

# 15 NOVEMBER 2017



# EUROPEAN HOSPITAL@ MEDICA

# 3

SPECIAL ISSUE: MEDICAL, TECHNICAL, PHARMACEUTICAL, INDUSTRIAL NEWS

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encoded GIF



recalled GIF



## CRISPR system embeds images in DNA

19th century horse gallops through bacterial DNA

Report: By Mark Nicholls

A research team in the United States has developed a revolutionary technique that has encoded an image and short film in living cells.

Scientists at the Wyss Institute for Biologically Inspired Engineering and Harvard Medical School (HMS) used CRISPR gene editing to encode the image and film in DNA, using this as a medium to store information and produce a code that relates to the individual pixels of each image. The team hopes to use the technique to create 'molecular recorders', an approach ultimately to lead to better methods to generate cells for regenerative therapy, disease modelling and drug testing.

For the research, the HMS group inserted a gif – five frames of a horse galloping – into the DNA of bacteria and then sequenced the bacterial DNA to retrieve the gif and the image, verifying that the microbes had incorporated the data as intended. The images chosen were of a human hand (because it has the type of intricate data the researchers hope to use in future experiments) and a galloping horse by 19th century British photography pioneer Eadweard Muybridge, because it has a timing component that could help to understand better how a cell and its environment may change over time.

### The bacteria acquired data frame by frame

The team used still and moving images because they represent constrained and clearly defined data sets. The film also gave the bacteria a chance to acquire information frame by frame. The breakthrough follows work in 2016 when the HMS team built the first molecular recorder based on the CRISPR system.

The recorder allows cells to acquire elements of chronologically provided, DNA-encoded information that generate a memory in a bacterium's genome. The information is stored as an array of sequences in the CRISPR locus and can be recalled and used to reconstruct a timeline of events.

The latest breakthrough confirmed the scientists' ability to engineer CRISPR system-based technology that enables the chronological recording of digital information in living bacteria. The CRISPR system

helps bacteria develop immunity against viruses in their environments.

### Capturing viral DNA molecules

Dr Seth Shipman, a postdoctoral fellow in Genetics at HMS, explained that, as a memory of survived infections, it captures viral DNA molecules and generates short 'spacer' sequences from them, which it then adds as new elements upstream of previous elements in a growing array located in the bacterial genomes' CRISPR locus.

The CRISPR-Cas9 protein – a widely used genome-engineering tool – uses this memory to destroy the same viruses when they return, but other parts of the CRISPR system have not so far been much exploited. In this study, the scientists showed that two proteins of the CRISPR system, Cas1 and Cas2, which they had engineered into a molecular recording tool, together with new understanding of the sequence requirements for optimal spacers, enables a significantly scaled-up potential for acquiring memories and depositing them in the genome as information.

'We designed strategies that essentially translate the digital information contained in each pixel of an image or frame into a DNA code that, with additional sequences, is incorporated into spacers,' Shipman explained. 'Each frame thus becomes a collection of spacers. We then provided spacer collections for consecutive frames chronologically to a population of bacteria, which, using Cas1/Cas2 activity, added them to the CRISPR arrays in their genomes. After retrieving all arrays again from the bacterial population by DNA sequencing, we finally could reconstruct all frames of the galloping horse movie and the order in which they appeared.'

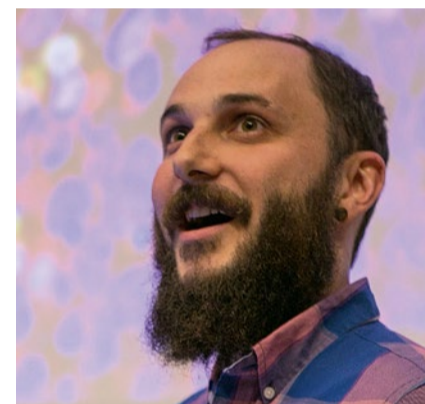
Effectively, to read the information back, the researchers sequenced the bacterial DNA and used a computer code to unscramble the genetic information. 'We took on this research because we see the potential for cells to gather information about their own biology and their environment,' Shipman said. 'For that to happen, we need a way to capture and store information within a cell while it's still alive – that's what we are testing.'

It took researchers three to four years to go from the idea of cells

encoding information using the CRISPR-Cas adaptation system to this latest work and it took several days to do the recordings.

'Going forward,' Shipman continued, 'we'd like to see this work used as the basis for building living biological recording devices that might function as a research or medical diagnostic tool.'

Seth Shipman PhD is a neuroscientist and postdoctoral fellow in Genetics at Harvard Medical School and a member of a team at the Wyss Institute for Biologically Inspired Engineering. Shipman gained his doctorate through his focus on Neuroscience, at the University of California, San Francisco. His key interests lie in genetics and the advancing understanding of brain function.



## HALL 10 - STAND E 31

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Envisioning the future of patient monitoring

# The distance is within reach

30 years ago, monitoring in most intensive care environments was via an ECG display with a numeric value for heart rate combined with intermittent manual measurements of blood pressure. Advances in technology have greatly increased monitoring parameters. Eight, for example, are included in the current minimum standards for monitoring under anaesthesia but more than ten further sensors are routinely available. \* Mindray, which specialises in patient monitoring & life support, in-vitro diagnostics, and imaging systems, is headquartered in Shenzhen, China, and employs nearly 7,600 people internationally. Here, the company looks at present and future technological developments for intensive care.

All technological advances come with paradoxes. Patient monitoring is a multifarious process involving the contextual acquisition and interpretation of patient-related data as well as the performance of diagnostic tasks. While the exponential growth in the number of parameters provides clinicians with more patient information to base their diagnosis on, it also makes decision-making a more complex process. Clinicians must hunt for the most relevant pieces out of a vast amount of data that often comes unprocessed and unorganised.

The question is: how to reconcile this paradox? The clinical setting is in urgent need of decision support. Especially when the acuity of today's clinical environment frequently necessitates real-time decision-making, prompt response to life-threatening events, and handling of a variety of medical devices. In this sense, patient monitoring might become a valuable tool, if it can reduce the cognitive workload of the stressed clinician and ease

**BeneVision's interoperability platform builds bridges between stand-alone devices and data sources**



Shadowless, clear and homogeneous

## A light that's just right

Generating a shadowless, clear and homogeneous light assures clarity of the surgical site. Thanks to next generation LEDs, the Italian firm Acem reports that its 'Starled5 NX produces a perfect illumination under every condition generating an IR-free light,

an excellent colour temperature and a practically endless life cycle at low consumptions.

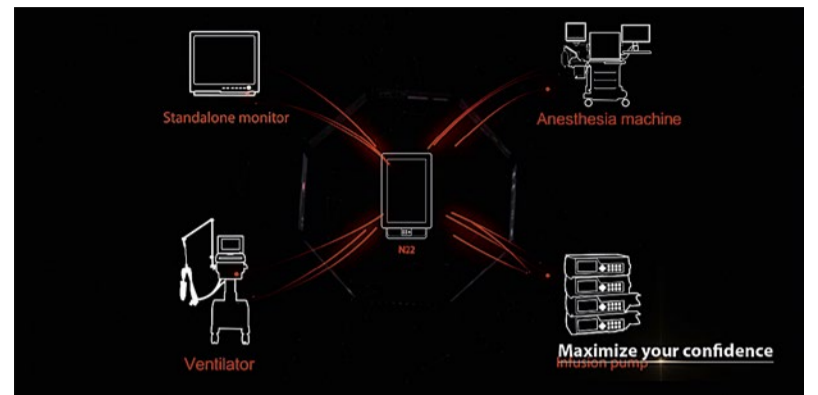
'The 43 LEDs in the system are circularly positioned and divided into five reflectors (with seven LEDs each) and another eight LEDs are radially

placed around the handle. The lamp produces in this way a high illumination level of 130.000 lux (160.000 lux optional) for a steady life cycle of about 50.000 hours.

