaminates water from any source using only solar energy. The technology is a very affordable ($0.005/L) “at-source” method of water purification. It offers a combination of features and capabilities that makes it extremely well suited for household use. It is GSM-mobile enabled and is data-driven through sensors, enabling service through micro mobile payment. It is eco-friendly, has a lifetime span of up to 20 years, doesn’t require filters/membranes, doesn’t drain the main’s electricity, and doesn’t expel toxic waste into the ocean. The long-term goal is to prevent the worsening of the water crisis.

The Desolenator merges photovoltaic (PV) and thermal energy with a heat exchanger to drastically increase the yield of clean drinking water produced per square meter of solar panel surface. This technology transforms some of the existing bottlenecks associated with PV solar, turning these weaknesses into strengths in order to maximize the potential energy hitting the surface area of the system. Traditional photovoltaics convert 15-20% of the energy that hits them into electrical energy, with the rest lost as heat. The Desolenator uses all of this heat and traps it through insulation to heat the water. It then uses electrical energy to boil the water, and a heat exchange mechanism to increase throughput and yield.

“Desolenator is extremely proud and thankful to all those who voted for us. We believe that the global water crisis is a serious issue, and winning recognition from a leading publication offers great support to our efforts. We will surely return to share our progress with readers over the coming years.”
The sponsors of the 2016 Create The Future Design Contest thank the following judges for their participation.

- **Piero Aversa**  
  Chief Engineer - Global Powertrain NVH, Ford Motor Company  
  Dearborn, MI

- **Dean Barker**  
  R&D Manager, Fisher and Paykel Healthcare  
  Auckland, New Zealand

- **Nate Bernklau**  
  Senior Drivetrain Engineer, John Deere  
  Davenport, IA

- **Thierry Boulanger**  
  MedTech Professional, Air Liquide  
  Newark, DE

- **Doug Bradley**  
  Advanced Development Engineering Manager, Plasan  
  Wixom, MI

- **Sabin Carpiuc**  
  Software Engineer, The MathWorks Ltd.  
  Cambridge, England, UK

- **Kevin Cook**  
  Vice President, Marketing & Communications, Space Foundation  
  Colorado Springs, CO

- **Jeff Crompton**  
  Principal, AltaSim Technologies  
  Columbus, OH

- **Evangelos Diatzikis**  
  Fellow Engineer, Siemens Energy Inc.  
  Orlando, FL

- **Barry Dieser**  
  Director of Information Technology, Signicast LLC  
  Hartford, WI

- **Thomas Dineen**  
  Systems/Software Engineer, Honeywell International  
  Glendale, AZ

- **Sunil Dixit**  
  Technical Fellow, Northrop Grumman Aerospace Systems  
  El Segunda, CA

- **Mitch Finne**  
  Engineering Manager, Medtronic  
  Plymouth, MN

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

- **Jim Hathaway**  
  Manager, Production Programs, Northrop Grumman Aerospace  
  Redondo Beach, CA

- **Virginia Hogan**  
  Senior Manager, Marketing - Masking, Global, Dymax Corporation  
  Torrington, CT

- **Travis Holland**  
  Mechanical Engineer, Corpus Christi Army Depot  
  Corpus Christi, TX

- **Robert Holzhauer**  
  Electrical Cost Engineer, FCA  
  Northville, MI

- **Dave Housey**  
  Engineering Manager, Midmark Corporation  
  Versailles, OH

- **John Hoyle**  
  Lead Engineer, Johnson Controls Inc.  
  Plymouth, MI

- **Mary Hubbard**  
  Department of Defense – Army  
  Huntsville, AL

- **Tony Ieraci**  
  Senior Manager, Marketing Communications, Global, Dymax Corporation  
  Torrington, CT

- **David Jorde**  
  Development Consultant, Jorde Development  
  Fallbrook, CA

- **Paulo Jorge**  
  Engineering Specialist, Bombardier  
  Toronto, ON, Canada

- **Pankaj Kalore**  
  Engineer, Midmark Corporation  
  Lincolnshire, IL

- **Shivaram Kamat**  
  Senior Consultant, Tata Consultancy Services Ltd.  
  Pune, Maharashtra, India

- **Yathiraj Kasal**  
  Program Manager, Additive Manufacturing, Honeywell Technology Solutions  
  Bangalore, Karnataka, India

