



The European Institute for the PCB Community

## **EIPC SPEeDNEWS**

*The Weekly On-Line Newsletter from the European Institute of Printed Circuits.  
Issue 20 – June 2021*

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### NEWS FROM BELGIUM

#### ***In Memory Of Willem Hofland***



It is with great sadness that we have to announce the passing of Willem Hofland, former Director Advocacy for ICL-IP Europe and BSEF board member.

Willem had more than 35 years' experience in sales & marketing of which 15 years was abroad. Before retiring Willem Hofland worked since 2008 as Director Advocacy for ICL-IP Europe and accessed to an extensive network of people in industry, the political arena and relevant stakeholders globally.

At BSEF we had the privilege to work closely with Willem before he retired in 2018. His deep knowledge of the bromine industry, his kindness and compassion to everyone around him will be missed terribly.

We are sending our deepest condolences to Willem family, friends and our colleagues at ICL.



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### NEWS FROM GERMANY

#### ***Aegis Software Steps Up To Help New And Existing e-Mobility Manufacturers***

**Erlangen, June 2021,** -- *The traditional automotive sector has been a leader for safety-critical, mass-production of a key consumer product, but has also been a laggard in the adoption of Smart technology within manufacturing. Suppliers of key components, assemblies and modules into the automotive sector have been at the mercy of the final assembly-line optimization model, with little regard made for efficiencies upstream in the supply-chain.*

*As automotive today gives way to e-Mobility, revolutionary changes are happening, that bring a whole new generation of opportunity at every level of the manufacturing process. Gasoline is giving way to battery power and other renewable energies, the focus moves away from mechanical domination towards electronic, taking with it the need for safety, and now security. The manufacture of autonomous e-mobility must face the additional burden of heightened security of physical and intangible materials (e.g. software), as well as being cybersecure, in order to avoid the opportunity for compromise resulting in unexpected end-product behavior.*

*With this step-change in technology, even established automotive manufacturers will be caught off guard, with new players in the market seeking to out-smart legacy players through the adoption of advanced Smart technology. There are however some very fundamental lessons to learn as the transition is made, based on the know-how of manufacturing safety critical products such as military and automotive, but using new technologies in a way that protects and assures quality, as well as production performance, avoiding wasted and inappropriate investment.*

**Join Aegis software as we present the, “Ready to Manufacture e-Mobility?” webinar on Thursday June 24<sup>th</sup>, in which we present the modern core principles and MES technologies behind the best practices for e-Mobility manufacturing, aimed at helping those in the market currently make a safe and successful transition, whilst also fast-tracking new entrants to the industry. <https://info.aiscorp.com/webinar-e-mobility-manufacturing>**

[www.aiscorp.com](http://www.aiscorp.com)



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### NEWS FROM SWEDEN

#### **The PCB material and pricing situation – PCB supply outlook**

*June 2021*

Commodity prices have continued to increase, with JP Morgan speculating that we are witnessing the start of a new super-cycle, driven by a post-pandemic recovery, combined with massive fiscal stimulus, re-starting of many global economies and a weaker USD. Copper, rice, iron ore and precious metals have seen 20% to 30% increases, with copper increasing around 20% this year on the back of increasing demand and reduced supply.

IMF revisions to the global economic outlook show that the global economy is now expected to grow 6% in 2021. The forecast made during January signaled 5.5%.

Global manufacturing PMI increased to 55.8 in April (55 in March) confirming that the global manufacturing upturn continues to gain pace as we move into Q2. Supply chain pressures remain intense as demand for new work reached its highest point in almost 11 years.

Input prices have continued to increase to rise reaching 69.6, the highest in over a decade. Average supplier lead times reached a record and the growth in backlogs reached a 17 year high.

What are the effects on availability and lead times?

Increasing PCB demand and foil shortages are keeping material lead times high and supply shortages continue. Both pre-pregs and Copper Clad Laminates are in short supply. This status is expected to run through Q3 and start to ease in some extent going into Q4.

The order loading rate within almost all factories remains exceptionally high. Many factories already see 80%-100% of their capacity booked for June. For July, we are seeing approximately 40% booked. It's estimated that such capacity pressures will last into August / September and such capacity limitations are impacting overall production lead times in the same fashion as the material lead times are.

NCAB has staff on site in all our main PCB factories to safe guard the prioritization we have with regards to available material for NCAB orders. Yet, as a result of these material supply issues, we do envisage a period with a heightened risk of prolonged delivery times for some orders and potential challenges in achieving our desired delivery dates.