'Acris is the extraordinary and innovative system realised by Acem that ensures, due to the use of a microprocessor, the control of electrical curves typical of LEDs to remain unaltered over time but maintaining a long life cycle. The colour rendering index of Starled5 NX is 95 and its colour temperature 4.500 °K. (Optional: Variable colour temperature from 3.700 °K to 4.700 °K continuous).'

### Focused and ambient

To achieve a correct illumination according to different surgical needs the lamp can produce focused and ambient light. Due to its special optics, the light field focusing system adjusts the lightspot diameter accurately, assuring an excellent sharpness of details in the operating area, the firm reports. Ambient light is man-



The BeneLink Interfacing Module integrates monitored data from other bedside devices

### Intelligent decision support

What if monitoring systems can be more intelligent? What if their assistance goes beyond raw information to software entities enriched with decision support? BeneVision envisions more possibilities of patient monitoring with powerful decision support tools such as ST Graphic, HemoSight, SepsisSight, BoA Dashboard and EWS scoring. These tools summarise complex clinical measurements such as rSO<sub>2</sub>, ICG, PiCCO, AG, RM, BIS, NMT, etc. and translate it into visualised graphic display, so that clinicians can grasp patient conditions at a glance.

For example, HemoSight helps clinicians make decisions through sets of hemodynamic assistance applications, with visualisation and infographics of hemodynamic parameters. ST Graphic and real-time QT/QTc analysis help clinicians recognise subtle cardiac changes and make early diagnosis and treatment.

Mindray believes the best way to predict the future is to create it. The revolutionary BeneVision N Series is designed to liberate clinical expertise with maximum decision support throughout the entire patient monitoring process, from data acquisition, interpretation to its application in decision-making.

\* Source: American Society of Anesthesiologist; Recommendations for Standards of Monitoring during Anesthesia and Recovery



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aged by the Endo function. 'This technology allows visual comfort as well as correct exposure of the surrounding environment thanks to its particular light beam coming from the upper part of the lamp.'

This model is particularly suitable for minimally invasive surgery and ideal for preparation and surgical operations plus patient monitoring.

The lamp is also easy to move with the lateral handles assuring stability and constant illumination even during movement, the manufacturer adds. 'Its ergonomic and practical design takes into consideration sanitary requirements essential for the operating room. For this reason Starled5 NX has been manufactured with a smooth and resistant material that makes cleaning quick, easy and complete. Its removable and sterilisable central handle can house a video camera, on demand, shooting

Acem is at Medica  
Hall 10 / Stand E31



43 LEDs are circularly positioned and divided into five reflectors

surgical operations accurately (alternatively the video camera can be placed on a separate arm).

'The lamp shape assures visual comfort and is particularly suitable for laminar flows in the operating room. All the functions of this model are managed by the handy, digital and easy-to-read I - SENSE control panel on the cardiac structure.'



The interdisciplinary challenge

# Evaluating ICU care for cancer patients

**Progressive treatments offer new chances for cancer patients, but also could result in as yet unknown complications. The number of cancer patients transferred to the ICU for cancer-specific and internal medicine related reasons is on the increase. Caring for them on the ICU is a complex challenge, with interdisciplinary cooperation playing an essential part. Lena Petzold reports**

**Certain criteria need** to be met for the admission of a cancer patient to the ICU, according to Dr Peter Schellongowski, specialist in internal medicine and intensive care specialist and senior consultant in the ICU at Vienna's Medical University. The Austrian ICU specialises in the care of critically ill cancer patients suffering from, for instance, acute respiratory failure and infection related problems such as sepsis or toxic reaction.

'We need to consider several factors when deciding whether critically ill cancer patients should be cared for in the ICU. Apart from the patient's general condition, we must evaluate the probability of surviving acute organ failure(s) along with the expected long-term survival and therapy options after intensive care. Intensive care treatment can be very strenuous and even traumatising and can affect the remaining quality of life, which is why the admission criteria are important,' Schellongowski explains. Patients in the early stage of a disease, which is still treatable, and whose life expectancy is likely to be more than a year; patients who should receive curative treatment, and patients in remission from their primary disease, are usually always admitted. They are given a so-called full code management, meaning that they will receive the entire range of intensive care treatments available. However, if treatment options have been exhausted or intensive care is unlikely to improve a patient's life expectancy or condition we would refrain from treatment.

For patients receiving palliative care who may have a good chance of longer-term survival due to treatment progression, admission to the ICU can also make sense. This would be the case, for instance, for patients with low-grade non-Hodgkin Lymphoma. Intensive care treatment is also offered to patients in partial remission, such as patients in partial remission from multiple myeloma or solid tumours, as a long-term prognosis can be achieved in a palliative setting.

'The group of patients who may benefit from intensive care continuously expands due to the broad range of cancer treatments available. Oncology is continuously evolving, making the exchange of information and a close cooperation between intensive care medics and oncologists so important: it guarantees the best treatment for the patient,' Schellongowski explains.

## Close examination

Despite structured criteria and guidelines, the decision-making process on treatment and admission objectives is often very complex. 'A minimum "one-year survival" objective obviously does not mean that a patient with an 11-months survival prognosis will immediately fall outside the scope. Each case is intensively examined under various aspects.'

That includes a conversation with the patient, though it might not always be possible. 'In intensive care medicine, the patient's ability to communicate and make decisions is often



**Patients in the early disease stage, those who should receive curative treatment and patients in remission from their primary disease, are usually admitted to the ICU and given so-called full code management**

severely impaired and, whilst living wills are helpful, they are not yet that widespread. The window of opportunity to make treatment decisions is also often tight. In each case, we aim to act to the best of our knowledge and in a patient's best interest.

'If the situation is not clear-cut,' he added, 'we often start a so-called ICU trial. This multi-day treatment trial examines whether the patient responds positively to the treatment. Then we decide if it makes sense to continue with intensive care.'

In some cases, previously defined, limited intensive care treatment is considered, with certain procedures

such as intubation being excluded. 'A study has confirmed that this approach also helps a large number of patients to survive, and that survivors suffer from the anticipated post intensive care syndrome (leading to anxiety, depression or post-traumatic stress syndrome) no more frequently than patients without therapy limitations.'

Outside of specialist centres, cancer patients are also frequently admitted to intensive care wards. 'Unfortunately, the availability of data is not optimal. Based on available figures, we assume that every sixth to eighth patient on a European intensive care ward is a cancer patient,'

Schellongowski points out. 'The majority of these patients have solid tumours and are in the ICU for observation and post-operative care for a number of days. However, a significant number of patients is also admitted due to internal complications from cancer and their treatment. Three to four percent of all patients on intensive care wards have haematological cancers, such as leukaemia or lymphoma. In these cases, cancer-specific, internal complications are the most common reason for admission.'

Patients in the early stages of a cancerous disease are in particular need of intensive care. Five to six percent of cancer patients with solid tumours are admitted to the ICU for primary surgical care in the early stage of the disease. For haematological patients the number is significantly higher. Especially among patients with aggressive, haematological cancers, up to 18% require intensive medical care during the early disease stage, either because complications have led to organ dysfunction or because aggressive treatment given at the start has caused secondary complications, which ultimately also lead to organ dysfunction.

## Specific treatment

The most common cause for ICU admission is acute respiratory failure, followed by complications from sepsis. Haematological diseases in particular often lead to pulmonary complications, because infections or complications arising from leukaemia mean the lungs no longer function normally. It is essential to take the cancer background into account for diagnosis as well as empirical treatment. 'With infectious complications arising from an aggressive cancer there is often a special range of pathogens involved. Most often we treat for several potential infectious causes, but sometimes



Source: MedUni Wien F. Matern

**Assoc. Prof. Peter Schellongowski MD**, is an internal medicine and intensive care specialist and senior ICU consultant at Vienna's Medical University. He heads the working group on haemato-oncological intensive care medicine at the Austrian Society for Internal Medicine and General Intensive Care and Emergency Medicine (ÖGIÄIN). Along with coordination of the 'Register for Critically Ill Cancer Patients of the iCHOP Initiative' he also heads the YELENNA Study on acute respiratory distress syndrome in cancer patients, for which he recently received the ESICM Young Investigator Award.

we must simultaneously administer chemotherapy.

