

BEST OF CES 2019

Every year the world's biggest technology companies unveil their new products at the world's biggest technology show. Here's what to expect from 2019

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CES isn't just the world's biggest technology show, it's the world's craziest technology show. Almost 200,000 people descend upon Las Vegas for the chance to see what's going to be released, and it's a truly motley collection of people: the exhibitors, the "buyers" for companies such as Dixons Group, plus thousands of journalists to spread the word.

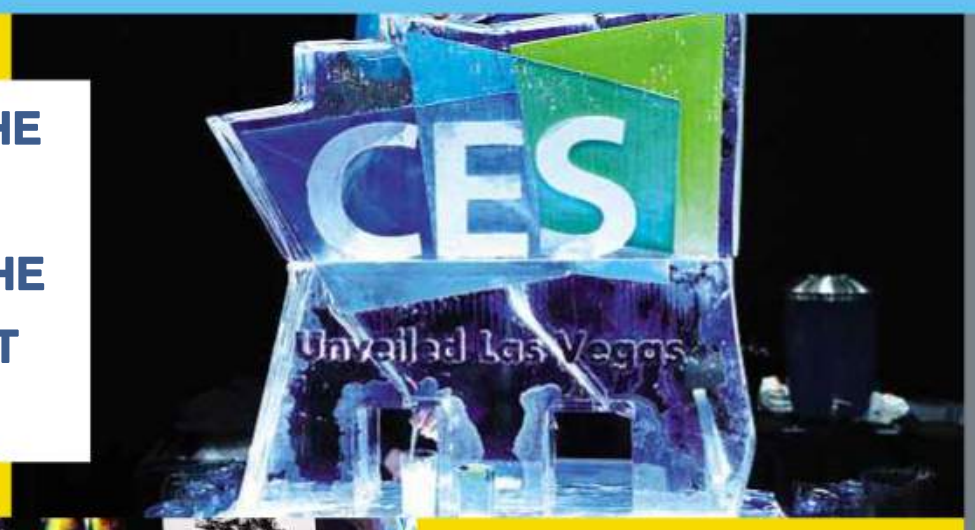
This year, we saw one stand-out theme: screens. Not boring old TVs, but flexible screens that may well change the shape of the devices we use in years to come. We also saw a fascinating mainstream debut for Samsung's MicroLED tech, which not only gets rid of the bezels but frees us all from the idea of a fixed resolution panel. Want weird and wonderful resolutions? Samsung's MicroLED tech can do it.

We saw a big presence from AMD for once, as it took the chance to debut its second-generation Ryzen mobile processors and announce a wholesale (well, almost) shift to the 7nm process. While Intel is still struggling with its move to 10nm, it also had announcements to make about its next generation of chips.

There was no shortage of good news for laptop lovers, too. While many of the new laptops were more refreshes than huge updates, Dell introduced what promises to be a truly upgradeable gaming machine, while Nvidia's RTX graphics chip for laptops is worth waiting for if you're a gamer.

It's impossible to truly distil a show that covers 2.9 million square feet into ten pages, but with Tim Danton, Barry Collins and Jon Honeyball all trudging along the myriad show floors, we've done our best to pick our highlights. And there's a lot to enjoy.

"CES ISN'T JUST THE WORLD'S BIGGEST TECH SHOW, IT'S THE WORLD'S CRAZIEST TECH SHOW"





"ALIENWARE IS DESCRIBING THE AREA-51M AS THE 'WORLD'S MOST POWERFUL LAPTOP'"

"FLEXIBLE SCREENS MAY WELL CHANGE THE SHAPE OF THE DEVICES WE USE IN YEARS TO COME"





"RAY TRACING ON A LAPTOP (AND A SLIM ONE AT THAT) BECAME A REALITY FOR THE FIRST TIME"

"AMD USED CES 2019 TO PUBLICLY DEMO ITS 7NM 3RD GEN RYZEN DESKTOP PROCESSORS"



PC PRO BEST OF CES 2019

THE AWARD WINNERS

We picked ten "Best of CES 2019" award winners from the show, so look out for this logo on the products that excelled.