- **Ewen Kellar**  
  Principal Project Leader, TWI Ltd.  
  Cambridge, Cambridgeshire, UK

- **Ankit Kothari**  
  Godrej & Boyce Mfg Co Ltd  
  Mumbai Maharashtra, India

- **Jacque La Valle**  
  Senior Electrical Engineer, Naval Air Systems Command  
  Patuxent River, MD

- **Wallace Latimer**  
  Product Manager, Coherent  
  Wistonville, OR

- **Dzung Le**  
  Reliability Manager, Schlumberger  
  Jurong, Singapore

- **Joseph Lipman**  
  Director of Device Development, Hospital for Special Surgery  
  New York, NY

- **Pascal Martinez**  
  Extremely Large Telescope Dome and Main Structure Deputy, European Southern Observatory  
  Garching bei Muenchen, Bavaria, Germany

- **Edgardo Matus**  
  Senior Design Engineer, MABE  
  Queretaro, Qro, Mexico

- **Adrian Nastase**  
  Chief Electronics Engineer, Newport Corporation  
  Irvine, CA

- **Paul Nussbaum**  
  Assistant Dean, College of Engineering Tech, ECPI University  
  Richmond, VA

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

- **David Ouellette**  
  Lead Designer, General Electric  
  Plainville, CT

- **Anilkumar Pandit**  
  Senior Consulting Engineer, GE Industrial Solutions  
  Bangalore, Karnataka, India

- **Samuel Phillips**  
  Consulting Engineer  
  Grass Valley, CA

- **Marek Piechocinski**  
  MEMS Design Engineer, Cirrus Logic  
  Edinburgh, UK
Visitors to the Create the Future Design Contest web site were invited to vote for their favorite entries. The most popular entry wins a GoPro® camera; the other popular vote prizes include a Sphero® BB-8™ Droid™ or robotic gaming system.

**IoBike**
Marcelo Abdala Daher, Rafael Moana Cardoso de Vitor, and Guiliano de Vitor, iobike, Sao Paulo, Brazil
IoBike is a lighting solution that connects bicycles to the IoT. A display creates brake lights and headlights projected from the wheel. It communicates with beacons that collect bike-traffic data and allows interaction with the location.
http://contest.techbriefs.com/2016/entries/6835

**Remote Control Switch Board**
Asha Arora and Ankit Dalal, Dronacharya College of Engineering, Gurgaon, Haryana, India
A wireless remote electric switch is controlled by a radio or other signal, and does not require an operator to touch the switch. It uses batteries with a low, safe voltage, protecting against electric shock if touched with wet hands.
http://contest.techbriefs.com/2016/entries/7256

**Slosh Reduction Using Linear Actuator in Liquid Propulsion System**
Sloshing can be seen in all vehicles that undergo accelerated motion. This technology prevents sloshing as the amount of fuel decreases according to its burn rate.
http://contest.techbriefs.com/2016/entries/7022

**cerVIA System - Automated, Accurate, and Accessible Cervical Cancer Screening**
Rashit Patnaik, Stephanie Yang, Oliaci, Oleru, and Johanne Dale, Luso Labs, Plano, TX
See page 22.
http://contest.techbriefs.com/2016/entries/7288

**Solution for Airplane Crashes**
Manoj Sharma, Pantnagar, Uttarakhand, India
An airplane cabin made of fireproof cloth material fills with air, and a belt attached to the cabin wall acts as a seatbelt. Springs are attached in outer areas to absorb shock. In the event of an imminent crash, passengers use the cabin as a shock- and fire-resistant refuge.
http://contest.techbriefs.com/2016/entries/6784

**Robotic-SixthFinger for Grasp Compensation in Chronic Stroke Patients**
Iftin Hussian, Domenico Prattichizzo, Giovanni Spogaletti, and Gianata Solvetti, Siena Robotics and Systems Lab, Siena, Toscana, Italy
The device compensates for diminished grasping abilities in chronic stroke patients. The wearable robotic extra finger is used with the weakened hand, acting as two parts of a gripper to cooperatively hold an object.
http://contest.techbriefs.com/2016/entries/6683

**Solar Charged Laboratory Bench Power Supply**
Williams A. Ayara, Covenant University, Ota, Ogun, Nigeria
This invention ensures that even when a total main power outage occurs, laboratory experiments do not need to be suspended. The power supply delivers low-voltage AC and DC power; and features a USB port for charging cellphones and other mobile devices.
http://contest.techbriefs.com/2016/entries/6618