'Occasionally, we cannot determine with any certainty whether pulmonary complications were caused by infection or by the disease itself. This complicates treatment, because chemotherapy can aggravate an infection. At the same time, chemotherapy cannot be suspended for too long, which is why we need to act with a lot of differentiation and need to carry out an intensive diagnostic investigation.

'Close cooperation between haematologists and oncologists is therefore of extraordinary importance and very desirable,' Schellongowski emphasises. 'It's scientifically well documented that intensive care patients with cancer, who receive intensive interdisciplinary care, have a better outcome'

**E-Mail:** peter.schellongowski@meduniwien.ac.at

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Human study of a novel PPG-based non-invasive sensor

# Manometry v. BioBeat

A preliminary human study was conducted to validate an advanced wearable sensor which has been developed by the start-up company BioBeat Technologies Ltd, comparing it to the common manometry method. The 2015 guidelines of the European Society of Hypertension on the requirements of the International Protocol (revision 2010) were used to define the difference between the commonly used device and the new one.

'This proprietary technology allows recording a pure PPG signal,' the company explains, 'together with an algorithm that continuously analyses and shows several physiological parameters, including Heart Rate (HR), SPO2, Changes of Systolic Blood Pressure (SBP), Changes of Diastolic Blood Pressure (DBP), Stroke Volume (SV), Cardiac Output (CO), Cardiac Index (CI), Systemic Vascular Resistance (SVR), Respiratory rate (RR), HR variability, and more.'

Together with Dr Yoram Newman, from the sports clinic of the Meir Medical Centre, Kfar Saba, Israel, they performed blood pressure (BP) ergometry tests during physical effort run with 57 healthy males/females aged 18-70 years. The BioBeat

wireless watch, transmitting to a tablet application, was attached to each volunteer's wrist, continuously recording all measurements.

During the ergometer bicycle test, BP and ECG measurements can detect any changes, as evidence of cardiac distress resulting from relative oxygen deficit. In the study, BP was measured before and every 1-2 minutes throughout the test, using the common manual sphygmomanometer, and in parallel the BioBeat watch.

After the study, participants rested and clinic physicians again measured BP values.

When comparing BP measurements from the manometry method to BioBeat, the latter sensor and

application achieved accuracy in the 96-98% level range – readings within the 95% level defined as acceptable by the European International Protocol for BP devices – which means BioBeat can be formally used as an accurate and reliable BP measuring device.

The researchers also note that these accurate results were achieved using a wearable watch that simultaneously and continuously measures several other parameters, enabling a simple and efficient way to measure complex vital signs. 'So far, these complex parameters could have been

measured only with highly expensive, labour intense devices and instruments, performed and interpreted only by highly skilled health personnel,' the firm observes. 'The simplicity of BioBeat, and independence of human performance in recording measurements, may change the way we monitor these parameters in the near future.'

Additional benefits of BioBeat, it adds, include the wireless configuration (i.e. no wires between sensor on the subject and monitoring system); reducing motion errors caused by patient movement; health personnel not needed for sensor placement; low power needs – the system can run from a commercial battery.

More human studies will aim to establish further the capabilities of

**BioBeat BP measurements passed the International Protocol (revision 2010) requirements**

Comparing BioBeat measurements to International Protocol (revision 2010) requirements.			
Difference	≤ 5 mmHg	≤ 10 mmHg	≤ 15 mmHg
BioBeat SBP	275	320	345
% of all measurements	75.3%	88%	99.9%
BioBeat DBP	321	350	365
% of all measurements	87.5%	95.3%	99.5%
International Protocol (revision 2010) requirements	75%	90%	96%



LTC (Ret) Arik Eisenkraft MD MHA CMO of BioBeat. Dr. Eisenkraft, is also a researcher at the Institute for Research in Military Medicine, leading research efforts on future trauma and emergency medicine & pre-hospital care

this technology. Several other studies will be published soon. Based on initial results, a request for an FDA approval (510K Class 2) is pending.

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Sensor technologies in medicine

## Breathing air systems

How can newborn babies benefit from sensors with chip technology and what might the future hold for sensor data? Samuel Wehrli, Product Manager for Gas Flow at Sensirion AG in Switzerland explained during our EH interview at the MST Conference held in Dortmund.

Samuel Wehrli: 'Sensirion has committed itself to advancing sensor technology by equipping sensors with microchips. Sensors deliver important information in very different areas. In medical technology, the use of chip technologies is opening up brand new, exciting solutions. My team and I are part of this development.'

Why should sensors be equipped with chip technology?

'Chip technology is utilised to process signals, or to calculate. Fusing it with sensors results in a signal that fits with a standardised protocol. Sensors with chip technology can therefore deliver the best possible information.'

'What's more, chip technology is particularly scalable and suitable for mass production. Sensors equipped with chips can also be produced in the smallest format, a combination which leads to a significantly bet-



With experience in micro-sensors development, physicist Samuel Wehrli joined Sensirion in 2007. In 2013 he became product manager of the company's Gas Flow branch.

ter and more stable product. The fusion with chip technology results in a high-quality, yet affordable mass market product for the customer.'

ity respectively are often very good, as the electrical wiring used is very compact, which reduces the failure proneness enormously.

'Technical processing also plays an important part. A sensor works within a system; the more functions can be integrated into the sensor, such as calibration for example, the more precise the information delivered. If breathing air is measured, for instance, the customer receives added value if they know how many litres per minute flow through the sensor rather than just being shown a curve, as is still the case with older generations of sensors.'

Where are sensors used in health-care?

'In medicine, we work with flow sensor technology intensively, i.e. with the above-mentioned measurements of inhaled and exhaled air. Thanks to digitisation and new measuring procedures the precise monitoring of breathing air in medicine is becoming increasingly more detailed and opens up a broad field of opportunity for sensor technology. Neonatology is one of the new areas of application. Sensirion have developed a very small and light sensor in cooperation with some manufacturers of ventilators. A typical sensor is about the size of two matchboxes – too big for a newborn baby – which just about fits into a hand. Consequently, the new sensor is much smaller and impacts on breathing as little as possible due to its low weight. It also facilitates better monitoring of respiratory flow in young children.'

How and where else could sensors be used?

'For the sensitive topic of hygiene standards in hospitals; sensors can contribute towards adherence to standards. Admittedly this is a challenge, as sensors come into contact with pathogens through human breathing air. This can be dealt with in two



different ways: "single use" sensors, which are disposed of and which need to be available in large quantities at low cost, or sensors that can be sterilised and prepared for multiple use with wash or steam sterilisers. If the latter is the case, each sensor must be robust enough to withstand the intensive sterilisation procedure without damage, around 50 times. Both solutions prevent the transmission of pathogens.'

What is the future of sensor technology?

'There are many approaches as to how sensor technology can be advanced. One example is anaesthesia. Here the equipment mixes air with additional oxygen; the more precisely this concentration can be controlled and adjusted via sensor technology, the better for the patient. Sensor technology can be used wherever gas is in motion, i.e. for oxygen, CO2 or other substances.'

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What makes a good sensor?

'In the first instance, it's the quality of the signal. The more precise the measurements, the better the sensor. When used with chip technologies, the signal colour and signal qual-

Sensirion's neonatal flow sensors





A bed suitable for wash tunnels

# The gentle patient lifter

Among products demonstrated at Medica 2017 will be those from DewertOkin GmbH, which manufactures and sells single and double drives, lifting columns, control keypads and control units, products that are used for bedding, seating, medical and office application. The firm's MEGAMAT 12 extra-quiet single drive for hospitals and nursing beds features wash-tunnel resistance on request. 'With the new Accu-Control control unit, patient lifters can be gently moved even while under heavy loads. The newly designed BUS control unit ensures a significant streamlining of the planning and commissioning processes,' the firm reports.

