

While none of us wants to hear a consultant telling us we have cancer, recent advances in medical technology and surgical procedures have improved significantly the prospects of our overcoming many of the cancers deemed previously terminal.

Cancer is one of the leading public health challenges in Europe. More than 3million cases are diagnosed every year and it is the second most common cause of death across the continent. When taking into account healthcare costs and lost productivity, the disease costs the European Union some €126billion per year.

Despite improvements in techniques, cancer surgery carries some significant risks; one of which is failure to remove all the cancerous tissue. So what better winner of the British Engineering Excellence Awards Grand Prix (sponsored by MA Business) than a system which holds in prospect a reduction in follow up operations, reduced healthcare costs and – most importantly – better peace of mind for the patient?

What the Judges said:

“LightPath revolutionises cancer surgery, reduces the need for follow on surgery and brings peace of mind to patients. It is poised to make a big difference in people’s lives.”

Consultancy of the Year

Sponsored by IMechE

Although Williams has undertaken projects outside of Formula One since the 1980s, its diversification started in 2008 with the hybridisation of Formula One. As the only team in F1 to develop a hybrid system entirely in house, it realised the commercial potential and created Williams Hybrid Power.

With growing expertise in hybrid propulsion systems, it was approached by Jaguar Land Rover in 2010 to help in the creation of the C-X75 hybrid supercar. This led to the creation of Williams Advanced Engineering as an umbrella for projects outside of Formula One.



Making a difference

Academic research has been turned into a leading edge medical imaging system for cancer surgery. By **Graham Pitcher**.



The LightPath Imaging System uses Cerenkov luminescence imaging to detect cancerous cells

Williams says it is full of problem solvers, tackling complex engineering challenges on a daily basis. Prototype specialists, the company can provide proofs of concept rapidly.

Apart from working with leading car manufacturers, Williams is the sole supplier of batteries for Formula E, designing a battery that can propel a car at 225km/h, while remaining practical in terms of aerodynamics, range, recharging times and safety.

Initially designed to provide 133kW, with 40kW regeneration, the specification was changed by the FIA to 150kW with 100kW regeneration. In Season 2, the power requirement increased to 170kW – nearly 30% more than the original design.

What the judges said:

“The challenge of designing and making batteries for Formula E which worked reliably was an impressive performance. It was hard to ignore the engineering excellence involved.”



Small Company of the Year

Sponsored by Innovate UK

From making and supplying hoses to customer specifications, Forth Engineering has developed into a specialist manufacturer and independent distributor of hydraulics and pneumatics.

Forth has developed a range of capabilities, including mechanical, electrical, electronics and CE&I services. Specialising in technical innovation, Forth continues to develop a range of remotely operated vehicles, radiation tolerant cameras and remote tooling used in the nuclear industry for the inspection and manipulation of spent fuel and active waste.

In a Knowledge Transfer Partnership programme with Manchester University, Forth is looking to develop a robot that will allow equipment to be deployed in harsh environments such as nuclear, marine, gas, oil and subsea.

What the judges said:

"Forth has expanded its business by moving from traditional products to the supply and development of novel technology."

Start up of the Year

Sponsored by Cambridge Consultants



The way in which we interface with a range of products has changed significantly over the years. But one problem with touchless technology is the lack of feedback. Looking to solve this problem and to address a potentially massive market, Ultrahaptics has developed a technology that it believes will disrupt the way in which people interface with their applications.

Ultrahaptics' technology uses ultrasound to enable 'feeling without touching'. Using a small array of ultrasound speakers, it can create the feeling of virtual objects, switches and dials which float in mid air, or track the user's fingertips to create a system that supports gesture recognition and control.

Ultrahaptics is seeing significant demand for its technology and has identified markets that it believes will become viable using its technology.

What the Judges said:

"Ultrahaptics has the potential to be a game changer in a number of markets. It has a sound business plan, significant backing, plus sales and orders in hand."

Design Team of the Year

Sponsored by Premier EDA Solutions



Developing consumer electronics products brings a range of considerations into play. The main target is often meeting an aggressive price point, but hardware choice is also important in providing the required functionality.

Cocoon, a technology company looking to transform the home security market, enlisted ByteSnap Design to provide electronics and software design expertise for its latest product. Working with Cocoon, ByteSnap helped the company

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to make the necessary hardware choices, develop prototypes, write software and obtain certification for the device in the EU and the US.

According to ByteSnap, the design presented particular challenges: it had to meet demanding video, Wi-Fi and audio performance targets at a commercial price point, whilst being tightly constrained mechanically.

These targets meant ByteSnap needed to bring together engineers with a range of experience and to work closely with Cocoon's mechanical and software teams.

