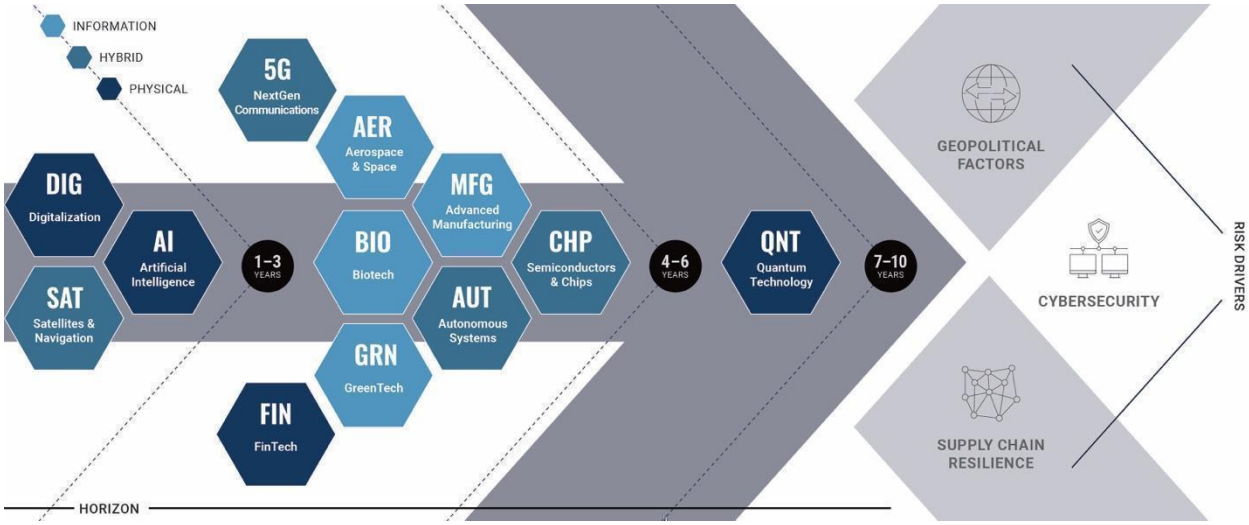
MATRIX MONITOR

Friday September 2, 2022

The only source dedicated exclusively to the emerging technologies shaping the future of business and national security.



This week's Next5 Matrix Monitor features the exposure of a massive Chinese database of personal information, France's AI system that finds undeclared swimming pools, Ethereum's plan to lower its carbon emissions, NASA's plan to launch its SLS rocket, The RQ-4 RangeHawk's role in the development of hypersonic missiles for the US, a "synthetic" mouse embryo without the use of egg or sperm cells, a method to cut the charging time of electric car batteries, Tesla's plan for its self-driving technology, a technological breakthrough by China's top chipmaker, the largest-ever quantum entanglement, and Iran's forging of ties with Russia.

NEXT5 EDITOR'S HIGHLIGHTS

→ **The four most valuable American companies - Apple, Amazon, Google, and Microsoft - have enough capital to acquire any startup they desire, but they are not doing a lot of buying lately.** So far this year, the Big Four have made just five acquisitions of private, venture-backed companies, per Crunchbase data. Of those, none were known unicorns and only one had a disclosed purchase price, indicating the rest were smaller deals by tech giant standards. Considering that the Big Four have over $300B in cash among them, and a collective market cap over $6T, their 2022 startup M&A activity is relatively small. And the Big Four are not alone. According to Crunchbase data, M&A activity involving VC-backed startups has fallen since last year, and the drop has been even more dramatic in the US. In 2021, there were more than 3,000 M&A deals globally involving a VC-backed company being bought. Halfway through the third quarter this year, just under 1,600 startups have been acquired. And in the US, just fewer than 1,700 VC-backed startups were bought last yet. But, this year has only seen 745 such deals. #USA #DIG #Geopolitics Crunchbase

