

Edition

2018

January 2018 refresh

- CES 2018: Mercedes-Benz unveils MBUX AI system
- NASA Shows Interest in 'Made in India' Tech for Space crafts
- ✓ Land Rover announces limited-edition Range Rover SV Coupé
- \checkmark LG Posts Biggest Ever Revenue in 2017 Thanks to TV Sales, Mobile Division Posts Loss
- 🛛 🗸 🛛 IBM, Maersk Announce Global Blockchain Shipping Ven



Giugiaro's GFG Style reveals Sibylla Concept





Giugiaro's GFG Style and Envision have presented a concept electric vehicle that blends advanced, electric technology with an extreme design inspired by the designer's concepts from the 1960s and

Making its debut at the 2018 Geneva Motor Show, Sibylla is a sporty four-seater all-wheel drive sedan with a design that references the very low and provocative hedonistic cars designed by Giugiaro in the Sixties and Seventies.

The concept car is equipped with Envision's EnOST, the world's largest energy IoT (Internet of Things) platform, which allows the car to become an intelligent green power plant.

The exterior design is characterized by a length of over 5 meters. "There is a continuous outline, which descends harmoniously from the transparent upper part towards the tail, while the side is made more light and dynamic thanks to a dihedral cut running just below the base of the window. This optically connects to the wheel arches, while the sill area of the brancardo is enlivened by a strong arched recess, also connected to the wheel arches."

The spectacular opening system features the world's first sliding windscreen front section: the expansive windshield dome moves forward, sliding at the center and opening into a huge space for the driver and front passenger.

The dashboard has a full-width smart interface, displaying data on the car's performance and the wider environment which it drives through.

The transparent windshield-roof has allowed GFG to eliminate the A-pillar, directly arriving to the B-pillar as a single curve.

This innovation makes the car extremely easy to get in and out of, while providing the driver a bright and panoramic view of the world around them. The rear compartment of the car is equally spacious thanks to the gullwing configuration.



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While working at Jodhpur-based Metallizing Equipment Company (MEC) as a chief scientist, Research and Development, (R&D), Dr Satish Tailor developed the controlled segmented Yttria Stabilised Zirconia (YSZ)-Plasma sprayed coating technology, which according to him could reduce the thermal spray coating cost by almost 50 per cent.

The photosensitive glass darkens in case of excessive sunlight, except for the traditional windscreen section necessary for driving. Once seated, the cockpit closes automatically, but can also move forward if desired.

The hood is laterally cut by two openings containing the structural guides necessary for the sliding of the glass dome. On the central guide in the mid-section of Sibylla is a 180° side and rear-view camera.

The electric drive system, with four electric motors placed on the two axles, has enabled the removal of traditional barriers inside the passenger compartment, such as the central tunnel.

This gives Sibylla a completely flat floor, which hosts the four independent seats: this feature allows the rear passengers to profit of the same adjustments as the front, totally reclinable. All the interior is trimmed with prestigious Poltrona Frau leathers.

A car with a 75 KWh battery stores as much electricity as an average European household consumes in a week, and can be both a flexible demand and an energy source.

With EnOSTM, the car not only connects to a network of 100GW of renewable assets, but also communicates and shares energy with other vehicles, homes and buildings, enabling a flexible and smart future energy system. This makes electricity clean, secure, and affordable for millions of EV users.



Seequent releases leapfrog works for civil engineering and environmental industries



Civil engineering and environmental industries are already "embracing the power of Leapfrog Works" according to Wallace. "We've been working alongside Mott MacDonald to identify opportunities to improve understanding and communication of ground conditions in infrastructure and groundwater projects, and support the cultural shift towards digitization and collaborative working." Seequent (formerly ARANZ Geo) released Leapfrog Works for the civil engineering and environmental industries. Built on the Leapfrog 3D implicit modeling engine, Leapfrog Works improves understanding, visualization and communication of subsurface conditions and the interaction with infrastructure.

"A long-time challenge for the industry has been the disparate processes of designing infrastructure and ground engineering, from tender to feasibility to operational phases. Working with industry leaders, we've developed a modelling solution that pairs a view of the geology with the engineering design, to better communicate the associated risks in projects to stakeholders," Seequent's General Manager of Civil and Environmental Daniel Wallace says.

First introduced to the mining and minerals industry close to 15 years ago, Leapfrog 3D geological modelling solutions are now available for a range of industries to help uncover valuable insights from geological data, to allow better decision making for earth, environment and energy challenges.