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LAPTOPS

We look at the compact, beautiful, heavyweight and flexible laptops that were on show in Las Vegas this year – and pick out three award winners

LENOVO THINKPAD X1 YOGA GEN 4

PC PRO BEST OF CES 2019



PRICE From $1,929
AVAILABILITY June 2019

The big change to the X1 Yoga in this fourth incarnation is its all-aluminium chassis, which helped Lenovo to reduce its footprint by 17% compared to its predecessor – and it's lighter, too, at 1.39kg. That's quite an achievement for a convertible with a 14in screen. While we aren't besotted by its slate-grey looks, the overall effect is of a sleek convertible that will be a joy to travel with. Note that Lenovo still finds a home within the chassis to stow the ThinkPad Pen Pro, solving one of our problems with the otherwise excellent Toshiba Portégé X30T-E (*see p48*). With the promise of up to 15 hours battery life, two Thunderbolt 3 ports and a privacy cover for the camera, this looks set to be the convertible to beat in 2019... when it eventually arrives.

HUAWEI MATEBOOK 13

PC PRO BEST OF CES 2019



PRICE From $999 from huawei.com
AVAILABILITY TBC

The MateBook 13 demonstrates why Dell's XPS 13 may no longer have things its own way. Huawei is releasing two models: one for $999 that includes a Core i5 processor, 256GB PCIe SSD and integrated graphics; and another for $1,299 with a Core i7 chip, 512GB SSD and GeForce MX150 graphics. We're most interested in the latter, as it not only offers genuine gaming performance (something the XPS 13 lacks), but also offers a better spec for a lower price. Even from our "play" on the CES show floor, it's obvious that this is a well-built system with a great 13in screen. Huawei claims a ten-hour battery life, too.

ASUS ZENBOOK S13 UX392



PRICE TBC
AVAILABILITY TBC

We reviewed the original ZenBook S13 three months ago (*see issue 291, p62*), and the UX392 looks to improve on its intriguing design. Despite weighing 1.1kg, it includes a GeForce MX150 graphics chip and either a Core i5-8265U or Core i7-8565U processor. But what really lifts it away from most competition is its compact footprint: at 195mm deep, it's much shorter than most 13in laptops – and really this a 14in machine, as the screen measures 13.9in across. It looks nice too, with a ultra-slim bezel and Asus' swirling metal design.

ALIENWARE AREA-51M

PRICE From $2,549
AVAILABILITY TBC

Alienware describes the Area 51-m as the "world's most powerful laptop", which isn't a surprise when you consider what's inside – essentially the same core components as the Yoyotech Warbird X2 on p52. Its specs go all the way to a desktop Core i9-9900K processor and a desktop GeForce RTX 2080 chip, with up to 64GB of RAM. With a 17.3in, Full HD 144Hz screen, it's amazing that it weighs less than 4kg. It was hard to tell from the show floor, but we suspect the fans in this striking system will need to go full pelt to keep everything quiet, so battery life won't be great, but it comes with the added plus that the CPU and GPU are both upgradeable.





LENOVO THINKPAD X1 CARBON GEN 7



PC PRO BEST OF CES 2019

PRICE From $1,709
AVAILABILITY June 2019

We've been fans of the X1 Carbon since its first iteration, with its hallmarks of slimline carbon fibre design, superb keyboard and powerful components. This latest version is a little slimmer and a little faster, with eighth-gen "Whiskey Lake" Intel Core i5 or i7 processors. It supports up to 16GB of RAM and can pack in a 2TB PCIe SSD, all in a 1.11kg frame. But it's the much-improved speakers and 500cd/m² HDR screen that will make a day-to-day difference.

"THE OVERALL IMPRESSION IS OF A SLEEK CONVERTIBLE THAT WILL BE A JOY TO TRAVEL WITH"

DELL XPS 13 (2019)



PRICE From £999 from dell.co.uk
AVAILABILITY Now

The Dell XPS 13 has been our A-List laptop for years, but it's always had a problem: the webcam placement. Until now. The new XPS 13 has a 2.25mm webcam, meaning it can still fit into the ultra-slim 4mm bezel. Dell is keen to emphasise that the screen is brighter and better than before, despite an anti-reflective coating, while packing levels of performance that its rivals can't seem to match. That's due to the exceptional cooling system, which means Intel's 8th Gen Intel Core chips can be pushed to their limits.

HP SPECTRE X360 15 WITH AMOLED



PRICE TBC
AVAILABILITY TBC

One thing made the HP Spectre x360 15 stand out: its gorgeous AMOLED screen. Images and videos looked so vivid it's difficult to go back to a normal display afterwards. As the x360 part of its name also gives away, it's a convertible so can slip seamlessly between laptop, "tent" and tablet modes. HP has also tweaked the design of the Spectre x360 range, with diagonal cut-outs at the rear edges that contain a USB-C port on one side and a power button on the other.