> Analyst Comment: *Crunchbase ran a similar story last year about the down trend in acquisitions by the Big Five (+Facebook) between 2020 to 2021. The latest Crunchbase article suggests the continued downtrend in Big Four buying could be driven by resetting private valuations or lower stock prices for the buyers. However, as we have previously reported, big tech companies have faced significant legal challenges, especially in Europe, when attempting to make acquisitions over the past year. Much of this is due to crackdowns on antitrust and anti-competitive practices. Next5 assesses this could be one of the reasons that tech giants are not in a hurry to acquire startups lately. And this trend is not limited to the West as China has also cracked down on its own tech giants - blocking IPOs and charging high fines for antitrust and anti-competitive practices. While these policies are designed to protect startups, and level the playing field, they actually could create unintended challenges for startups who want to be acquired by tech giants. Especially when it comes to emerging technology, innovation has become rather capital intensive and startups need access to the latest and greatest infrastructure to continue innovating, in many cases. For more analysis about the policy and legal challenges facing big tech acquisitions and how it is affecting startups, read Next5's blog: Why the US Needs Big Tech to Thrive.*

→ **NASA aims to make a second attempt to launch its giant next-generation moon rocket on Saturday, September 3**, five days after a pair of technical issues foiled an initial try at getting the spacecraft off the ground for the first time. NASA officials said Monday's experience was useful in trouble-shooting some problems and that additional difficulties could be worked through during a second launch try. For now, NASA officials said, plans call for keeping the 32-story-tall Space Launch System (SLS) rocket and its Orion astronaut capsule on its launch pad to avoid having to roll the massive spacecraft back into its assembly building for a more extensive round of tests and repairs. The long-awaited launch would kick off NASA's

moon-to-Mars Artemis program, the successor to the Apollo lunar project of the 1960s and '70s, before US human spaceflight efforts shifted to low-Earth orbit with space shuttles and the International Space Station. NASA's initial Artemis I launch attempt on Monday ended after data showed that one of the rocket's main-stage engines failed to reach the proper pre-launch temperature required for ignition, forcing a halt to the countdown and a postponement. Mission managers said they believe a faulty sensor in the rocket's engine section was the culprit for the engine cooling issue. As a remedy for Saturday's attempt, mission managers plan to begin that engine-cooling process roughly 30 minutes earlier in the launch countdown. #AER #USA
Reuters

> Analyst Comment: *Last Sunday on Meet the Press, NASA Administrator Bill Nelson, in an exclusive interview about the launch of Artemis1 compared the US space relationship with Russia to its non-relationship with China. Specifically, he said the US has offered cooperation with China, but China is not interested in any form of cooperation or communication and they are very secretive and non-transparent about their space operations. Conversely, he said, despite the atrocities happening in Ukraine, the US-Russia space relationship at the astronaut-cosmonaut level has not missed a beat. He reiterated that communication and cooperation in space, especially during the height of the Cold War, is absolutely critical for safety, and for maintaining the International Space Station (ISS). Despite that, China refuses to cooperate and now "we are in a space race," he said. The US has to get to the south pole of the Moon before China gets there. NASA is worried that if China were to land on the south pole first, they may attempt to claim it as their exclusive territory as they have done with the Spratly Islands in the South China Sea. He said the Moon has resources like Helium-3 which could give us access to new, more durable energy methods like fusion. And getting back on the Moon is the first step to sending humans to Mars. He said Artemis1 is the first major step in getting us there. Next5 notes this strategic messaging is a major shift in rhetoric from NASA, which has largely been a neutral organization, and served as a diplomatic bridge during conflict. Compared to the US Space Force - a military branch - NASA is a civilian-run program with significant commercial participation, so for the Administrator to strategically message to US adversaries and speak to the importance of national security in space exploration, is a notable change in NASA's historic role. For the Next5 perspective on the space race, read our blog post: The Next Space Race is Well Underway.*

DIGITALIZATION

→ **A massive Chinese database storing millions of faces and vehicle license plates was left exposed on the internet for months before it disappeared in August.** At its peak, the database held over 800M records, representing one of the biggest known data security lapses of the year by scale, second to a massive data leak of 1B records from a Shanghai police database in June. In both cases, the data was likely exposed inadvertently and as a result of

human error. The exposed data belongs to a tech company called Xinai Electronics based in Hangzhou on China's east coast. The company builds systems for controlling access for people and vehicles to workplaces, schools, construction sites, and parking garages across China. Security researcher Anurag Sen found the company's exposed database on an Alibaba-hosted server in China. The database included links to high-resolution photos of faces, including construction workers entering building sites and office visitors checking in and other personal information, such as the person's name, age, and sex, along with resident ID numbers, which are China's answer to national identity cards. It also had records of vehicle license plates collected by Xinai cameras in parking garages, driveways, and other office entry points. An undated ransom note left behind by a data extortionist claimed to have stolen the contents of the database, who said they would restore the data in exchange for a few hundred dollars worth of cryptocurrency. It's not known if the extortionist stole or deleted any data, but the blockchain address left in the ransom note shows it hasn't yet received any funds. #DIG #Cybersecurity TechCrunch