Leapfrog Works allows users to build 3D models from geotechnical data in days, not weeks, in an easy to use workflow. Models can be rapidly edited and new data can be easily reimported over the project lifecycle. Leapfrog enables collaboration and file sharing between multiple parties from remote locations using standard IT set up. Powerful 3D visualizations can be readily shared to aid stakeholder communication and understanding at each stage of a project.

Leapfrog Works interfaces and exchanges information with diverse digital design and Building Information Modelling (BIM) and digital geotechnical database platforms. The optional hydrogeology solution kit also integrates with flow simulation packages.



Seequent releases leapfrog works for civil engineering and environmental industries Mott MacDonald, a global engineering, management and development consultancy with over 16,000 employees in 150 countries, provided input into the development of Leapfrog Works. The company has signed a global enterprise agreement to give all geotechnical practitioners access.



"The outcome was targeted investigation, design, remedial and temporary works solutions. What this means in practice is illustrated by some of the projects we have utilized Leapfrog on. Since using the software, we have seen substantial reductions in the time needed to produce ground models, with associated cost savings compared to traditional approaches."

"The communication of geotechnical issues to nonspecialists has been a long-standing challenge for geotechnics practitioners, however Leapfrog has generated a step change improvement in our ability to communicate geotechnical issues to a wide range of stakeholders," says Mott MacDonald's geotechnics global practice leader Tony O'Brien.

Leapfrog unleashes a broad range of opportunities by enabling an improved understanding of ground risks and opportunities for innovation from available historical and investigation data.

O'Brien added, "The software's 3D geological models allow our project teams to thoroughly interrogate ground data from a variety of sources and field observations. By interrogating data sources in this way and applying our geotechnics expertise, we have achieved more efficient design solutions with higher levels of confidence.



Rettew wins award for virtual pipeline project



"Our engineers are at the forefront of many industry developments," Lauriello said. "This award recognizes the visionary thinking RETTEW has become known for."



The American Council of Engineering Companies of Pennsylvania (ACEC/PA) awarded RETTEW a Diamond Award for its Natural Gas Virtual Pipeline Terminal Design project.

The criteria used in selecting winning projects includes uniqueness, future value to the engineering profession, public perception, sustainable development considerations and complexity. Collectively, the winning firms and owners have strengthened the country's infrastructure, enhanced public safety, raised the profile of the engineering profession and offered sustainable, economic solutions for clients and taxpayers. The ACEC/PA Diamond Awards were presented at a gala held Feb. 22 in Lancaster, Pa.

"This project is one of many that required out-of-the-box thinking to develop an innovative solution for our client," said Mark Lauriello, president and CEO of RETTEW. "We helped a client achieve a first for the state – a virtual pipeline delivering affordable natural gas to rural areas without access to natural gas otherwise."

The project, completed in December 2015, is in Lycoming County, Pa. Businesses in rural areas do not have access to the stable prices and supply of the state's plentiful natural gas. Without any underground pipeline infrastructure, these companies must rely on other, more expensive forms of fuel to power their operations. RETTEW and its client, Compass Natural Gas Partners, developed a plan to connect to available natural gas pipelines, and then refine, compress, and transport the gas to local businesses via over-the-road trucking.

RETTEW designed piping, buildings, electrical systems, roadway improvements, and safety systems for the project, as well as managed construction. The high-pressure piping ensures the compressed natural gas can be transferred safely to delivery trucks – as much as 2 billion cubic feet per month. RETTEW used special materials and design considerations to manage thermodynamic interactions for the piping delivery system, which operates with 100 times more pressure than other natural gas pipelines. The firm also engineered systems to ensure the right level of compression to fuel Compass' fleet. The project site includes a small power plant that uses the natural gas to produce electricity for operations.



The new Volvo V60



Volvo has presented the all-new V60 mid-size estate, based on the Scalable Product Architecture platform and with a refined design derived from the recent 90 series.

The new V60 is based on Volvo's Scalable Product Architecture (SPA) platform, also used by the new XC60 and the three 90 series models.

Volvo Senior Vice President Design Robin Page explained "The V60 really is the central point of the Volvo brand. It's refined, has a beautiful proportion and stance, yet delivers on practicality and versatility."

Above and below: the design of the new V60 showcases a strong influence from the V90 (note: proportions are approximated)

The choice of engines includes the gasoline T5 or T6 and the D3 or D4 diesel engines.