Whilst this situation is affecting all types of PCBs we do see a higher impact on PCBs that require > 2oz (70µm) base copper foils and also with the not-so-standard or specialist materials.

What are the effects on pricing?

NCAB are monitoring underlying factors that are impacting the cost of PCB production. These include:

- Copper as a raw material, but specifically tracking the processed copper foils which have seen a 35% increase.
- Pre-preg and copper clad laminate; they key base materials used in the construction of the printed circuit board and year to date these have increased, on average, 40% and 45% respectively.
- Epoxy resin supply as this is a key raw material for base material and drops in output are impacting supply and driving quota selling.
- Oil as transportation in the form of fuel surcharge.

Through our unrivalled Factory Management organization, NCAB is in a unique position. Whilst we cannot eliminate the impact shortage of supply vs demand may have on lead times, being on site in our main factories makes a great difference. We are able to ensure NCAB orders get priority on available material, and we have also increased our production allocation.

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## ELECTRONIC INDUSTRY NEWS

### **U.S. Takes First Steps Toward Resilient Supply Chains**

By [George Leopold](#)

The marathon race that is the rebuilding of American technology supply chains has commenced, with cautious optimism that initial efforts will eventually yield resilient U.S. manufacturing and distribution frameworks for semiconductors and key energy technologies.

The pandemic [exposed vulnerable supply chains](#) for semiconductors, battery materials processing and cell assembly along with other strategic goods. Those gaps also underscored erosion of the U.S. manufacturing base. In short-term response to an ongoing chip shortage and the crying need for a long-term resilience strategy, the Biden administration last week released a 100-day review of U.S. supply chains.

The initiative and a follow-up review of the semiconductor and other sectors are seen as among the first, concrete steps toward weaning dependence on foreign suppliers and reshoring manufacturing of chips, lithium-ion batteries and other critical items.



Unpacking the recently completed supply chain review, Biden administration officials and industry representatives laid out a strategy for reconstituting technology distribution networks. Those efforts along with [pending funding](#) aimed at reviving U.S. chip manufacturing would encourage innovation and reduce the current heavy U.S. reliance on Asian foundry partners while rebuilding workforce skills that have eroded after decades of offshoring.

“We want to be able to not be reactive,” Sameera Fazili, (above) deputy director of the National Economic Council, told a forum this week sponsored by the Information Technology & Innovation Foundation. “We want to start getting ahead of these problems of resiliency so we are not always caught on our back foot.”

To that end, an [executive order](#) issued earlier this year by the Biden administration aims to “promote investment, transparency and collaboration to address the semiconductor shortage through partnerships with industry.”

Among the goals, added Sree Ramaswamy, a partner at McKinsey Global Institute and a policy advisor to the Commerce Department, are maintaining and advancing “U.S. leadership in semiconductor technologies through R&D of new materials, processes and applications, and bridg[ing] the gap between R&D and commercialization.”

Still, critics worry the bulk of the proposed \$52 billion in emergency funding for chip manufacturing R&D will be focused heavily on immediate challenges and large companies and not enough on game-changing innovation and innovative IC startups.

“It seems to me like a mix of both,” said [Chris Miller](#), assistant professor at the Fletcher School of Law and Diplomacy at Tufts University. “There’s a lot of money going to big firms that [either] don’t need it [or] won’t change their behavior as a result.”

Acknowledging those concerns, Ramaswamy noted that investment incentives in current chip legislation are designed to ensure “this is not a handout.”

He added: “We’re expecting the private sector to be significantly stepping up their investments. We look at this as a co-investment plan” that will have a spillover benefit.

“Sure, there are going to be grants involved,” acknowledged John Neuffer, president and CEO of the Semiconductor Industry Association (SIA). “But there’s going to be far more investments required from private-sector players. These are solvent companies that have to have a lot of capital to [make] these kinds of investments.”

Industry officials note that leading-edge fabs for advanced logic chips cost upwards of \$30 billion. “That’s a couple of aircraft carriers,” Neuffer stressed. “We’ve got to do something, otherwise we kind of tip into the abyss in terms of our manufacturing.”

Backers of the chip legislation also project an estimated 56-percent increase over the next decade in demand for chip production capacity, or what SIA’s Neuffer dubbed a “super cycle” of chip demand. “It’s not a question of whether these fabs should be built, because there’s market demand for them. The question is where they’re going to be built.”