→ **China has hosted a two-day "internet civilization" conference in the northern city of Tianjin**, where the country's top ideological cadres and cyberspace administrators hailed Beijing's progress in controlling online information and content. Through the "Great Firewall" that blocks non-sanctioned online information from overseas, a vast army of online police that censor domestic internet content, and hefty fines that punish businesses and individuals for violating content rules, the Chinese authorities have built an information control system that protects the primacy of Beijing's messages. Zhuang Rongwen, the head of the Cyberspace Administration of China (CAC), said the efforts to build up internet civilization are partly about "online promotion and education of core socialist values." China's taming of the internet as a propaganda channel has been solidified in recent years. Through real name registration requirements and other surveillance technologies, the Chinese authorities have gained the capacity to chase down individuals behind internet posts deemed undesirable. Beijing has also implemented several strict regulations to govern internet platforms. New rules on privacy, data management, and algorithmic recommendations have crimped popular revenue models. Sheng Ronghua, CAC deputy head, said last week that China had censored ~20B pieces of "illegal and undesirable information" and shut down nearly 1.4B internet user accounts since 2019, or about one account per Chinese person. #DIG SCMP

→ **Japan's digital minister has vowed to rid the bureaucracy of the floppy disk and other outdated tools, including the hanko stamp, fax machine.** Floppy disks, the hand-sized, square-shaped data storage items, along with similar devices including the CD or even lesser-known mini disk, are still required for ~1,900 government procedures and must go, digital minister Taro Kono wrote in a Twitter post Wednesday, August 31. Japan isn't the only nation that has struggled to phase out the outdated technology – the US Defense Department only announced in 2019 that it has ended the use of floppy disks, which were first developed in the 1960s, in a control system for its nuclear arsenal. Sony stopped making the disks in 2011 and many young people would struggle to describe how to use one or even identify one in the

modern workplace. Legal hurdles are making it difficult to adopt modern technology like cloud storage for wider use within the bureaucracy, according to a presentation by the government's digital taskforce dated Tuesday. The group will review the provisions and plans to announce ways to improve them by the year's end. #DIG #JPN Bloomberg

SATELLITES & NAVIGATION

→ **The NRO expects to select multiple providers of radio-frequency data collected by commercial satellites next month.** RF data is used to track ships, vehicles, or any devices that emit radio frequency signals. Pete Muend, director of the NRO's Commercial Systems Program Office, said several proposals were received after the agency issued a solicitation in July. The plan is to sign agreements that give the NRO access to data collected by companies' commercial satellites so government analysts can better understand the quality of the data. Another key goal of these contracts is to figure out how to integrate commercial data into government ground systems, according to Muend. The NRO is trying to build a hybrid, or mixed architecture of government and commercial remote sensing satellites, according to Muend. The agency has signed 10-year deals with three providers of electro-optical imagery but so far has not awarded similar contracts to providers of other types of imagery like radar, RF, and hyperspectral. According to Muend, study contracts with a broad range of providers will inform statements of capabilities that could lead to long-term contracts. #SAT #USA Space News

→ **The FCC permitted SpaceX to launch its approved Ku-band and Ka-band satellites at ~550 kilometers above the Earth.** On August 26th, a US appeals court sustained the approval by the FCC for SpaceX to deploy some satellites in a lower earth orbit other than initially planned. The FCC gave SpaceX the greenlight to launch 2,824 satellites at a lower altitude in 2021 to enhance the Starlink broadband constellations' performance and bring high-speed broadband internet to individuals who do not have access to it. Previously, SpaceX could not deploy its constellation between 1,100 and 1,300 kilometers. #SAT #USA Coinspeaker