## Dewert is at Medica Hall 14 / Stand D34

'These innovations not only consistently expand our product portfolio, they also provide manufacturers of medical technology with real added value,' said Khalid Fariad, product manager at Dewert, referring to the MEGAMAT 12 single drive. This delivers increased pressure and pulling forces while emitting



The MEGAMAT 12 single drive delivers increased pressure and pulling forces while emitting less noise during operations

less noise during operations, the firm adds. 'It features an integrated emergency release function and a washable option.' The system does not need to be removed from a bed before the bed is cleaned in a washing tunnel, which the company points out, saves significant time.

'The Accu-Control mobile control unit for patient lifters has soft-start and soft-stop functions that prevent abrupt movements, even when under heavy loads, thus enabling the patient's position to be changed comfortably,' the Dewert report continues.

'Control buttons are attached directly to the housing so that it is easier for nurses to operate the lifter. The unit is powered by rechargeable batteries and needs fewer charging cycles and more executable movements per charge.

'The new Dewert BUS control unit can automatically detect all connected peripherals such as drives, handsets or sensors. The entire system can then be commissioned quickly and easily.'

Additionally, this new control unit can be configured using software. 'So manufacturers can now independently define motion profiles and perform optimisation loops by themselves. It is also possible to adjust all controls without changing the hardware, since the buttons can be assigned to various functions without any physical change to the handset.'

Dewert's Accu-Control control unit is powered by rechargeable batteries and needs fewer charging cycles



Source: DewertOkin GmbH

# Protec brings movement into X-ray



A motorised PRS 500 B X-ray system, added to the portfolio of Protec, specialist in traditional analogue X-ray film processing machines, 'combines efficiency, high work precision and optimum operating comfort,' the manufacturer reports. 'In addition to the user-friendly touch display, it also offers an automatic retraction of the tubular column, which adapts to the position of the bucky in the wall stand or table. The X-ray workflow is optimised, thus shortening the duration of the process and greatly increasing precision and ease of use.

X-ray systems and X-ray tables in the fields of human and veterinary medicine.'

The CONAXX 2 software, developed in-house and tried and tested and continuously enhanced, leads to a perfect X-ray image in just a few clicks, Protec adds.

'Workflows, or individual steps, can be designed that are highly efficient and individualised by automation,' the company points out.

An outstanding innovation in the Conaxx 2 software is Professional Image Tuning, or PIT for short. You can select the optics and quality of

## Protec is at Medica Hall 12 / Stand A63

'In addition, we see the system as a combination of robust construction and high design standards, adds Björn Salwat, Managing Director Commercial at Protec.

With a strong global orientation, Protec offers a holistic product portfolio to meet the highest international standards, the firm points out. 'It comprises highly compact analogue film processing machines, detectors, software and, since 2009, complete

your images individually and automatically store the ideal image processing for you.

'Above all, the premise of intuitive user guidance comes into its own here, as touch screens, intuitive symbols and user-friendly handling enhance the software of each X-ray system and increase the operating convenience to an optimum.'



Sensor technology can be used wherever gas is in motion, i.e. for oxygen, CO2 or other substances

Data protection continues to cause heated debates. How do you manage data produced by sensors?

'With our products, the end customer is responsible for data usage. There is a clear line between sensor technology and data processing. Data processing requires special licences, which creates a clear divide. Nevertheless, this data – if it is processed reliably and with protection – holds a lot of opportunities.

'Currently, the doctor evaluates the data selectively on a monitor and checks, for instance, whether a patient's breathing is okay during their ward round. If this data was saved in the Cloud, it could be analysed retrospectively, or cases could be compared and important insights obtained. However, at the moment this is still a long way off.'

# Investing in your future growth

The BBI Group is investing £14m in a new global headquarters to boost capacity and long-term growth.

The BBI Group (BBI), a trusted partner to some of the world's leading diagnostic and healthcare organisations for over 30 years, is bringing together three of its existing UK manufacturing locations into one, resulting in more knowledge and expertise under one roof, and centralising its manufacturing and development activities.

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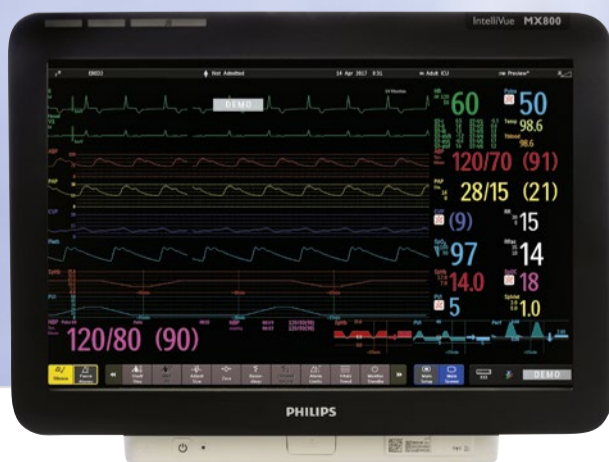


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Continuous measurement monitoring

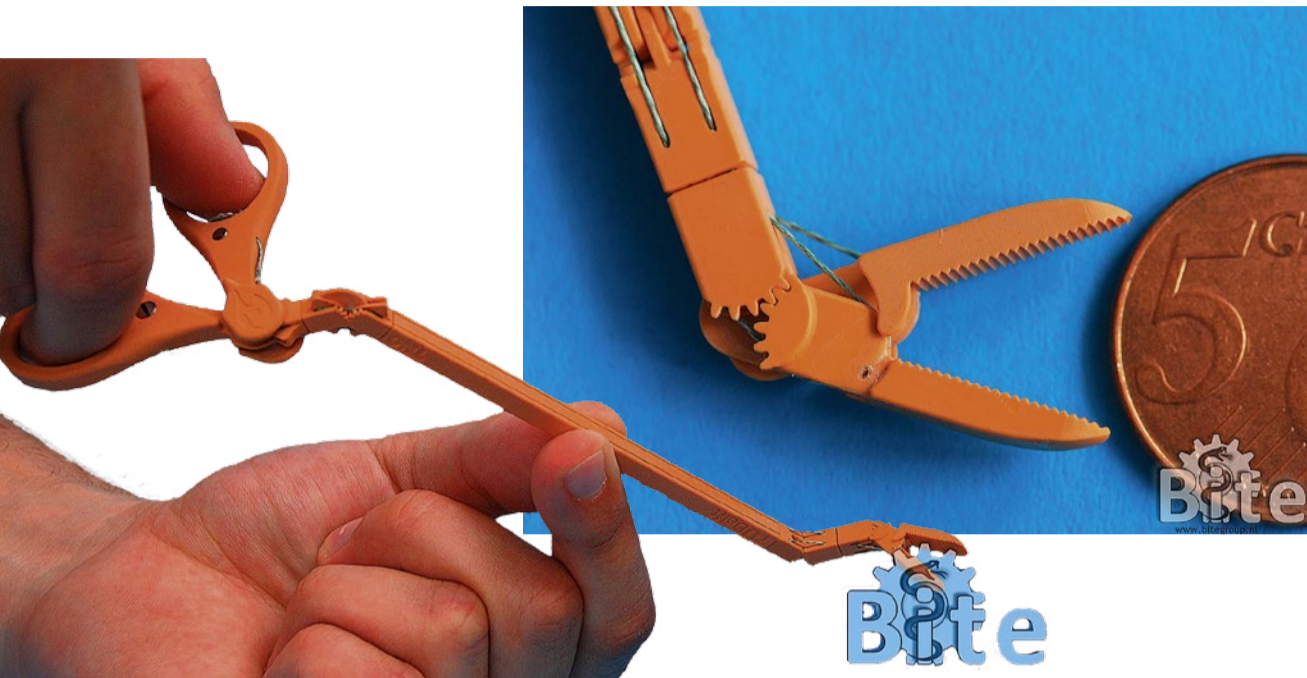


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Re-named 'additive manufacturing' and making products increasingly functional and creative.