As for the chip manufacturing legislation working its way through Congress, Miller of Tufts University sees certain virtues. “At the highest level, the [U.S. Innovation and Competition Act] has made clear that the U.S. isn’t going to let the industry be lured overseas by foreign subsidies, and that’s a powerful signal in itself.”

In her closing argument, Fazili, the White House economic advisor, concluded: “We have to start the marathon” to rebuild U.S. supply chains. “We need to prove to the world that democracies can work.” Passage of chip legislation “is a sign to the rest of the world that the US is back.”



George Leopold

George Leopold has written about science and technology from Washington, D.C., since 1986. Besides EE Times, Leopold's work has appeared in The New York Times, New Scientist, and other publications. He resides in Reston, Va.

## A Chip Industry for All Seasons

By [George Leopold](#)

Seasonal demand for semiconductors appears for now to be a thing of the pre-pandemic past as heavy demand for memory devices translated into unforeseen gains for the global chip industry during the traditionally slow first quarter.

Market forecaster Omdia reported this week that semiconductor revenues rose a modest but unexpected 0.5 percent over the previous quarter during the three months ending March 31. The gains mark only the third time chip makers have logged first quarter revenue growth since 2002.

Leading the way were memory makers Samsung Electronics, SK Hynix and Micron Technology. Micron recorded a hefty 9.7-percent quarterly gain, according to Omdia's Semiconductor Competitive Landscape survey.

### Top 10 semiconductor firms by revenue in 1Q21

Revenue in Millions USD

Company Name	Q4-20 Revenue (\$)	Q1-21 Revenue (\$)	Q1 QoQ Growth
Intel	19,433	18,675	-3.9%
Samsung Electronics	14,713	15,705	6.7%
SK Hynix	7,020	7,534	7.3%
Micron Technology	5,932	6,508	9.7%
Qualcomm	6,533	6,281	-3.9%
Broadcom Limited	5,030	4,990	-0.8%
NVIDIA	3,773	4,086	8.3%
Texas Instruments	3,964	4,047	2.1%
MediaTek	3,438	3,651	6.2%
Advanced Micro Devices (AMD)	3,200	3,386	5.8%
<b>Top 10 Companies</b>	<b>73,036</b>	<b>74,863</b>	<b>2.5%</b>
<b>All Others</b>	<b>57,616</b>	<b>56,462</b>	<b>-2.0%</b>
<b>Total Semiconductor</b>	<b>130,652</b>	<b>131,325</b>	<b>0.5%</b>

Source: Omdia Semiconductor Competitive Landscape Tool (CLT), 1Q21

(Click image to enlarge.)

Overall, the memory sector registered a 6.2-percent quarterly gain on the strength of heavy demand for DRAM, which accounts for more than half of all memory revenues. Omdia said DRAM revenue jumped 9.1 percent from the previous quarter, reaching \$95.8 billion.

"Despite the traditional low-demand season in the first quarter, both quantity and price increased as demand continued to be solid across all applications," said Lino Jeng, Omdia's principal chip analyst.

"In the case of legacy DRAM products, prices increased by double digits, which led Taiwanese companies to record positive sales growth," Jeng added. "In addition, because of increased purchasing due to concerns over supply shortages within the year, prices have risen in all applications, leading to improved earnings for major DRAM companies."

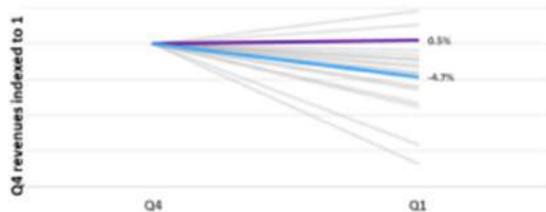
Moreover, Omdia expects IC sales growth to continue during the second quarter along with a “deepening supply shortage.”

Meanwhile, the non-memory segment of the global chip industry also outperformed seasonal patterns by 3.5 percentage points on a quarterly basis. Omdia said the pandemic and resulting chip shortages lifted average selling prices for most components, fueling positive quarterly growth well beyond the traditional minus-4.7 percent historical average for the first quarter.

### Intel Still Leads

Despite a nearly 4-percent decline in quarterly revenues, Intel remains the world’s largest chip maker, largely a function of its continuing dominance in enterprise data centers. Media darlings such as AMD and Nvidia continue to chip away at the x86 architecture’s hold on enterprise servers, for example, but continue to fall well short in terms of market share, Omdia confirms.