ASUS ROG MOTHERSHIP



PC PRO BEST OF CES 2019

PRICE TBC
AVAILABILITY April to June 2019

Until we saw the Area 51-m, we thought the Asus ROG Mothership was the craziest design yet. Taking inspiration from Microsoft's Surface Pro tablets, it uses a kickstand to support the 17.3in screen, which is a 144Hz Full HD affair. Its main party trick is the detachable keyboard, which you can either keep attached via USB or Bluetooth. Its gaming power isn't quite up there with the Alienware, but the Core i9-8950HK processor and RTX 980 Max-Q graphics will keep games flowing nicely at a Full HD resolution, with the option of ray tracing when that finally lands in the mainstream. We like it.

PROCESSORS

The battle between Intel and AMD had a few intriguing twists this year –we look at the biggest CPU announcements



INTEL LAKEFIELD

PRICE **Not applicable**
AVAILABILITY **Autumn/winter 2019**

Intel's CES announcements revealed more details of its intriguing Lakefield platform – including the code name. Inspired by a request from an anonymous system manufacturer, the idea is to create a low-power board that contains everything a PC needs to run, but in the same compact dimensions as a DDR4 memory module.

Lakefield will include one powerful Ice Lake core and four energy-saving Atom cores. It's Intel's twist on the "big.Little" concept popular in phone processors, where lightweight cores keep the background processes ticking over, and the more powerful silicon fires up only as needed to handle more demanding tasks.

It's an intriguing idea that may find its way into ultra-slim devices; an Intel video showed a flipbook design similar to the Lenovo Yoga Book we previewed four months ago *(see issue 290, p13)* – but with full-colour screens on both sides. Interesting times.



AMD 3RD GEN RYZEN PROCESSORS

PRICE **TBC**
AVAILABILITY **Mid-2019**

PC PRO BEST OF CES 2019

AMD used CES 2019 to publicly demo its 3rd Gen Ryzen desktop processors for the first time – and the signs are promising. When AMD president Dr Lisa Su pitched an 8-core/16-thread 3rd Gen Ryzen against Intel's top-of-the-range Core i9-9900K in Cinebench r15, the red chip posted a score of 2,057 to the Core i9's 2,040. But it's worth noting that, while Intel's chip is designed to be overclocked, here it was running at stock speeds.



Impressively, the Ryzen chip also consumed 26% less power than its rival. That's partly because, like AMD's server-focused Epyc processor, the 3rd Gen Ryzen uses a 7nm manufacturing process, while Intel is still stuck on 14nm for its desktop chips (but see Ice Lake below for more on that). The new chips also bring support for PCIe 4 for the first time, but that doesn't mean you have to upgrade your motherboard: AMD has promised that 3rd Gen Ryzen chips will fit existing AM4 boards, and Tom's Hardware (**pcpro.link/294pcie4**) suggests that a BIOS update could add support for PCIe 4 to existing boards.

A final key feature of the new chip design is its flexibility: Dr Su held up a sample 3rd Gen Ryzen chip, revealing a space where a further 7nm die could be added, doubling the core count to 16.

INTEL ICE LAKE

PRICE **TBC**
AVAILABILITY **Autumn/winter 2019**

CES 2019 saw Intel finally announce the arrival of its first mainstream 10nm chip, code-named Ice Lake. 10nm Intel chips were originally slated for 2016, so it's been a long-awaited development. It's still some way from release, though: Intel claims that Ice Lake will be available to buy "by holiday 2019". That should mean before Thanksgiving (the fourth Thursday of November).

In a reverse of AMD's strategy, Intel plans to launch its new Ice Lake processors in mobile incarnations first. A Dell spokesperson even walked onto the Intel stage carrying a laptop that, he claimed, contained an Ice Lake chip. Intel promises that Ice Lake will deliver "all-day battery life" – meaning 24 hours – but this may come at the expense of performance, as the company is concentrating on lightweight mobile processors at first.