ByteSnap helped to develop the product specification by selecting the transducers, SoC and Wi-Fi module, with cost, time and risk taken into consideration.

The product was challenging in that it had to send and receive Wi-Fi signals, while preventing unwanted emissions and avoiding susceptibility to RF problems. Preparing for approvals, ByteSnap took a proactive approach and designed for EMC testing from the beginning.

In order to maintain quality, ByteSnap formed an independent test team, helping to avoid issues that could lead to project slip. Cocoon scheduled a closed user trial in August 2015 with early backers and ByteSnap completed software and electronic design in good time.

What the Judges said:

"A tight, well scheduled design team with clearly outlined job descriptions and the expertise needed to deliver the design on time."

LightPoint Medical's vp of technology alliances Dr Mike Irvine receives the Electronic Product of the Year Award from New Electronics' group editor Graham Pitcher, right, and presenter Johnny Ball



Electronic Product of the Year

Sponsored by New Electronics

The LightPath Imaging System integrates state of the art imaging technology in a mobile device which provides surgeons with similar functionality to a PET scan, but at a lower price. It is also small enough to be used in the operating theatre.

The system uses Cerenkov luminescence imaging to show the surgeon which regions of an excised specimen contain cancerous cells. However, Cerenkov radiation emits light at a very low level and it wasn't until the introduction of electron multiplying charge coupled devices that it became possible to measure Cerenkov luminescence.

What the Judges said:

"It's inspiring to see a UK company bringing this kind of technology to market. LightPath has the potential to make a massive impact on cancer surgery."

Young Design Engineer of the Year

Sponsored by RS Components

Throughout the graduate scheme during and his two years as a lead engineer at Jaguar Land Rover, Chris Bellamy has invented, designed and developed creative and novel solutions to customer problems, as well as being involved in advanced vehicle development and vehicle sustainability.



One of his main achievements has been the pioneering of a human-centric design process, a concept said to be 'very new' to JLR. Working closely with JLR's consumer insight and human factors teams, Chris delivered 'outstanding results'.

Amongst his innovative designs are a novel vehicle interior table system, which cuts weight by 50% and cost by 80%, while increasing by five the number of ways it could be used.

What the Judges said:

"He has achieved a lot in a short career; it's not easy to make a mark in companies such as JLR at such a young age."



Design Engineer of the Year

Sponsored by maxon motor



Alex McDiarmid has proved to be an outstanding member of Parker Bestobell's design teams.

Since joining the cryogenic valve manufacturer, he has designed a number of innovative products which have helped to secure major contracts in the marine industry. He has challenged accepted wisdom and demonstrated true ingenuity when it comes to problem solving.

Once challenge was to design a range of valves suitable for high pressure marine fuel applications – these needed to withstand temperatures of -196°C and pressures of 625bar. The result is said by Parker Bestobell to be beyond anything it has previously manufactured. The challenge was even greater as the range had to be completed in time for launch at a prestigious exhibition.

He has taken part in engineering projects with schools and the local community, including Get up to Speed with Engineering and Manufacturing, which is visited by more than 2000 students from the Sheffield region. Alex also recently mentored a team from Bradfield School in a technology challenge.

What the Judges said:

"A driven young engineer who has moved his company's products forward. Alex is enthusiastic in his encouragement of the next generation of engineers."

Design Engineer of the Year Alex McDiarmid, centre, receiving his award from presenter Johnny Ball, left, and maxon motor UK's managing director William Mason

Judges Special Award

Each year, the British Engineering Excellence Awards judges have the discretion to make a Special Award to an entry that deserves particular recognition. This year, one company impressed the Judges by showing that British engineering excellence makes it possible to compete in the complex world of consumer electronics.

MQA's founder Bob Stuart is passionate about preserving audio quality and was confident that labels, artists and music fans would appreciate an audio format that could not only deliver rich sound quality, but also do so using a convenient file size. That format is MQA.

The first MQA enabled devices were launched by Meridian Audio in December 2015. Hardware partnerships have been reached with a number of companies, along with a long term licensing deal with Warner Music.

What the Judges said:

"Bob Stuart's development of the MQA audio codec – and its positive reception by leading consumer electronics brands – shows the UK is more than capable of holding its own in this highly competitive market."

Mechanical Product of the Year

Sponsored by Eureka! magazine

JCB's Hydradig; a new category of construction equipment.

Materials Application of the Year

Sponsored by Engineering Materials

BAE Systems' Highly Robust Ground Platform

Judges Special Award winner MQA believes it has developed an audio format that outperforms MP3 significantly