Total semiconductor revenue quarterly percentage change, Q4 to Q1



— 2003 - 2020 — Q4 2020 to Q1 2021 — Average (2003 - 2020) *(Click image to enlarge.)*

For how long Intel maintains its led is uncertain. Analysts note that only Intel, Samsung and Taiwan Semiconductor Manufacturing Co. possess the ability to fabricate advanced FinFET devices. After several years of process technology stumbles, observers note that CEO Pat Gelsinger appears willing to take more risks to revive Intel’s chips fortunes.

The key is the ability to design and build high-performance cores based on leading-edge FinFET technology, says Risto Puhakka, president of VLSI Research. Despite a growing emphasis by other U.S. chip makers on “relaxed” chip nodes, Puhakka said the winners will be chip makers able to design and scale chip production at the bleeding edge.

“It’s going to be the screamers,” Puhakka said. “So far, Moore’s Law beats anything else that’s been proposed.”

As the U.S. attempts to revive its chip manufacturing prowess, upstarts like SkyWater Technology argue there’s plenty of room in the chip market for larger geometries and smaller wafer sizes. “Intel is trying to decide whether they’re going to be a product company or a services company,” asserts SkyWater CEO Thomas Sonderman.

Based on recent moves, including a [\\$20 billion foundry expansion plan](#), it appears Intel’s Gelsinger is betting on products—the higher the performance, the better.

## **Chip Giants Are Making More Money Than Ever As The Semiconductor Shortage Rages**

The world's 10 biggest chip manufacturing companies saw their revenues surge to a record high in the first quarter of 2021, according to market research firm TrendForce. The combined quarterly total revenue of the chipmakers, known as foundries, rose to a record high of \$22.75 billion in the first quarter, according to a TrendForce blog published Monday. Chips are used in everything from cars and games consoles, to washing machines and toothbrushes. They form part of the life blood of the global economy and are vital to many of the world's biggest industries. But they're also in short supply — and the shortage could last until 2023.

### **World Economic Round Up**

The global economy is set for the fastest recovery from recession for more than 80 years, but poor nations are at risk of falling further behind wealthy countries amid slow progress with the Covid-19 vaccine, the World Bank has said. In its half-yearly outlook report, the Washington-based institution said the world economy was forecast to grow at 5.6 percent this year, in a sharp upgrade from previous estimates it made in January for growth of 4.1 percent. It said this would mark the fastest post-recession recovery in 80 years, fuelled by growth in a few major economies where rapid progress with the Covid-19 vaccine has enabled a faster return to relative normality. However, developing nations will continue struggling with the virus and its aftermath for longer, worsening divisions between rich and poor nations.

*The latest economic news by country to include USA, Europe, UK, Japan, China, Asia Pacific and India can be found each month in our [Semiconductor Monthly Review](#)*

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## NEWS FROM THE UK



### **Centre for Power Electronics Annual Conference online 13-15 July 2021**

Hear the latest outcomes of the EPSRC Tranche 2 Wide Band Gap (WBG) projects covering; Switch Optimisation, Reliability and Health Management, Virtual Prototyping, Heterogeneous Integration and Converter Architectures.

Leading edge research presentations on the latest developments in converters and inverters from Professor Akagi, Tokyo Institute of Technology, Professor Tim Green, Imperial College and Professor Jiabin Wang, University of Sheffield.

State of the art analysis of GaN and SiC devices and applications by Dr Giorgia Longobardi, Cambridge GaN Devices and Simon Price of Exawatt respectively

Panel Discussion on The Role of Wide Bandgap in the Successful Rollout of Electrification and the UK Perspective, chaired by Professor Phil Mawby, University of Warwick

Industrial presentations from exhibitors, including: Cupio Ltd, Heraeus Electronics, Inseto, IP Test, Rohde and Schwarz and Zeiss Microscopy

Registration for Centre for Power Electronics Annual Conference is open below.

Delegate (Industry and Academic) - £100

IMAPS Member (UK and Worldwide) - £80

Early Career Researcher (Academic, RA and Post-Doc) - £30

Student (Undergraduate and Postgraduate) \* – Free

Exhibitor (IMAPS-UK Corporate Member) - £400

Exhibitor (Non IMAPS-UK Corporate Member) - £500

Prices shown are exclusive of VAT.

\* - in applying for a free registration, you may be asked to provide evidence of your status and affiliation to a Higher Education Institute/University.