# The 3-D printing revolution



**Making money? 3-D printing prices will drop dramatically; then hospitals will have 3-D printers to customise implants or surgical instruments**

Warsaw, Ind.-based Zimmer-Biomet Inc., which began developing products 15 years ago.

Using what is called a build plate, industrial 3-D printing involves building up micro layers of titanium powder that are burned with a laser to solidify the powder into a metal with nano-precision to match the design model.

By the end of 2015 manufacturers had installed around 300 machines for 3-D printing of implantable prostheses.

Whereas in 2010 there were just four 3-D-printed implantable devices approved by the United States Food & Drug Administration, by 2014 twenty-five products had been FDA approved.

According to Kevin Lobo, CEO at orthopaedics leader Stryker Corporation, additive manufacturing is 'having an impact on our knee business as well as spine, and we have a huge line up of other divisions with ideas and prototypes to get into 3-D printer titanium product'.

In 2016 Stryker began construction of its second 3-D printing facility in Cork, Ireland.

Orthopaedics market specialist Ali Madani, from Avicenne Medical in Paris, said that titanium spinal cages made by additive manufacturing processes constitute the most dynamic orthopaedic segment and that these products are steadily eroding the market share for polymer-based PEEK cages.

In Europe, Madani pointed out that Italy is home to the most advanced companies in additive manufacturing where challengers like Lima Corporate, based in San Daniele del Friuli, and Milan-based Adler Ortho have invested massively in the technology and each year sell thousands of 3-D printed hip cups, shoulder implants, knee tibial plates, or mini-hip stems.

Robin Stamp, the associate manager for Advanced Technology at Stryker Orthopaedics explained that for over 20 years, Stryker has milled and machined metal implants using complicated, multi-step manufacturing processes based on coating materials with rigid requirements that limit design options.

'What 3-D printing does is give design freedom, an ability to try exotic designs, build channels into the surface, create roughness, give a product any feature needed for essentially the same cost as building a standard model,' he said. 'Where we are really seeing a difference is in the speed of design iterations.'

Instead of a product development cycle of 18 to 24 months with a high cost for making changes, he said that today, using additive manufacturing, his group can produce a design and within one week, give the part to a panel of surgeons and rapidly iterate, based on the panel's suggestions to further develop the design.

'This is phenomenally powerful,' he said. 'We are capable of doing so many more iterations, putting much more functionality and creativity into products.'

## Report John Brosky

**Inexpensive and readily** available, 3-D printers accelerate innovation in the design of medical devices from university laboratories to the factory floor.

At the Delft Technical University they call themselves the Bio-Inspired Technology Group, or BITE. And their claim to fame is in having created DragonFlex, the world's first steerable surgical instrument made entirely by 3-D printing.

While the prototype is more likely to earn doctoral degrees for the inventors than to win a CE certification for use by surgeons, it demonstrates the emerging robustness for 3-D printing technology.

'It's cheap, it's accessible, and 3-D printing helps students to rapidly try out their product ideas,' said Robert Webster, a visiting speaker at TU Delft from Vanderbilt University School of Engineering.

'As the prices come down dramatically and performance goes up, it's reasonable to think that in a few years, the idea of a hospital having a 3-D printer in the basement to create on demand patient-specific implants or customised instruments for surgery, is absolutely feasible,' he said. 'The hospital could take any scan, print it and create a 3-D model.'

According to Amir Zadpoor, Director of the Additive Manufacturing Lab at TU-Delft, when rapid prototyping using 3-D

printers first became feasible, academic projects made up 80 percent of the activity.

Device designers in industry quickly caught up, calling it 'additive manufacturing' instead of 3-D printing. While this year more than \$3 billion will be spent as companies find new applications to convert traditional manufacturing processes, this investment is expected to reach \$20 billion annually in just a few more years.

Zadpoor notes that medical devices today account for 40 percent of that spending '... because there is such a great added value to these products that justify the increased cost associated with the technology'. The pioneer in additive manufacturing applied to orthopaedic devices is

## Advances in vocal pathology diagnoses

# New voice app to detect diseases

**A new app measuring the biomechanics of the voice could impact on the market of ENT and speech pathology products, Mélisande Rouger reports**

**Acoustic tools** that provide glottal source analysis, which are traditionally used in the diagnosis of vocal chords pathology, could soon become obsolete due to a recently launched app that has introduced a highly reliable and entirely mobile technology.

Called Voice Clinical Systems, the new device uses the self designed Wave Tracking technology, which focuses on the signal emitted from the patient's lips. The patient only has to speak for three seconds, directly into a tablet or smartphone, and a diagnosis follows within minutes.

The app is likely to resonate in the vocal chords pathology world, as its correlation with the clinic is unheard of, according to Dr Carlos Ramirez, a Madrid-based ENT physician, who co-developed the app.

'The information we are extracting has nothing to do with what we've used previously. Until now, the analysis we have used had very little clinical correlation; these tools were not describing the pathology the patient might have been suffering. Our

app offers information that has a far better correlation with the clinic than the previously used technologies,' he pointed out.

As reported, Voice Clinical Systems works by taking a sample of the patient's voice fed directly into a tablet or smartphone. The recording is then sent directly to an online server, for

analysis. The information extracted is then returned shortly to the sender in the shape of a record, which is tailored to the on-going investigation.

This mobile approach enables physicians to record samples anywhere without the heavy, costly equipment usually needed for voice analysis. 'Voice analysis systems currently used

require hardware and a computer, which is only available at the health-care facilities,' Ramirez said. 'Mobility offers flexibility and brings advanced voice analysis technology to places which may not have had the necessary infrastructure before.'

The app offers three types of medical reports, which can differentiate between organic and functional pathology. All patient data are anonymized and the reports only feature the age and gender of the patient.

The one-page long basic report is called the clinical screening; this can be used by primary care professionals and general practitioners to help them refer patients to specialists.

It includes straightforward colour-coded graphs, in which red is pathology and green normal.

For patients in need of follow-up, specialists may use the intermediate report, which provides them with an alteration index. Information contained in this report may be particularly useful in patients who have received polyp surgery or are undergoing rehabilitation to correct a functional defect.

The three-page report is a more complete document, and will help ENT and speech therapists to help diagnose pathology with a high degree of subtlety. Because voice can be an indication of neurologic disorders before any other symptoms develop, neurologists may also use the app for the early detection of Parkinson's disease.

The app only targets HC professionals for the moment, but



**Carlos Ramirez Calvo MD** co-directs the ENT department at Vithas Nuestra Señora de América Hospital and is co-director of the Pablo Iglesias ENT Clinic in Madrid. He is a founding member of IFMEC, a company dedicated to innovation and training in medicine and surgery. He is also a founding member of Voice Clinical Systems.

it may become available to patients within two years, Ramirez said. 'In that case doctors will still have to interpret the report, but,' he surmises, 'patients could definitely go visit a specialist with their report in hand.'

The cost of the report ranges between €10 and 20.

Launched in English and Spanish in December, the app has been used in two private institutions in Madrid and has already received positive feedback from physicians who have tested it at various institutions across Spain. Ramirez: 'Voice Clinical Systems has been tested to check its correspondence with clinical diagnosis in 2,000 cases; the correspondence with the clinic has been higher in 99% of the cases.'

The app (Android and iOS) can be downloaded here: <http://www.voicecs.com>





Teleradiology provider wants to include pathology in the equation

# Integrate technologies to upgrade reports

As the demand for imaging studies booms and digital pathology takes off, it is becoming necessary to look at the interactions between radiology and pathology in telemedicine, an expert explained during the Radiology Triangle Madrid meeting early this year.

**Demand for teleradiology** services is growing fast and the business is expected to generate US\$3.8 billion in 2019.

'We exist because of the increasing gap between the demand for imaging work and current possibilities,' said Alexander Böhmcker, CEO of Telemedicine Clinic (TMC), a teleradiology provider with a network of 195 radiologists in Sweden, the United Kingdom and Australia. 'Small hospitals now have a huge challenge to attract talent locally.'