**Hyper4 High Efficiency Engine**
Bernie Bon, Jorge Martins, Francisco Brito, and Tiago Costa, MNC Engineering LLC, Whittier, CA
This engine improves fuel efficiency of internal combustion engines by up to 75% using a compact axial design. The configuration allows for the inclusion of rotary valves and water injection for internal cooling and the reduction of NOx emissions.
http://contest.techbriefs.com/2016/entries/6670

**Smart Split Shoes**
Sandeep Sugam Mallula, CYISENT Ltd., Bangalore, Karnataka, India
The shoes feature a pressure sensor that provides an electric pulse when pressure is applied, and a proximity sensor that senses the closeness of the foot towards the sole of the shoe. When both sensors are activated, a solenoid attached to one half of the shoe is activated to attract the other half, closing the shoe.
http://contest.techbriefs.com/2016/entries/6670

**Black Box for Car Accident**
Alpana Gupta and Anupam Lata, Dronacharya College, New Delhi, Delhi, India
This system monitors the speed of a car using a tachometer and an ultrasonic sensor attached to the system. If a sudden decrease in speed occurs and the sensor detects a collision, the system sends the location of the accident to the police, hospital, or family members.
http://contest.techbriefs.com/2016/entries/7258
The 2016 Create the Future Design Contest is sponsored by COMSOL, Inc. and Mouser Electronics

COMSOL, Inc. (Burlington, MA) provides software solutions for multi-physics modeling and simulation. Its flagship product, COMSOL Multiphysics, lets engineers and scientists build simulations to verify and optimize their designs. Its unparalleled ability to include all relevant physical effects that exist in the real world opens up a wide array of modeling possibilities. COMSOL's customers apply this technology to make cars and aircraft safer and more energy efficient, enhance the reception of our cell phones, search for new energy sources, explore the universe, develop medical equipment enabling more accurate diagnoses, and educate the next generation of scientists. www.comsol.com

Mouser Electronics, a subsidiary of TTI, Inc., is part of Warren Buffett's Berkshire Hathaway family of companies. Mouser is an award-winning, authorized semiconductor and electronic component distributor, focused on the rapid introduction of new products and technologies to electronic design engineers and buyers. Mouser.com features more than 4 million products online from more than 500 manufacturers. Mouser publishes multiple catalogs per year providing designers with up-to-date data on the components now available for the next generation of electronic devices. Mouser ships globally to more than 400,000 customers in 170 countries from its 492,000-square-foot state-of-the-art facility south of Dallas, TX. www.mouser.com

Analog Devices (Supporting sponsor)
Innovation, performance, and excellence are the cultural pillars on which Analog Devices (ADI) has built one of the longest-standing, highest-growth companies within the technology sector. Acknowledged industry-wide as the world leader in data conversion and signal conditioning technology, Analog Devices serves over 60,000 customers, representing virtually all types of electronic equipment. www.analog.com

Intel (Supporting sponsor)
Intel is the world’s largest manufacturer of semiconductors. Intel’s entire processor portfolio provides design engineers with direct access to the industry’s most advanced processors. Intel’s industry-leading technologies are created using the most advanced foundry process technologies in the industry, producing unprecedented levels of performance and efficiency. www.intel.com

Imagineering, Inc. (Consumer Products Category and Electronics Category Sponsor)
Imagineering, Inc., based in Elk Grove Village, IL, is your most reliable source for high-quality and on-time printed circuit boards and printed circuit board assemblies. With over 30 years of contract manufacturing experience, Imagineering, Inc. is your one-stop solution for all your Electronic Contract Manufacturing needs. Get Instant Online Turn Key quotes for all your PCBA needs. www.pcbnet.com

Maplesoft™ (Machinery/Automation/Robotics Category Sponsor)
Maplesoft, a subsidiary of Cybernet Systems Co., Ltd. in Japan, is the leading provider of high-performance software tools for engineering, science, and mathematics. Maplesoft’s core technologies include the world’s most advanced symbolic computation engine and revolutionary physical modeling techniques. Combined, these technologies enable the creation of cutting-edge tools for design, modeling, and high-performance simulation. www.maplesoft.com