ARTIFICIAL INTELLIGENCE

→ **According to France's tax authority, a new AI system found thousands of undeclared swimming pools, allowing it to collect millions of dollars from homeowners who failed to report the facilities.** Developed by Google and Capgemini, the AI software learned how to spot pools on aerial images of nine French departments during a trial run last year, which were then cross-checked with land registry databases. Since pools boost property values, they usually lead to higher property and residency taxes – unless the owner neglects to notify tax authorities. According to the Parisien newspaper, which reported the results of the AI test, an average pool of 320 square feet would be taxed at $200 a year. In the nine test departments, the software detected more than 20k pools, which led to the collection of ~$10M in tax revenue last year. The DGFiP public finances authority said the program would now be rolled out nationwide, potentially leading to 40M in new levies in 2023. It could also eventually be used to find

undeclared home extensions, patios, or gazebos, which are also used to factor property taxes, the authority said. #AI #SAT #USA #FRA France24

→ **Some Taiwanese startups specializing in AI have chosen to expand in Japan rather than mainland China due to structural barriers that have become inherent in Chinese cyberspace.** Sega Cheng, a former Google engineer, founded the startup iKala in Taipei in 2011 as an online karaoke operation. Now, the company helps vendors connect with influencers. And in September of last year, iKala established a Japanese unit. The startup's AI mines posts, areas of interest, and other data from 150k influencers, using the results to guide consumer product manufacturers to the right online personalities. Last year, Taiwanese authorities recognized iKala as one of nine leading startups, but Taiwan's population of 23M makes it a relatively small tech market. In 2015, iKala began its overseas expansion in Southeast Asia, and the company now has business operations in six markets. In China, however, iKala has only established a local agent. According to Cheng, there are huge cost burdens associated with the protectionism defining China's tech industry. China has walled off its cyberspace to control the proliferation of information, which has resulted in stronger ties between Japan and Taiwan in the AI space. #AI #Geopolitics #USA #TWN #JPN #CHN Nikkei Asia

NEXT GENERATION COMMUNICATIONS

→ **Reliance Jio Infocomm, India's top telecom mobile operator, has earmarked a spending of $25B on the rollout of its 5G services that it plans to debut in key cities this Diwali in October**, the company announced at its annual general meeting Monday, August 29. The company, which has amassed more than 421M telecom subscribers, will extend its 5G network to "every town" in India by the end of 2023, it said. According to Reliance Industries' Mukesh Ambani, Jio will deploy a standalone 5G architecture that doesn't rely on existing 4G networks and hence offers superior performance. The company can connect 100M homes with its 5G network and further accelerate its connectivity ambitions with fixed broadband services, he said, without sharing tariff details. The announcement follows Jio — which counts Google and Meta among its backers — spending $11.13B to buy more 5G airwaves than any other telecom operator in the country. The company is working with Meta, Google, Microsoft, Intel, and Qualcomm to broaden their joint collaborations, according to Ambani. #5G #USA #IND TechCrunch

FINANCIAL TECHNOLOGY

→ **Ethereum, the second largest cryptocurrency, will complete a plan to lower its carbon emissions by more than 99% next month**, the foundation that controls the platform has confirmed. The project, called "the merge," will result in Ethereum switching the underlying technology it uses for validating crypto transactions to a new process that requires less energy to manage. The energy consumption of Ethereum mining is currently estimated at ~72 terawatt-hours a year, according to Alex de Vries, a Dutch economist who runs the Digiconomist website. That is comparable with the power consumption of Colombia, with a carbon footprint

equivalent to that of Switzerland. The changeover will lead to the platform moving away from a "proof of work" process, which requires cryptocurrency miners to generate random numbers to verify records stored on the blockchain. Ethereum will instead use a "proof of stake" process, in which the network will be secured by users who "stake" sums of the cryptocurrency, committing themselves to acting honestly at the risk of losing it. There are still potential problems ahead. The foundation said users needed to watch out for an increase in scam activity because hackers could take advantage of the confusion around the switchover to try to trick users into giving up their passwords, their funds, or both. The final stages of the merge are expected to begin on September 6th, the foundation said, with the old blockchain switched off at some point between September 10th and 20th. #FIN The Guardian