The V60 comes with two plug-in hybrid powertrain options: the new T6 Twin Engine AWD gasoline plug-in hybrid that generates a combined 340 hp, or the T8 Twin Engine AWD gasoline plug-in hybrid that delivers 390 hp.

As in the brand's tradition, the new V60 includes a comprehensive list of safety features that come as standard, such as advanced driver-support systems known from the 90 series and XC60.









The new Volvo V60





The premium interior is equipped with the Sensus infotainment system, fully compatible with Apple CarPlay, Android Auto and 4G. The system is controlled via a tablet-style touch screen that combines car functions, navigation, connected services and entertainment apps.

In a first for the segment, customers can access the new V60 via Volvo Cars' new premium subscription service, Care by Volvo, which offers car access via a monthly flat-fee subscription rather than ownership.

UK prices for the V60 will start at £31,810 on the road (full pricing and specification details will be announced shortly). First customer deliveries are expected in Q3 2018. The City Safety with Autobrake technology uses automatic braking and detection systems to assist the driver in avoiding potential collisions, and is the only system on the market to recognise pedestrians, cyclists and large animals. In a world first, City Safety now also engages autobraking to mitigate oncoming collisions.

The Pilot Assist system – which supports the driver with steering, acceleration and braking on well-marked roads up to 80 mph – has been upgraded with improved cornering performance. The V60 also includes Run-off Road Mitigation, Oncoming Lane Mitigation and other steering-assistance systems. The optional Cross Traffic Alert with autobrake further improves safety for people inside and outside the car.





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Engineers 3-D print shape-shifting smart gel



In their study, the engineers used a lithography-based technique that's fast, inexpensive and can print a wide range of materials into a 3D shape. It involves printing layers of a special resin to build a 3D object. The resin consists of the hydrogel, a chemical that acts as a binder, another chemical that facilitates bonding when light hits it and a dye that controls light penetration. 3-D printing becomes 4-D as objects morph over time and temperatures change. Rutgers engineers have invented a "4D printing" method for a smart gel that could lead to the development of "living" structures in human organs and tissues, soft robots and targeted drug delivery.

The 4D printing approach here involves printing a 3D object with a hydrogel (watercontaining gel) that changes shape over time when temperatures change, said Howon Lee, senior author of a new study and assistant professor in the Department of Mechanical and Aerospace Engineering at Rutgers University-New Brunswick.

The study, published online today in Scientific Reports, demonstrates fast, scalable, highresolution 3D printing of hydrogels, which remain solid and retain their shape despite containing water. Hydrogels are everywhere in our lives, including in Jell-O, contact lenses, diapers and the human body.

The smart gel could provide structural rigidity in organs such as the lungs, and can contain small molecules like water or drugs to be transported in the body and released. It could also create a new area of soft robotics, and enable new applications in flexible sensors and actuators, biomedical devices and platforms or scaffolds for cells to grow, Lee said. "The full potential of this smart hydrogel has not been unleashed until now," said Lee, who works in the School of Engineering. "We added another dimension to it, and this is the first time anybody has done it on this scale. They're flexible, shape-morphing materials. I like to call them smart materials."

Engineers at Rutgers-New Brunswick and the New Jersey Institute of Technology worked with a hydrogel that has been used for decades in devices that generate motion and biomedical applications such as scaffolds for cells to grow on. But hydrogel manufacturing has relied heavily on conventional, two-dimensional methods such as molding and lithography.



Engineers develop flexible lithium battery for wearable electronics

Shaped like a spine, new design enables remarkable flexibility, high energy density, and stable voltage no matter how it is flexed or twisted



A team led by Yuan Yang, assistant professor of materials science and engineering in the department of applied physics and mathematics at Columbia Engineering, has developed a prototype that addresses this challenge: a Li-on battery shaped like the human spine that allows remarkable flexibility, high energy density, and stable voltage no matter how it is flexed or twisted. The study is published today in Advanced Materials.

"The energy density of our prototype is one of the highest reported so far," says Yang. "We've developed a simple and scalable approach to fabricate a flexible spine-like lithium ion battery that has excellent electrochemical and mechanical properties. Our design is a very promising candidate as the first-generation, flexible, commercial lithium-ion battery. We are now optimizing the design and improving its performance."