We don't yet know how many cores Ice Lake chips will include, or how fast they'll run, but the supporting cast looks good, with the chipset having support for Wi-Fi 6 (aka 802.11ax), Thunderbolt 3 and a new set of extensions called VNNI (vector neural network instructions), which help Ice Lake processors handle AI-based tasks better than previous chips. As a practical demonstration, Intel gave an on-stage demo of two systems running Microsoft Photos, showing that the one with VNNI optimisation enabled was twice as quick at recognising people.



CREATIVE SXFI AMP

Jon Honeyball gives his take on one of the most interesting technologies on display at CES, only this time it was tucked between his ears

PC PRO BEST OF CES 2019

PRICE £140 from uk.creative.com
AVAILABILITY Now

I spent a couple of hours with Creative Labs at CES as it showed off a production-ready version of a technology it prototyped last year. In essence, it's an amplifier/DSP processor box that feeds your headphones and allows for the creation of true 360-degree spatially correct sound from appropriate multichannel sources.

The concept isn't new. The human hearing mechanism relies on a clear understanding of the shape of your head, and your ears, to determine where a sound originates from. This is because the head, nose, forehead and ear pinnae create a different acoustical path to one ear compared to the other when the sound source is off centre. This "occlusion" is unique to each user, and the ear/brain interface learns when we're babies.

Binaural sound, as it's known, aims to recreate this using headphones. The problem is the head shape. You need to process the sound to create the surround effect, but my head shape is different to yours. Attempts to create binaural recording heads, such as the Neumann KU100 (**neumann.com/ku-100**), are a good generic solution, but the non-generic nature of heads limits its accuracy.

HEAD MODELLING

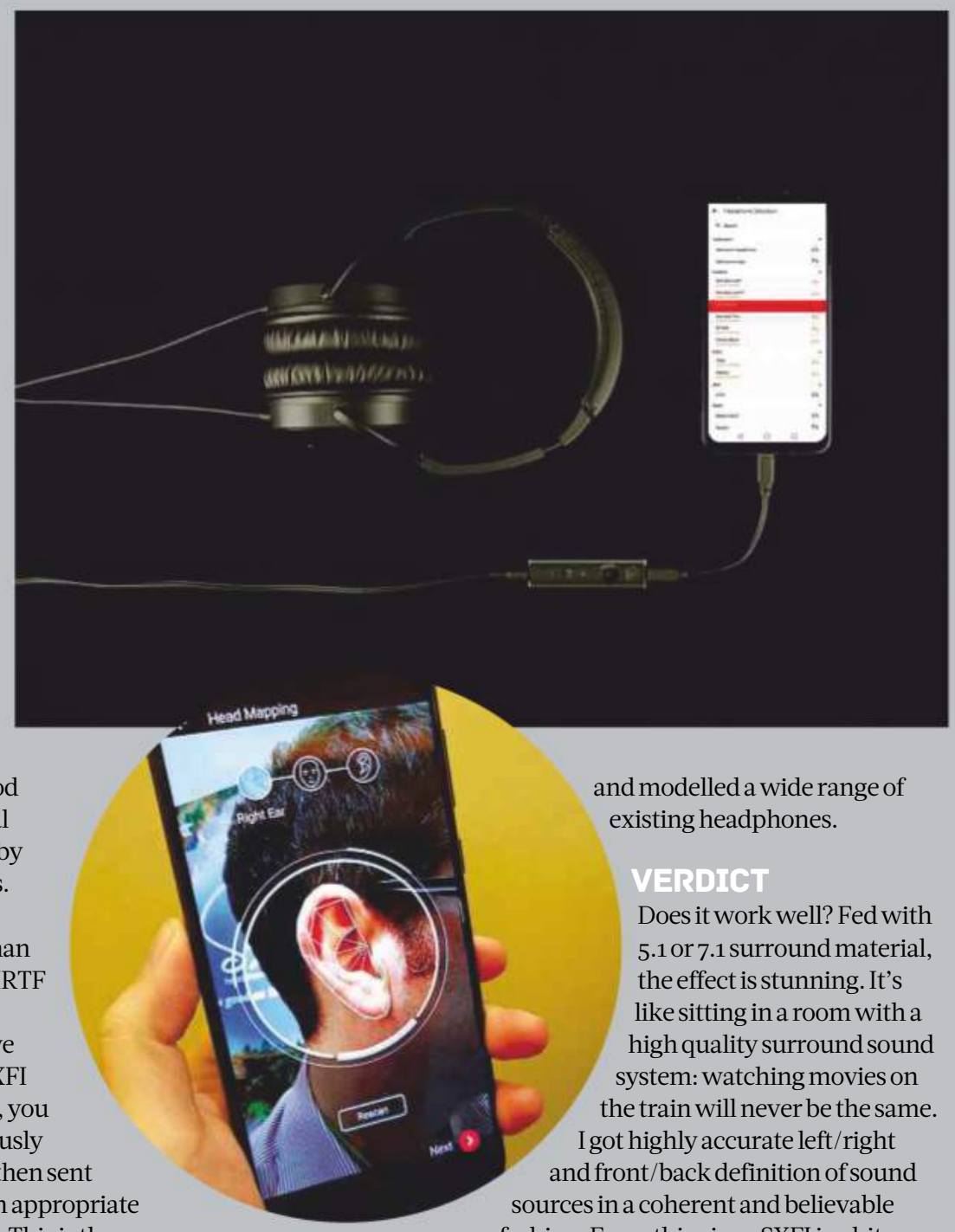
We need a way to model your individual head accurately. Fortunately, this problem is well known, and is called HRTF (Head Related Transfer Function). HRTF allows you to define the head/ear shapes, and to choose one for your binaural playback. Which one do you choose? Until now it has been a matter of trial and error. Choose one of the dozens of publicly available HRTF definitions and see which one gives the most accurate and coherent sound stage. But this is tiresome, slow and hit and miss.