For any other details or information please contact:

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e-mail: [Office@imaps.org.uk](mailto:Office@imaps.org.uk)

[Register Here](#)





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### PANDEMIC NEWS

#### **How the Delta variant took over**

#### **The Delta variant accounts for 90 per cent of new Covid-19 cases in the UK. Scientists fear its global spread is going unchecked**

Every day, a little flotilla of refrigerated vans arrives at the Wellcome Sanger Institute in rural Cambridgeshire to deliver waste material from the many thousands of PCR tests conducted across the country, to a small team of dedicated and highly trained scientists.

This is the beating heart of the UK's Covid-19 surveillance system, which uses the PCR swab samples to conduct genome sequencing. Its aim? To monitor the rise and spread of new variants. This information can then be used to identify how the virus is evolving as it moves through the population and gathers mutations which enable it to adapt to human cells.

Over the past month, the rapid spread of the so-called Delta variant – otherwise known as the B.1.617.2 strain of SARS-CoV-2 – the most virulent and transmissible form of the virus to emerge thus far, has meant the monitoring work has never been more vital. “Right now we’re sequencing around 4,000 genomes a day,” says Jeffrey Barrett, director of the Covid-19 Genomics Initiative at the Wellcome Sanger Institute, who is leading the operation. “Because the case numbers in the UK are going up.”

The Delta variant has now established itself as the UK's dominant strain. It currently accounts for 90 per cent of new Covid-19 cases in the UK, with studies suggesting it to be 60 per cent more transmissible than Alpha, which in itself was 50 per cent more transmissible than the original Wuhan strain. This infectivity has already precipitated the onset of a third wave, with the number of daily Covid-19 cases in the UK topping 9,000 last Wednesday for the first time since February.

While Delta is believed to have first appeared in India sometime last autumn, before reaching the UK in late March, its rate of spread and potency in recent months has caught the scientific community off guard. Barrett admits that most genomic scientists, including those at the Wellcome Sanger Institute, were anticipating the next 'super-spreader' variant to be a new evolution of the Alpha, or Kent, variant which emerged in South-East England in September 2020. "But in fact, the next worrying thing wasn't Alpha at all," says Barrett. "It was this ancestor of Delta, which was circulating for quite a while in India, a place which didn't have very good genomic surveillance, and we didn't see it coming."

In fact, when scientists first identified that there were three novel strains of SARS-CoV-2 in India – known as B.1.617.1, B.1.617.2, and B.1.617.3 – starting to cause concern, B.1.617.2 or Delta was not initially the main focus of attention. "In March and April, Delta was the dominant strain in India, but it took time to really take off and grow in the UK," Barrett says. "Everyone was initially focused on B.1.617.1, as the mutations in that one looked a bit more worrying, but that has fizzled away now."

So why did the Delta variant take over so quickly? Yatish Turakhia, a genomic scientist at the University of California, Santa Cruz, explains that Delta contains 20 different mutations, compared to the original strain of SARS-CoV-2. However there are seven particularly key adaptations in the virus' mushroom-shaped spike proteins, which latch onto human cells, and are driving its increased transmissibility. These spike protein mutations are thought to increase how tightly the virus binds to the ACE2 receptor protein – the keyhole it uses to invade cells – as well as enabling more of its genetic material to penetrate inside.

"You can think of the way the virus enters cells as like a lock and key mechanism," says Turakhia. "So when some of these mutations happen, it means the key fits the lock better, meaning it can make a more effective entry into the cell."

Two of the spike protein mutations have already been seen in other variants. One, on location 681 of the spike protein, is also present on the Alpha variant, while the mutation on location 452 has been seen in viral strains found in California. But the other five are completely new, and scientists are racing to try and figure out what their biological function is. "Delta is playing the same trick as other variants, grabbing onto human cells a bit more tightly, but using mutations we haven't seen before," says Barrett. His team at the Wellcome Sanger Institute are still figuring out the precise function of all of these new

mutations, but they believe that some of them alter the shape of the spike protein, in a way which benefits the virus.

Scientists are in a rush to understand the mutations. As well as being more transmissible, there seems to be evidence that Delta is more virulent than previous strains. While the original strain of SARS-CoV-2 predominantly impacted the elderly and those with underlying health conditions, Delta appears to threaten even the young and fit.

Public Health England's latest report – which covers surveillance of Delta up until June 3 – revealed that the majority of the new Covid-19 cases are in the younger, unvaccinated segments of the population. In Scotland, analysis published in the *Lancet* journal on hospital admissions between April 1 and June 6 suggests that Delta has caused twice as many hospitalisations as Alpha. This has led to questions about the UK's border policy, which some – including Labour leader Keir Starmer – blame for facilitating the spread of Delta from India to the UK. According to the Civil Aviation Authority, some 42,406 people travelled between India and the UK in April.