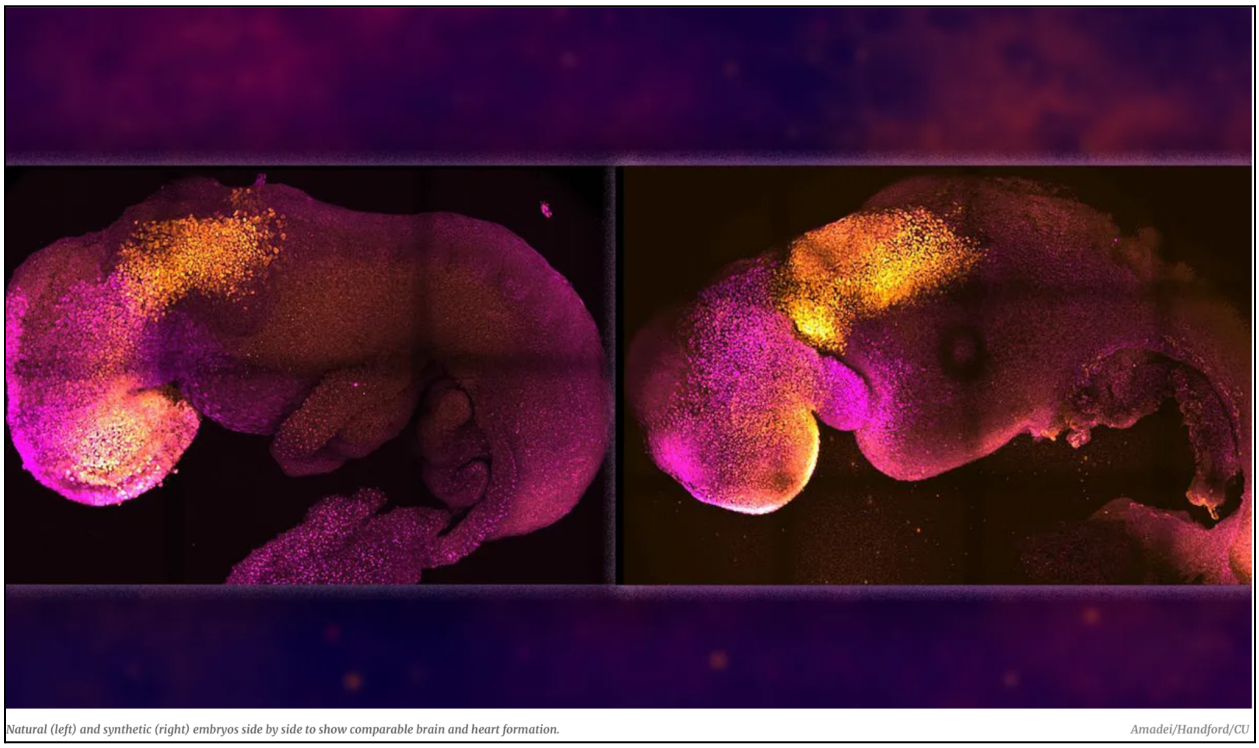
→ **Iran passed an act enabling the use of Bitcoin and cryptocurrency payments for imports through a comprehensive legal framework**, according to a report from local news outlet Tasnim. According to the report, Iranian Minister of Industry, Mine, and Trade Reza Fatemi Amin revealed that the recently passed law defines regulations on cryptocurrencies, addresses supply concerns for fuel and electricity costs for mining, and provides authorization for the administration to use cryptocurrencies. Minister Fatemi Amin reiterated the authorization was an agreement between the Ministry of Industry and the Central Bank — suggesting a multi-departmental consensus on the viability of bitcoin as a means for international payments. Additionally, Fatemi Amin noted that local businesses will be able to import vehicles by using bitcoin instead of the US dollar or the euro. Tasnim highlighted that the move follows an August 9 announcement by the head of Iran's Trade Promotion Organization (TPO) saying the country registered its first import order processed with cryptocurrency. The order was reportedly valued at over $10M. #FIN #IRN Bitcoin Magazine