Yang, whose group explores the composition and structure of battery materials to realize high performance, was inspired by the suppleness of the spine while doing sit-ups in the gym. The human spine is highly flexible and distortable as well as mechanically robust, as it contains soft marrow components that interconnect hard vertebra parts. Yang used the spine model to design a battery with a similar structure. His prototype has a thick, rigid segment that stores energy by winding the electrodes ("vertebrae") around a thin, flexible part ("marrow") that connects the vertebra-like stacks of electrodes together. His design provides excellent flexibility for the whole battery.

The rapid development of flexible and wearable electronics is giving rise to an exciting range of applications, from smart watches and flexible displays -- such as smart phones, tablets, and TV -to smart fabrics, smart glass, transdermal patches, sensors, and more. With this rise. demand has increased for high-performance flexible batteries. Up to now, however, researchers have had difficulty obtaining both good flexibility and high energy density concurrently in lithiumion batteries.



Engineers develop flexible lithium battery for wearable electronics

"Our spine-like design is much more mechanically robust than are conventional designs," Yang says. "We anticipate that our bio-inspired, scalable method to fabricate flexible Li-ion batteries could greatly advance the commercialization of flexible devices."



1-Copper current collectors, 2-Graphite anode, 3/6-Separator, 4-Lithium cobaltate cathode, 5-Aluminum current collectors, 7-Polyethylene supporting film.

Yang's team cut the conventional anode/separator/cathode /separator stacks into long strips with multiple "branches" extending out 90 degrees from the "backbone." Then they wrapped each branch around the backbone to form thick stacks for storing energy, like vertebrae in a spine. With this integrated design, the battery's energy density is limited only by the longitudinal percentage of vertebra-like stacks compared to the whole length of the device, which can easily reach over 90 percent.

The battery shows stable capacity upon cycling, as well as a stable voltage profile no matter how it is flexed or twisted. After cycling, the team disassembled the battery to examine the morphology change of electrode materials. They found that the positive electrode bio-inspired design." was intact with no obvious cracking or peeling from the aluminum foil, confirming the mechanical stability of their design. To further illustrate the flexibility of their design, the researchers continuously flexed or twisted the battery during discharge, finding that neither bending nor twisting interrupted the voltage curve. Even when the cell was continuously flexed and twisted during the whole discharge, the voltage profile remained. The battery in the flexed state was also cycled at higher current densities, and the capacity retention was quite high (84% at 3C, the charge in 1/3 of an hour). The battery also survived a continuous dynamic mechanical load test, rarely reported in earlier studies.

"As the volume of the rigid electrode part is significantly larger than the flexible interconnection, the energy density of such a flexible battery battery can be greater than 85 percent of a battery in standard commercial packaging," Yang explains. "Because of the high proportion of the active materials in the whole structure, our spine-like battery shows very high energy density -- higher than any other reports we are aware of. The battery also successfully survived a harsh dynamic mechanical load test because of our rational



Alfa Romeo and Sauber reveal the 2018 Formula 1



Alfa Romeo Sauber F1 Team has unveiled the C37, the 2018 season racecar that marks the comeback of the Italian carmaker in the Formula 1 Championship.

The C37 looks different to last year's C36 – due to the new technical regulations as well as because of the team's new technical approach.

Alfa Romeo's comeback restores one of the great names that have gone down in the history of Formula 1, and marks the return of the "Quadrifoglio", the legendary badge that has appeared on Alfa Romeo's top performance cars since 1923, to the circuits. The official rollout of the C37 will take place on the occasion of the first winter tests at the Circuit de Catalunya near Barcelona from the 26th of February to the 1st of March 2018.

Featured on the engine cover of the new C37, the famous good-luck charm has a fascinating history, deeply rooted in the racing world. The first Alfa Romeo car to carry the Quadrifoglio was the "RL" driven by Ugo Sivocci which won the 15th edition of the Targa Florio in 1923. The same good-luck emblem also appeared on Brilli Peri's "P2" when he triumphed in the first "Motor Racing World Championship" in Monza in 1925, gaining the first of Alfa Romeo's five World Titles, and it was present again in 1950 and 1951, when Giuseppe "Nino" Farina and Juan Manuel Fangio drove the Alfa Romeo 158 and 159 cars, the famous "Alfettas", to success in the first two Formula 1 World Championships.









Today, the legendary symbol returns to the highest level of motor racing to show the whole world the continuing strength and success of the Alfa Romeo philosophy, a constant search for excellence applied to racing, then transferred in its entirety to the brand's production cars. The legend continues.



Student's Corner

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Never be satisfied with inaction. Question and redefine your purpose to attain progress

Jeffrey K. Liker, The Toyota Way

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