Barrett says that there are multiple ongoing hypotheses for exactly how Delta's mutations have made it more infectious. One is that every cough or breath contains more virus, because the variant has been more successful at reproducing within human cells. The other is that infected people might be shedding live virus for a longer period of time. "All of this would make it more transmissible, and mean that there's more virus getting into people, resulting in more severe disease," he says.

There are also some suggestions that Delta may have changed the widely accepted symptoms of Covid-19, meaning that people go longer before they realise they have the virus. While people have learnt to associate symptoms of a fever, and loss of smell and taste with Covid-19, early analysis conducted by the ZOE COVID Symptom Study suggest that headache, runny nose and sore throat tend to be more common early symptoms of Delta.

"That could be the critical thing," says Barrett. "If people have a headache or a runny nose, they probably initially think it's a cold or allergies, rather than Covid-19. And if on average, they're spending one or two more days in circulation with the rest of the population before isolating, that will be driving the spread."

The rise of Delta has prompted Boris Johnson's government to take two steps, one being the postponement of 'Freedom Day' – marking the end of public health restrictions in the UK – and accelerating the vaccine rollout. The NHS has announced that all over 18s will be able to book a vaccine appointment by the end of the week.

Vaccines still represent highly effective forms of protection against Delta, although its mutations have made a slight dent in their efficacy. The Pfizer-BioNTech vaccine has been found to be 88 per cent effective in preventing symptomatic disease from Delta in fully vaccinated people, a slight reduction from its 93 per cent efficacy against Alpha. But after just a single dose, the vaccine is only 33 per cent efficient against Delta, compared to 51 per cent against Alpha.

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One of the reasons for this is that while the vaccines still generate effective T cell immunity against the Delta, they appear to induce lower concentrations of protective antibodies. "Some of those mutations might mean the antibodies that are made by the vaccine just aren't quite the right shape anymore," says Barrett. "So basically they don't stick to the virus as well, and the virus is better able to get past them and get into cells."

But while the UK population is shielded from the worst effects of Delta by the efficiency of the national vaccination program, there are growing fears that Delta could trigger major spikes in the Covid-19 death rate elsewhere in the world over the coming months. As well as being the dominant variant in India and Singapore, it has already reached more than 70 countries. It accounts for six per cent of cases across the US, but that figure is up to 18 per cent in some states, and while Delta is well monitored in the UK – which has one of the world's most efficient systems for spotting variants – few countries are capable of tracking it to the same extent, meaning it may already be gaining traction, unnoticed, in other parts of the globe.

In the meantime, as scientists are still attempting to understand the intricacies of Delta, they are also on the lookout for the next major variant. The worry is a variant that severely impacts the efficacy of vaccines. "It's hard to make predictions," says Nathaniel Landau, a microbiology professor at NYU School of Medicine, who is studying the new variants. "The question is whether the virus will continue to come up with these novel mutations, or

whether we're kind of reaching the saturation points, where the virus has developed all the mutations it can.”

However, there are signs that SARS-CoV-2 may still have some evolutionary tricks up its sleeve. Barrett points out that a new form of Delta already exists, adding a mutation called K417N initially found on the Beta or South Africa variant that further reduces antibody binding. While there are very few cases of this variant so far it is being closely monitored.

“We’re continuing to do all this genome sequencing to hopefully catch these things as early as possible,” he says. “We're running analysis on all 100,000 genomes we've generated over the last couple of months, to see which mutations are arising, and updating this every day to look for patterns that might predict a variant growing and becoming really problematic. But making these predictions is easier said than done, because the virus keeps on surprising us.”



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## International Diary

### 2021

#### **10<sup>th</sup> EIPC Technical Snapshot Webinar**

Registrations via [www.eipc.org](http://www.eipc.org)

July 14

#### **11<sup>th</sup> EIPC Technical Snapshot Webinar**

Registrations via [www.eipc.org](http://www.eipc.org)

September

#### **EIPC @ FED Conference**

Bamberg

16 & 17 September

#### **12<sup>th</sup> EIPC Technical Snapshot Webinar**

Registrations via [www.eipc.org](http://www.eipc.org)

October

#### **EIPC @ Productronica 2021**

Messe Munchen

16-19 November