AEROSPACE & SPACE

→ **The RQ-4 RangeHawk UAV will soon be used to support the development of hypersonic missiles in the US, according to a press release by its manufacturer, Northrop Grumman.** Hypersonic missiles are the newest frontier in the weapons race, with countries like Russia and North Korea claiming to have successfully demonstrated this technology. Last month, the US Air Force confirmed that its Air-launched Rapid Response Weapon (ARRW) had been successfully tested almost a year after similar claims from Russia. Now, in a bid to further its hypersonic missile program, the Department of Defense Test Resource Management Center (TRMC) has sought access to Northrop Grumman's giant drone, RQ-4 RangeHawk. After years of service, the US Air Force has decided to retire its GlobalHawks by 2027. Northrop Grumman stated that Global Hawk aircraft were now being reconfigured into RangeHawks. During the reconfiguration, the aircraft will be equipped with advanced payloads to support the testing of hypersonic vehicles and other long-range weapons. The company claims that the "over-the-horizon altitude, endurance, and flexibility" offered by the RangeHawks will be critical in collecting telemetry and other data for the hypersonic vehicles. #AER #USA #RUS #PRK #CHN Interesting Engineering

BIOTECHNOLOGY

→ **Genetic engineers at the University of Cambridge have created a "synthetic" mouse embryo without the use of egg or sperm cells, using stem cells capable of developing a heart, brain, and other organs for up to a week.** The researchers mimicked natural processes in the lab by guiding the three types of stem cells found in early mammalian development to the point where they begin interacting. The researchers were able to get the stem cells to "talk" to each other by inducing the expression of a specific set of genes and creating a unique environment for their interactions. The scientists say their findings, which are the culmination of more than a decade of research that has progressively led to more and more complex embryo-like structures, could help scientists understand why some embryos fail while others develop into a healthy pregnancy. Furthermore, the findings could be used to guide the development of synthetic human organs for transplantation.

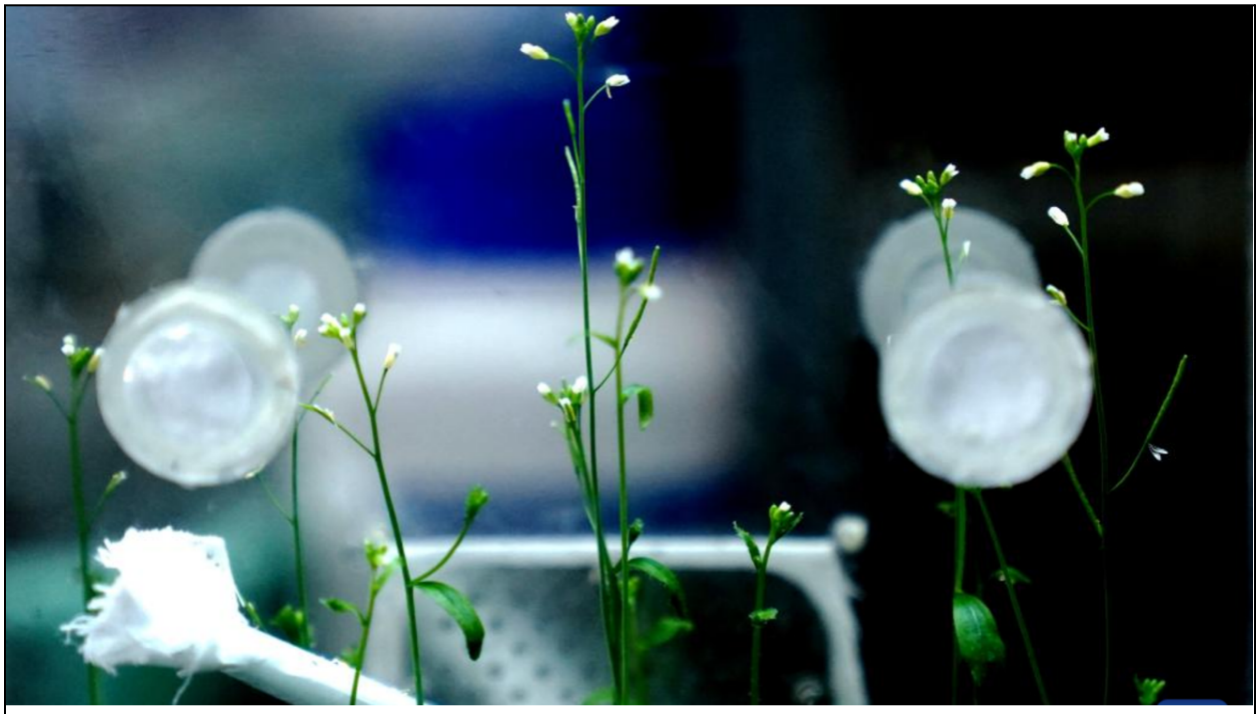

Natural (left) and synthetic (right) embryos side by side to show comparable brain and heart formation. Amadei/Handford/CU