Organisational issues apart, teleradiology makes sense when there is a need for sub-specialisation, the businessman told key radiologists from Spain and overseas – all personally invited to the meeting. 'This is how we can connect many different cases from different hospitals and route them to the best available specialist. The main advantage of teleradiology is sub-specialisation, because it leads to increased effectiveness and better outcomes.'

Sub-specialisation is also relevant for telepathology, an emerging area that TMC has started developing with a network of seven pathologists, who provide reporting services, second opinion and training services.

The company has issued 40,000 digital histopathology reports so far and it is keen to develop a synergy between radiology and pathology in the future.



'When we think about the integration of teleradiology and telepathology, we also think of applied sub-specialisation to pathology,' he pointed out. Sub-specialisation may be even more important in pathology because pathologists often wonder who checks the results afterwards. Having second readings and the radiologist providing an opinion on their reports would be of tremendous help.'

In the literature there is a large amount of evidence for specific needs for radiology and pathology integration, e.g. in breast cancer, lung diseases, bone and soft tissue diseases and prostate cancer, Böhmcker argued. 'It's about using the report data in larger cohorts and clinical efficiency, as well as improv-

ing the reporting environment and the preparation of tumour boards. It can also help in data mining and research.'

Integrating pathology results into the teleradiology report makes sense from a referring clinician and patient perspective, and matches the needs of the customers, Böhmcker explained. 'There are situations in which hospitals ask for both services at the same time.' Combining teleradiology and telepathology in a single report would be relevant in areas such as mammography.

'Once the biopsy has been performed, and before the pathologist creates his or her initial report, he/she would have access to the radiology report. After the interpretation of the study by the pathologist, a

final consensus report would be created.' Pathology results could easily be added to the structured report, to evaluate discrepancies between the reports of both specialists. 'In the end,' Böhmcker said, 'we would have an integrated report combining all the available clinical data. We would have a pathology summary with key images, the same as for radiology.'

TMC is currently working with two Swedish hospitals on two reporting platforms and technical solutions to combine both pathology and radiology findings. Using common reporting platforms would enable specialists to exchange information and feedback before and after they read each other's reports. It would also grant the provider direct access to the final report and improve its adherence to outcome.

'While a teleradiology company can be very far from the outcome results, an integrated solution can bring it very close,' Böhmcker pointed out.

Developing common reporting platforms requires a lot of technical effort and the models used by TMC are locally based. The company is now working on a scalable solution.

Another challenge is that the structured report (SR) is still not very popular among radiologists, despite its benefits over free text, according to Böhmcker.

'The SR first appeared in the literature in 1922, but its application today remains limited. However, standardising information offers many opportunities, for instance better communication and the possibility to perform data mining for peer review, audit, teaching and research. And most importantly, clinicians like it.'

To help radiologists switch to the SR, TMC is working on making it user-friendlier by clearing some of its unused sections and using voice commands. Teleradiology, on the contrary, has become more accepted



**Alexander Böhmcker**, CEO of the Telemedicine Clinic (TMC), completed his Lic.oec. degree at the University St. Gallen, Switzerland and his MBA at ESADE in Spain. Prior to joining Telemedicine Clinic he had Business Development and Finance leadership roles in the Deutsche Bank, BMW and GFT. He joined TMC in 2008, managing in close collaboration with the co-founders. Today the firm leads European teleradiology and pathology, providing around 120 hospitals in Scandinavia and the UK with diagnostic reports, delivered by a network of over 200 sub-specialist radiologists and pathologists. He is also co-founder of the Spanish Chapter of 'Conscious Capitalism'.

ever since its introduction in 2009. 'Acceptance has grown,' he confirmed. 'The discussion is no longer on whether we want to have teleradiology or not, but rather what's the best combination – onsite and remote radiology, and when and how to best use teleradiology.'

Teleradiology still needs to overcome a number of difficulties including access to clinical information, communication with the referring physician and outcome access.

'This stresses the importance of integrated technologies and structured reports. Image transfer is not an issue anymore,' Böhmcker concluded. (MR)

New tech secures mobile IT for roving medics

# Healthcare goes out and about

**New technology being deployed across the National Health Service in central England is helping to give more secure mobile systems to healthcare professionals, Mark Nicholls reports**

**The partnership between** Toshiba and the Birmingham CrossCity Clinical Commissioning Group (CCG) is bringing the work of health and social care organisations closer together.

One of the initiatives planned for the Birmingham area is the introduction of Toshiba Mobile Zero Client (TMZC) to its laptops, which as a result have no hard drive and no local operating system or memory. Instead, they utilise the health system's existing virtual platforms to access and process information.

Ciaron Hoye, Head of Digital for Birmingham and Solihull Clinical Commissioning Groups, explained that, with the CCG moving the local data and applications that healthcare professionals use to the cloud – and giving them access to it through the cloud using virtual platforms – the CCG is breaking down the 'siloed structure' between health and social care organisations to create a more connected digital ecosystem.

This gives practitioners a faster, more holistic view of a patient's history and personal information and is also more secure at a time when health systems have been among organisations vulnerable to cyber attacks over the last couple of years.

'Our patients don't see the boundaries between these organisations,' Hoye pointed out. 'They expect a joined-up service where their personal information follows them to each appointment – allowing seamless healthcare.'

'Because the devices are mobile, we're giving our workforce the tools they need to meet the increasing demand for a more flexible healthcare service.'

'Patients will see a reduction in time spent in and between appointments, as diagnostic information will be more readily available. Instead of waiting for records to be shared between practices – the information will follow the patient, enabling quicker and better-informed diagnosis.'

With healthcare professionals increasingly working from the field, the CCG believes the TMZC solution will enable them to access needed information wherever they are, and simultaneously record patient information records with up to

date statistics when they are being seen. Another advantage is that, because no information is stored on the laptops once they are turned off, healthcare providers can share mobile devices and still have access to all the information and applications they need through the virtualised desktop. Additional security features allow the device to remotely be deactivated and reduce the risk of sensitive data being misplaced in the field should it be lost or stolen.

A challenge IT departments face in supporting a mobile workforce is securing the sensitive and personal information across multiple devices and a widening network, which can mean investing in expensive Mobile Device Management solutions (MDM). 'However, because data is virtually stored when using zero client solutions, sophisticated security packages are unnecessary because it can all easily be managed in the cloud,' added Hoye.

Toshiba and the CCG have worked closely to identify a solution that not only helps create a more connected digital ecosystem, but also supports its increasing need for more mobile and flexible working practices. Following a successful user acceptance test, the technology will be rolled out across the CCG



**David Sims** is Toshiba's Solutions Sales Specialist. With over 22 years' experience in telecommunications, he specialises in mobility, IOT/M2M and security solutions. Prior to employment at Toshiba, he had held various roles in the telecommunications industry.

area – which covers a million health and social care patients over a large urban environment.

A future development, he said, could be wearable devices used to monitor individuals away from hospitals to collect information about their health.

David Sims, Solutions Sales Specialist with Toshiba, said the company is also helping to explore how Internet of Things (IoT) can transform wellness care in the Birmingham area, and how 'the huge volume of data that devices such as wearables can be utilised for proactive healthcare.'

## Challenges in mobile healthcare

'Last year healthcare was the fifth most targeted industry in cyberattacks,' Sims pointed out. 'At the same time healthcare staff are



**Ciaron Hoye** is Head of Digital for the Birmingham and Solihull Clinical Commissioning Groups, and is also the Digital Workstream lead for the Sustainability and Transformation Plan within the region. Within the industry he was a developer, before moving to the NHS. Having led a number of projects from large scale Virtualisations, to smaller innovations into the use of technology to support healthcare, his current focus is on the use of cognitive computing and personalised healthcare.

increasingly operating from the field, a trend that IT departments must support to ensure sensitive patient and business critical data is kept secure. However, mobile working practices bring with it an increased risk of sensitive data being lost or stolen.'

TMZC safeguards the technology by storing data away from the device, making it only accessible through its existing cloud-based virtual desktop infrastructure solution.