Clearly we need a more accurate and quicker solution to the problem. And this is where Creative's work comes into play.

It has done two things. Firstly, to create an app with which you get a friend to photograph each of your ears and your front-facing view of your head and face. From this, a reasonable attempt at the HRTF can be determined. It has also used tiny in-ear microphones that measure people's real acoustic HRTF. Deep learning of thousands of these in-ear acoustical measurements, along with the photos, allows Creative to have a good guess at the acoustical performance simply by your head/ear shapes. It isn't perfect, but is significantly better than using some generic HRTF data set.

So, at CES, Creative showed off its new SXFI system. Using its app, you take photos as previously described. These are then sent up to the cloud and an appropriate HRTF is chosen. This is then downloaded into the SXFI inline amplifier/DSP unit. Rather like the inline controls on headphone cables, this takes USB music feed in, and feeds out DSP-processed audio to headphones.

The configuration tools list not only your head settings, generated from the photos, but also the specific headphones you intend to use. The headphones themselves influence the accuracy of the sound, and this needs to be compensated for as well. Fortunately, Creative has already measured and modelled a wide range of existing headphones.





TOP **You'll need a pair of headphones that have been tested by Creative**

ABOVE **Creative's app is used to take a set of photos that measure your HRTF**

LEFT **The inline unit feeds out the DSP-processed audio to the headphones**

VERDICT

Does it work well? Fed with 5.1 or 7.1 surround material, the effect is stunning. It's like sitting in a room with a high quality surround sound system: watching movies on the train will never be the same. I got highly accurate left/right and front/back definition of sound sources in a coherent and believable fashion. From this view, SXFI is a hit.

Creative also offers the capability to "binauralise" stereo and mono material. Here, I found it to be much less successful, often creating a wide smear of sound with a notably honky/peaky midrange sound. Trying to create surround from stereo is always going to be tough, and Creative's attempts are no worse than others that have equally failed in the past.

However, when presented with true surround information (from a film, or Netflix or YouTube source), the system is truly compelling. Truthfully, the concept of HRTF and binaural is not new. But Creative has brought an interesting research twist to the subject, and its use of modelling an HRTF based on head photos reaching into a deep learning model of real ear acoustics, has to be applauded.

WEIRD & WONDERFUL

From a brand-new PDA to a flat-pack arcade machine and self-filling beer fridge, there was plenty of quirky tech at CES 2019

COSMO COMMUNICATOR



PRICE **$569 from pcpro.link/294cosmo**
AVAILABILITY **June 2019**

The Cosmo Communicator isn't a lot more developed than when we covered it two months ago, but makers Planet Computers did have a prototype lid – complete with 4in AMOLED panel – to show off at CES. As with all such displays, it looks bright and vivid, but its biggest benefit is that this means people can triage calls without opening up the lid. Early days, but this follow-up to the Gemini PDA looks like it could genuinely replace your phone...