Qosina (Medical Category Sponsor)
Qosina is a leading global supplier of thousands of stock components to the medical OEM and pharmaceutical industries, offering complimentary samples, low minimums, and Just-In-Time (JIT) delivery. Qosina provides in-stock solutions from an ISO 9001 and ISO 14001 registered facility. Whether you need molded or extruded components, high-value plastics, metal, sub-assemblies, or packaging, we invite you to talk to our customer service or product development teams. www.qosina.com

Dymax Corporation (Aerospace & Defense Category Sponsor)
Dymax Corporation, originally founded in 1980 as the American Chemical and Engineering Company, is a leading manufacturer of advanced light-curable adhesives, coatings, oligomers, light-curing equipment, and fluid dispense systems. Dymax serves the needs of OEMs in the medical, electronics, optical, aerospace, automotive, appliance, metal finishing, and alternative energy markets. www.dymax.com

SAE International (Medical Category Sponsor)
SAE International is a global association of more than 138,000 engineers and related technical experts in the aerospace, automotive, and commercial-vehicle industries. SAE International’s core competencies are life-long learning and voluntary consensus standards development. SAE International’s charitable arm is the SAE Foundation, which supports many programs, including A World In Motion® and the Collegiate Design Series™. In 2012, SAE International acquired Tech Briefs Media Group, publishers of NASA Tech Briefs. www.sae.org

Prize Sponsors:

Supporting Sponsor:
WE’LL HELP YOU STICK IT TO YOUR COMPETITORS.

Adhesives are only the beginning. At Dymax we provide the light-cure technology, dispensing systems, curing equipment, and support you need to gain an advantage over your competitors.

Talk to us and find out how.

dymax.com/wehelp
Top Prizes Awarded in the Create the Future Design Contest

Top prizes in the 2016 Create the Future Design Contest were awarded on November 11 in New York City. The Grand Prize winner, and winners in seven categories, took home awards for their innovative design ideas.

Sponsored by COMSOL and Mouser Electronics, the contest attracted more than 1,100 new product ideas from 62 countries. Find descriptions of all winning inventions and honorable mentions at www.createthefuturecontest.com.

Keynote speaker Salim Nasser, CTO and Co-Founder of Rowheels, was the Grand Prize winner of the 2010 Create the Future Design Contest. Salim shared how his idea for changing the way manual wheelchairs are propelled—pulling, rather than pushing—has helped reduce shoulder and wrist injuries and pain for users. Learn more at www.rowheels.com.

The seven category winners received a workstation from Hewlett-Packard. Representing HP was Martin Citron, Senior Technical Consultant.

The winner of the $20,000 Grand Prize, Thomas Healy, Founder and CEO of Hyliion, developed a way to hybridize the trailer portion of the tractor-trailer, saving more than 30% on fuel, and reducing emissions by 10%. The system uses regenerative braking to capture power when the trailer is slowing down or going downhill, and reuses the power to help the truck-trailer up hills. Learn more at http://contest.techbriefs.com/grand_prize2016.

Mark Skoog of NASA’s Armstrong Flight Research Center accepted the award as Electronics category winner. His team’s technology encodes massive amounts of data into a package more than 1,000 times smaller than with standard compression, improving digital terrain maps. Learn more at http://contest.techbriefs.com/electronics_winner2016.

2016 Create the Future Design Contest winners and sponsors. Front row (l-r): Keynote speaker Salim Nasser; Gary Cola, Aerospace & Defense category winner; Jon Sumroy, Consumer Products category winner; Mark DiPaolo, Automotive & Transportation category winner; William Janssen, Sustainable Technologies category winner; Nicholas Pinto, Machinery/Automation/Robotics category winner. Back row (l-r): Svante Littmarck of contest sponsor COMSOL; Mario Freni of contest supporting sponsor Analog Devices; Sean Connell, Medical category winner; Thomas Healy, Grand Prize winner; Bernt Nilsson of contest sponsor COMSOL; Martin Citron of prize sponsor Hewlett-Packard; Marilyn Cooper of contest sponsor Mouser Electronics; and Mark Skoog, Electronics category winner.
THE DESIGN CONTEST 2017
THE FUTURE STARTS
3.1.17
ENTER TO WIN!
www.createthefuturecontest.com

GRAND PRIZE: $20,000
ACCEPTING INDIVIDUAL AND TEAM ENTRIES STARTING MARCH 1, 2017
Get details at www.createthefuturecontest.com

Principal Sponsors

Category Sponsor

Comsol
Mouser Electronics
Analog Devices
Schneider Electric
Intel