'This removes the threat of malware being stored on devices,' Sims added, 'as well as nullifying concerns about data being compromised should a device be lost or stolen.'



Navigated ultrasound

# The best intraoperative imaging technique

**New navigation imaging and neurophysiological stimulation techniques enable an approach to brain tumours long considered unresectable before and during surgery, but not one does it quite as well as ultrasound, according to a leading Spanish neurosurgeon.**



Report: Mélisande Rouger

**Resecting an entire tumour** and determining brain shift remain challenging for surgeons in brain cancer surgery. However, they are likelier to overcome these difficulties if they use intraoperative ultrasound, according to Dr Cristian de Quintana Schmidt, neuro oncologist at Santa Creu i Sant Pau Hospital in Barcelona. 'Neuro navigated ultrasound provides the surgeon with confidence in the assessment of resection accuracy and in the determination of brain shift,' he said. Last August, during the World

**Awake brain surgery – Intraoperative image. Example of a patient monitoring three languages (Catalan, Spanish and English)**

Congress of Neurosurgery in Istanbul, de Quintana presented the results of a prospective two-year study on ultrasound use in intra-axial tumours. For surgeons, brain shift is a major problem. Even if they use pre surgical imaging to help plan surgery, the brain will change during the intervention; it will lose liquid and volume, shift shape and move, and ultimately make it harder for surgeons to perform.

Unlike intraoperative magnetic resonance imaging (MRI), which requires 20-30 minutes time to adjust to pre-surgical images, it takes a little over two minutes (2 minutes 19 seconds) for intraoperative ultrasound to overlap with previous images. Because it is so fast, ultrasound can be repeated as many times as necessary, enabling the surgeon to detect brain shift and evaluate how much tumour is left, almost instantly.

'Ultrasound has changed the way we operate on patients. When I'm done resecting, I check if the tumour has been fully removed, or if there is any residual. In 14% of the cases, ultrasound helps to resect further, which significantly improves our results. Extensive resection tremendously increases patient survival and prognosis,' de Quintana pointed out.

Intraoperative imaging enables to safely excise tumours long thought to be unresectable. At Santa Creu i Sant Pau Hospital, ultrasound has helped de Quintana to successfully carry out surgery in 10-20 patients of the 40-50 patients he operates on annually.

Another benefit of ultrasound compared to other intraoperative techniques is that it is cheap and easily moveable across the hospital, without losing too much in image quality.

After studying hundreds of cases over two years, de Quintana observed that ultrasound had achieved 78% of correlation with pre-surgery MRI. 'That's a totally acceptable performance for intraoperative imaging,'

he confirmed. Ultrasound is particularly helpful in visualising metastases, which are less infiltrative than glioma and usually easier to resect.

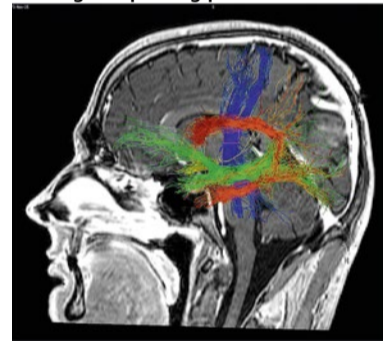
Last but not least, the learning curve is much faster than with MRI. 'All you need is a bit of experience. Ultrasound is not a complicated technique, but you need good equipment and good probes.'

All these benefits have convinced the researcher that ultrasound is the best imaging tool in his arsenal. 'Based on image quality, time, ease of use and cost, ultrasound is the most efficient intraoperative imaging technique at our disposal.'

Nevertheless de Quintana stressed the role of functional MR and tractography in the pre surgical setting. 'We are increasingly using these techniques to help prepare for surgery,' he said. 'They remain crucial to be able to localise tumour and determine our approach, in order to resect as much tumour as possible without damaging neurological function.'

Tractography, in particular, is instrumental in visualising subcortical neural tracts and understanding how the tumour relates to surrounding structures. The technique relies on 3-D modelling based on data collected by diffusion-weighted images, and uses colour to image functions such

**Tactography of a German and English speaking patient**



**Cristian de Quintana Schmidt MD** is responsible of neuro-oncology in the department of surgery at Santa Creu i Sant Pau Hospital in Barcelona, Spain. He is a specialist in highly complex brain tumour resection and an expert in technological advances in this field. His publications, courses and conference presentations number more than a hundred.

as language, vision and motion. This information is then sent to the neuro navigator to facilitate surgery.

De Quintana also highlighted the role of neurophysiological stimulation during surgery to help distinguish functional areas of the brain and evaluate patient response.

Brain mapping in tumours located in or close to key areas generating motion, vision and speech or linked to memory enables assessment of response while the patient is awake or asleep.

A surgeon, neurophysiologist and neuropsychologist usually perform this stage of treatment together. Once the patient is asleep, the medical team will gently wake him or her up to perform brain mapping and ask him/her to carry out tasks. Doctors then perform tumour resection, and close up the patient when he/she is asleep or sedated.

The single-use cervical rotating biopsy punch

# Dermatology added to a fine portfolio

**DTR Medical Ltd is at Medica Hall 16 / Stand F42**

A new **Cervical Rotating Biopsy Punch** featuring a low profile jaw was 'designed to provide specialists with better access to the transformation zone,' DTR Medical reports, adding that the punch offers a 360° rotation for flexible positioning and

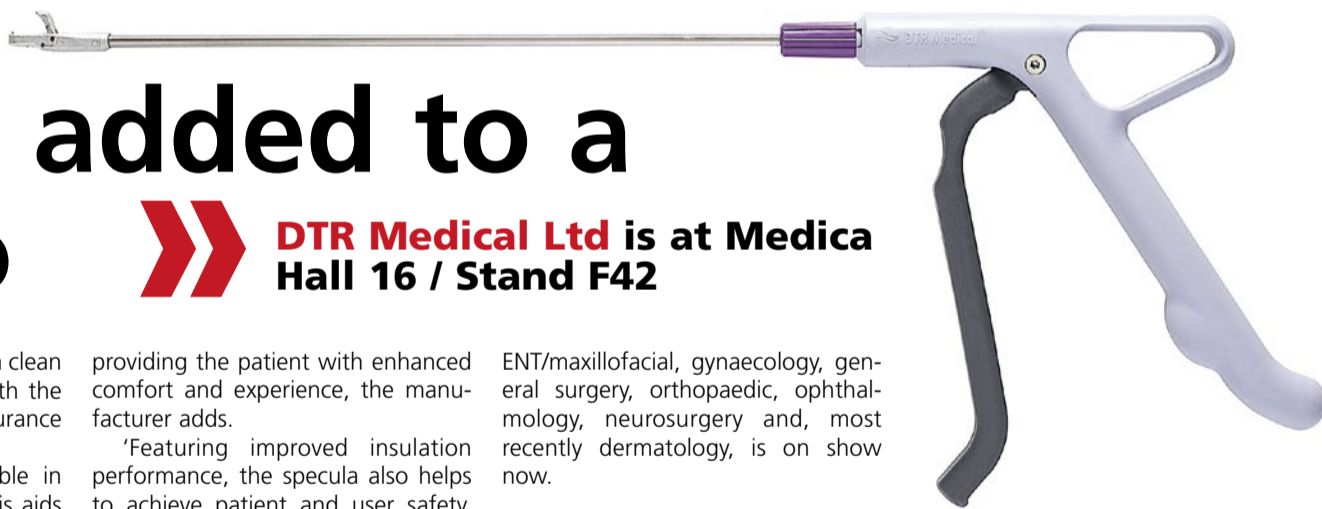
the sharp metal jaw to ensure a clean cut, delivering the clinician with the best possible view and the assurance of achieving biopsies first time.

The Cusco Specula, available in Small XXLong, is also new. This aids in examining a wider spectrum while

providing the patient with enhanced comfort and experience, the manufacturer adds.