ARCADE1UP



PRICE **£399 from smythstoys.com**
AVAILABILITY **Now**

If the splurge of retro consoles has whet your appetite for yesterday's games, why not take your old-school obsession a step further and build your own arcade machine? Arcade1Up delivers Ikea-style flat-pack arcade machines, and at CES it announced it was adding *Mortal Kombat*, *Space Invaders*, *Final Fight*, *Golden Tee* and *Karate Champ* to its already impressive list of retro classics. Each cabinet includes multiple games to stave off the boredom – *Street Fighter II* detained us for longer than it should have on the Las Vegas show floor. The cabinets are well built, although the joysticks are a little loose for our taste. Don't go smashing your fist into the screen when it's "Game Over", either, as you'll likely knock it through...



"WHEN THE APP DETECTS YOU'RE RUNNING LOW ON BEER, IT AUTOMATICALLY PLACES AN ORDER WITH YOUR CHOSEN RETAILER"

LENOVO YOGA A940



PRICE **From €1,899**
AVAILABILITY
April 2019

If you've been hankering after a Microsoft Surface Studio, Lenovo would like to throw its hat into the ring. This 27in all-in-one has a screen that – like Microsoft's baby – folds down into easel format, letting "creatives" draw on screen with the supplied pen and adjust settings with a dial, which plug into the USB sockets on either side of the screen.

There are other considerate design touches, too. The wireless keyboard, mouse and stylus have places to live on top of the base unit when the screen is folded down; there's a Qi wireless charging pad for topping up your phone; and the bottom of the display is lit to help illuminate documents or drawings on the desk. The Ultra HD screen was magnificent on the demo model, but you can expect the price to be equally emphatic when it arrives in spring.

NETATMO SMART VIDEO DOORBELL



LENOVO SMART CLOCK WITH GOOGLE ASSISTANT



PRICE $80
AVAILABILITY
Spring 2019

If you're fed up of using your phone as an alarm clock, and don't want a fully fledged smart display next to your bed, this kooky Smart Clock is well worth a look. Not only is it compact, roughly the same size as a normal alarm clock, but its screen can switch from telling the time to showing you your day's agenda at the swipe of a finger or a verbal command. With Google Assistant built in, you can simply say "Hey Google, good morning" and it will start your wake-up routine, whether that's switching on the lights and radio or hooking up to other smart home devices you own. A smart fabric covering means it looks good, while there's a USB-A port on the rear so you can keep your phone charged. And if you're worried about privacy, there's a physical switch at the back to turn off the mic – and no front-facing camera to worry about either.

SHIFTALL DRINKSHIFT



PRICE TBC
AVAILABILITY TBC

The self-replenishing beer fridge sounds like something Homer Simpson would buy, but it might be coming to a den near you before long. The slightly fuzzy brainchild of Japanese company ShiftAll, we found this beautifully designed fridge in Eureka Park, the CES hall reserved for startups and inventions looking for a break. Sensors detect when a beer is taken from the fridge, alerting an equally swish app. When the app detects you're running low, it automatically places an order with your chosen retailer. Cheers!

RING DOOR VIEW CAM



PRICE $199
AVAILABILITY TBC

With the three video doorbells already in its range, it was hard to envisage what yet another Ring product could add to the market. However, the Ring Door View Cam does address a particular niche. Designed to replace conventional peepholes, the Door View Cam adds Ring smarts to a very old-fashioned way of seeing who's at your door. You can still peer through the peephole, but should somebody knock at your door while you're out, you can use your smartphone to see and talk with couriers, Jehovah's Witnesses and whoever else may be darkening your door. It's battery-powered, so doesn't rely on a wired doorbell already being in place, making this device attractive to those who live in flats or apartments and want to screen visitors who have managed to blag their way past the main door buzzer. A vibration sensor will even alert you if they bang on your door instead of using the bell. Plus, when you move you can simply swap it out with the old peephole (you didn't throw it out, did you?).

EPSON WORKFORCE ES-55R



PRICE $220
AVAILABILITY TBC

With all the consumer-focused technology on show at CES, it was refreshing to find a product squarely aimed at business users – the Epson WorkForce ES-55R portable scanner. It gets an award because it solves a particular problem: turning receipts into expense submissions using QuickBooks Online or Excel. Previously, you would have to pay a monthly fee for this kind of service, but it now comes bundled with the affordable ES-55R as part of Epson's ScanSmart Accounting Edition software. Naturally, this portable scanner does all the usual things you'd expect, too: scanning straight to the cloud, OCR to turn PDFs into editable Word and Excel docs, and automatic feeding mode so you can turn multipage scans into one file.