'Featuring improved insulation performance, the specula also helps to achieve patient and user safety. 'The company's full collection for

ENT/maxillofacial, gynaecology, general surgery, orthopaedic, ophthalmology, neurosurgery and, most recently dermatology, is on show now.



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ISSN 0942-9085

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**Subscriptions**

Liane Kaiser,  
Theodor-Althoff-Str. 45, 45133 Essen, Germany

**Subscription rate**

6 issues: 42 Euro, Single copy: 7 Euro.

Send order and cheque to:  
European Hospital Subscription Dept

**Printed by:** druckpartner, Essen, Germany

**Publication frequency:** bi-monthly

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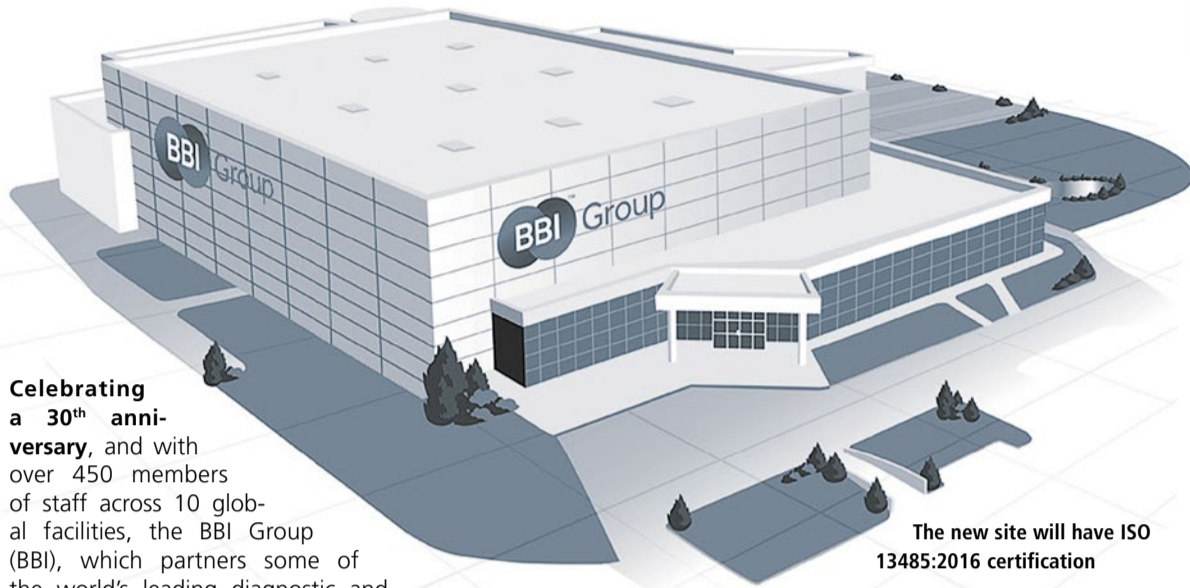
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Healthcare firm boosts capacity for long-term growth

# Wales gains firm's £14m global headquarters



**Celebrating a 30<sup>th</sup> anniversary**, and with over 450 members of staff across 10 global facilities, the BBI Group (BBI), which partners some of the world's leading diagnostic and healthcare organisations, is creating a new £14 million global headquarters in Wales, United Kingdom. This new site unites three of its existing UK manufacturing locations under one roof, thus also amalgamating knowledge, expertise and development activities.

### Company divisions

**BBI Solutions** focuses on immunoassay development and manufacturing services, providing an extensive portfolio of products and technologies to the international diagnostic market.

**BBIInnovations** develops global networks with academic and industry partners to bring early and mid-stage technologies and products

**BBI Detection** specialises in the development and supply of innovative technologies for rapid sampling and identification of bio-threats,

explosives and narcotics for military, first responder and security markets.

**BBI Healthcare** - Launched in 2006 with a diabetes product, in 2008 this division was merged with Aleris firm Cedar Health, which brought the Balance Activ brand into the portfolio. Today the division develops, manufactures and distributes healthcare products that include women's health, energy and digestive products, to consumer retail, healthcare professional and export markets.

'BBI Healthcare,' the company reports, 'has grown to be a multi-million pound business with an energetic and innovative team of over 40 personnel delivering new products, strong brands and education into retail, and primary and secondary care markets.'

The significantly larger site allows BBI to continue to grow with its cur-

rent and future customers providing increased capacity opportunities that far exceed its existing manufacturing facilities, the firm adds. The new site will also be certified to world recognised Quality Management System, ISO 13485:2016, providing peace of mind to customers.

Lyn Rees, The BBI Group CEO commented: 'The aim of the new site is to establish a world-class facility that will provide the capacity for our customers' growing businesses and keeps us ahead of the regulatory changes that are being driven through our market.'

'BBI has seen significant growth in Europe, USA and China and, as we continue to penetrate these markets, the new headquarters will give us the pedigree to compete more effectively. We look forward to welcoming our customers to the new headquarters when we open in 2018.'

Transfer to the global headquarters of existing operations will begin very early in the New Year. [www.the-bbigroup.com/futuregrowth](http://www.the-bbigroup.com/futuregrowth)

The new site will have ISO 13485:2016 certification



# Solid IT hardware and communication

When Taiwan-based Adlink acquired Penta, the buyer benefited from 20 year's experience in design and hardware manufacturing. Today, Adlink provides state-of-the-art computing products such as advanced TCA processor blades and platforms, compact PCI/PlusIO, VPX blades, industrial SBCs, motherboards and chassis, plus embedded flash storage, computer-on-modules, rugged small form factor SBCs & systems, fanless embedded computer, wireless internet gateways, and SEMA cloud. The firm's IMPS product lines include

'Adlink products also support multiple operating systems and include comprehensive and easy-to-use software packages and services,' the manufacturer confirms.

### Medical panel computers

The medical panel computers and monitors have been designed with optimum viewing capabilities and hygienic fully-sealed and easily cleanable housings, suitable for patient vital sign monitoring, nursing care, clinical diagnosis, PACS, anaesthesia monitoring and OR documentation.

The MLC 5 medical panel computer is designed for digitally integrated operating theatres to enable

## Adlink is at Medica Hall 10 / Stand F40

industrial mobile handheld computers, smart panels, smart touch computers, industrial & panel PCs, medical PCs & display.

All these products and components are governed by strict revision control, medical regulations and risk analysis, and the firm emphasises that it also ensures support for customers who want to integrate the medical product solutions into their own medical systems.

easy access to PACS images, EHRs and other relevant patient data. The device allows surgeons to manage the patient's vital parameters and other critical information during surgery', Adlink explains. 'The MLC 5 therefore is ideally used to simplify surgical patient data monitoring with superior graphic processing capabilities.'

## BBI is at Medica Hall 3A / Stand 3AB02-1

# Top quality single-use suctions

A pioneering single-use Diathermy Abbey Needle with suction that helps surgeons improve performance and outcomes during a range of procedures is on show at this year's Medica. Developed by Single Use Surgical, the firm reports that the device improves visibility at the surgical site during submucosal diathermy (SMD), turbinectomy and breast surgery. 'It offers a unique combination of precise cauterisation and targeted suction helping to remove surgical smoke and reduce the risks associated with reprocessing a reusable monopolar device,' the firm explains.

Single Use Surgical was established in 2001 as a direct response to

## Single Use Surgical is at Medica Hall 16 / Stand F42

UK hospitals' concerns over the cleaning practices involving fine lumen instruments, and how it posed a high risk of cross contamination between patients, the company points out. 'Since then, we have developed the widest range of high quality and specialist single-use suctions capturing

The single-use Diathermy Abbey Needle improves visibility at the surgical site during submucosal diathermy (SMD), turbinectomy and breast surgery

the same look, feel and functionality as the reusable equivalent.'

The manufacturer makes products with stainless steel tubes rather than aluminium, which, it reports, has helped it to become a leading single-use medical device specialist. The range spans many specialties including ENT, head and neck, gynaecology, laparoscopy, general and vascular surgery.



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