PRICE Around £250
AVAILABILITY TBC

Netatmo, best known for its range of smart weather stations, has joined Ring and a throng of other CES exhibitors with its own smart doorbell. Its best feature is total cost of ownership. Although we're yet to get an official price (expected to be around £250), Netatmo won't charge users an ongoing fee to access the video archive of people knocking at their door. Ring charges £30 a year for that facility. That's because Netatmo stores the videos locally, on a supplied 8GB SD card. You can replace it with a 32GB card of your own, should the storage prove insufficient.

There's no battery-powered option with Netatmo – you'll need to wire this slim-profile bell up to your existing doorbell wiring. The Full HD images captured by the doorbell looked sharp and well detailed in the demo we were given at CES, but if you're looking to integrate this into a wider smart home system, you may have to wait. At launch, it will only support Apple HomeKit and Siri – Google Assistant and Alexa support will apparently come later.

NVIDIA DRIVE AUTOPILOT

Quite aside from its fleet of RTX graphics cards sweeping all before it, Nvidia is making inroads into automated cars. And it chose CES 2019 as its launchpad for Nvidia Drive AutoPilot. This gives car makers a "Level 2+" system, which means it fulfils all the Level 2 features (where the car can automatically steer and accelerate, but the driver must be ready to take control) but with the ability to jump to Level 3 and beyond with updates.

So why Nvidia? "You need a massive amount of computation," Danny Shapiro told us from the show floor. "Our approach is to start from supercomputing, that's what we do, and bring it down into an automotive grade, compact, energy-efficient product." In this case, a PCB



stacked with Nvidia chips that car manufacturers can build around to create their own hardware and software.

Volvo has already announced that it's using Nvidia Drive Autopilot in its 2020 cars, and this looks set to be the first mainstream transition to autonomous driving. Not just assisted driving, but taking full control. "A Level 3 system is saying that the driver can relinquish control to the vehicle," said Shapiro. "And it really comes down to a sense of liability. Because if you say that the car will take over when there is an autonomous mode then who is responsible for the car? The manufacturer has to accept responsibility."

Shapiro explained that Volvo was one of the first to explain how it would do that in practical terms. "They had a video of a family getting in the car and driving on the highway and hitting the button. And then they could talk and they could play games or do whatever, and they would be alerted, you know, 'in three miles you need to take over because it's going to exit. During that highway [journey], Volvo said we will accept responsibility for that vehicle."

Nvidia is also emphasising that its technology will be used to ensure people don't get too distracted. "We're introducing driver monitoring, which I think is key here. Because if the person is not paying attention, we alert them, we make sure that they're still engaged. And if they're not, then you know, we're going to have to take steps."

Spray water in their face, we asked? Jolts of electricity? Sadly not, Shapiro told us. The more likely scenario is that the car will pull over. A little more mundane than we hoped, but it could be that CES 2019 quietly marked the moment when autonomous driving moved from theory to reality.

GAMING

A 7nm graphics card, affordable RTX and real-time laptop ray tracing have arrived

AMD RADEON VII



PRICE **$699**
AVAILABILITY **7 February 2019**

AMD president Dr Lisa Su announced its first 7nm gaming CPU: the Radeon VII. AMD's benchmarks suggest it's around 25% faster than the previous top-of-the-line Radeon RX Vega 64, but the gaming community has reacted cautiously. Why? There's no native ray tracing support, rumours suggest AMD won't be able to produce the cards in huge volumes for the foreseeable future (something it disputes) and the gamers were hoping for a bigger jump in frame rates.

NVIDIA GEFORCE RTX 2060



PRICE **£329 from nvidia.com**
AVAILABILITY **Now**

If spending almost $700 on a graphics card doesn't fill you with glee, Nvidia's launch of the GeForce RTX 2060 should. It won't be as fast as the Radeon VII above, but early benchmarks suggest that it is a match for the GTX 1070 Ti. That means it will cope well with AAA games at 1440p, and run all games flawlessly at 1080p. The key figures to note are 6GB of GDDR6 memory and 1,920 CUDA cores.

NVIDIA GEFORCE RTX MAX-Q DESIGN

PC PRO BEST OF CES 2019

PRICE **Not applicable**
AVAILABILITY **Now**

It appears that Alienware (*see p31*) didn't get the memo, but bulky gaming laptops are surely on their way out. Nvidia announced that 40 new laptops would be shipping with its GeForce RTX Max-Q design in early 2019, which means that real-time ray tracing on a laptop (and a slim one at that) became a reality for the first time. What most impressed us is that Nvidia has also controlled heat output to the extent that Razer, for example, can fit RTX 2080 Max-Q graphics into the Razer Blade 15, where it was previously restricted to the GTX 1070 Max-Q design. While we can't quite agree with Nvidia CEO Jensen Huang's "we've redefined mobile gaming" claim, we're seriously impressed.



DISPLAYS

2019 was the year of the bendable screen, but that wasn't the only big development

ROYOLE FLEXIBLE SCREEN

PC PRO BEST OF CES 2019

PRICE Not applicable
AVAILABILITY Now

Bendable screens are this year's hot tech. Endless queues formed to see the Royole FlexPai in action, with the firm's Android-powered "tablet" folding in half to create a double-screened phone. In truth, the FlexPai feels like a sample rather than a fully fledged product – but you can buy a "developer model" from **royole.com/flexpai** for £1,209, with buggy software and middling screen quality. However, that misses the point: device designers need no longer be constrained by flat, unbendable screens, but instead imagine radical new ideas.



LG SIGNATURE OLED TV



PRICE Not specified
AVAILABILITY Distant

The LG Signature OLED TV is something special. When not in use, the screen rolls down into a base unit that looks like a giant speaker. But when you do want to watch something, it rolls upwards to create a super-slim 65in OLED screen. It sounds crazy but it works: it rolls into position within around 30 seconds, stays rigid when vertical and the 4K OLED panel looked bright and vivid. And it doesn't just function as a TV: it has six other modes (music, clock, frame, mood, lighting and home dashboard). Two big questions remain: its price, which will definitely be five figures, and availability.

SAMSUNG MODULAR MICROLED TECHNOLOGY



PRICE Not specified
AVAILABILITY Distant

MicroLED technology has the capability to shake up the way we think about screens. Samsung created a showroom where it set up press-only proof-of-concept displays: on one wall it showed how two separate MicroLED displays (one square, one TV-shaped) could be joined together to form one ultra-wide display... before separating again to form two displays. Or another, where three square MicroLED screens took turns to merge together vertically. Impressive stuff.

"FLEXIBLE SCREEN TECH IS A GAME CHANGER, BUT IT REQUIRES A MAJOR VENDOR TO DIVE IN HEAD FIRST"

JON'S HITS AND MISSES OF CES 2019

Alexa is everywhere. Its takeover of an entire industry is stunning. If you are not Alexa-capable, either as a voice device or something that can respond to Alexa platform interfaces, you're toast. Google is hanging on bravely, and Apple owns the high-value market with Siri, but Microsoft is nowhere to be seen.

Other hits? The 2019 TVs from LG and Samsung are breathtaking, with real, meaningful and significant improvements in both picture quality and functionality. 8K upscaling makes sense, and Samsung demonstrated astonishing noise and artefact removal (under ideal conditions, of course). We also saw a growing openness from these companies, which is refreshing to see. There was also an array of amazing desktop monitors, including a truly drool-worthy ultra widescreen desktop monitor from LG coming later this year.

Shall we sing the 5G song? Qualcomm and Intel were there in force, but there was little or no real hardware. But that's okay – 2019 will be the year of the initial deployment of 5G, both for country-level infrastructure and for end user devices. 2020 will be the CES to really judge progress here.

Royole's flexible screen technology is a game changer. But it requires a major vendor to dive in and buy up the rights, and then to apply it to a huge array of products. What I have seen was mind blowing, and the possibilities are mostly undiscovered. For myself, I want an Apple Watch wrist band that is live all the way around the wrist. Who will buy the tech? Samsung? LG? Apple? Google or Amazon? I can't wait to see.

Missing in action? A distinct lack of anything around proper real-time home security for monitoring IoT devices, and the push towards "VPN to Home" capabilities. It's almost as if the industry is playing a game of "pass the parcel" with this one, hoping that it will be someone else's fault when a big Internet of Things security disaster is uncovered. That won't work, and 2020 needs to be the timeframe where security vendors stop pretending it's 1998 and move forward two decades.