#BIO #GBR Interesting Engineering GenEng

→ **For the first time, researchers successfully fused two chromosomes in mice and demonstrated that the new karyotype can be passed down to offspring.** Researchers from the Chinese Academy of Sciences used haploid embryonic stem cells and gene editing to demonstrate the feasibility of large-scale DNA engineering in mammals. To date, only yeast has been used to perform chromosome-level engineering. In diploid cells, two sets of chromosomes align and negotiate the genetics of the resulting organism. This is referred to as genomic imprinting, and it happens when a dominant gene is marked active while a recessive gene is marked inactive. The scientists fused the two largest mouse chromosomes (chromosomes 1 and 2) as well as two medium-sized chromosomes (chromosomes 4 and 5). Karyotypes with fused chromosomes 1 and 2 had stalled mitosis, polyploidization, and embryonic mortality. The smaller fused chromosome, made up of chromosomes 4 and 5, on the other hand, could be

passed down to homozygous offspring. The researchers discovered that the weakened fertility was caused by an abnormality in how chromosomes separated after alignment. This discovery demonstrated the importance of chromosomal rearrangement in establishing reproductive isolation, a critical evolutionary indicator of the emergence of a new species, according to the researchers. #BIO #CHN GenEng Interesting Engineering

→ **Onboard the Tiangong space station, Chinese astronauts successfully grew rice seedlings.** Although previous rice experiments in space have been carried out, the one carried out aboard Tiangong is the first of its kind to attempt to produce the entire plant's life cycle, which begins with a seed and ends with a full plant generating new seeds. The rice experiment began on July 29, and the seedlings of the tall shoot rice variety have grown to about 30 cm in height, while the seedlings of the dwarf rice variety, known as Xiao Wei, have grown to about 5 cm in height. The researchers want to look into how microgravity affects plant flowering time at the molecular level and whether the microgravity environment can be used to control the process.



Arabidopsis thaliana blooms in a simulator of an experimental environment in the space station. CAS

#BIO #AER #CHN Interesting Engineering

GREEN TECHNOLOGY

→ **The tax credits contained in the Inflation Reduction Act's (IRA) $370B of climate spending should help double the capacity of installed wind and solar by 2030**, according to an analysis by the research firm Energy Innovation. This extra resource could enable clean

electricity to provide anything from 72% to 85% of the total US supply by this time, flowing from 795 to 1,053 gigawatts of cumulative solar and wind capacity. Previously, wind and solar developers had to rely upon short-term tax breaks and partner with banks or other large institutions. The new bill provides the certainty of a 10-year tax credit program and allows the credits to be transferable to the developers themselves. There are also billions of dollars for the domestic manufacturing of clean energy components, as well as rebates for people to buy electric cars. The US should be able to cut its emissions by about 40% by the end of this decade, boosting the global effort to stave off climate change. The spending is likely to catch the attention of China, the leader in clean energy production. #GRN #USA #CHN The Guardian

→ **Government researchers claim they have found a way to cut the charging time of electric car batteries already on the road down to about a third of what it is today.** In a presentation at the ACS Fall 2022 meeting held last week, lead researcher Eric Dufek of the Idaho National Laboratory said the researchers have increased the amount of energy that can go into a battery cell in a short amount of time – the batteries can charge to 90 percent in ten minutes without damaging the battery. It's always been possible to force more energy into a battery in a shorter time than today's fast chargers do, but it tends to damage the battery. When the lithium-ion batteries used in current EV designs charge, lithium ions move from the cathode to the anode. Charging quickly can leave some ions stuck outside the anode. That degrades a battery's performance and ultimately makes the cathode crack, rendering the battery useless. To move the idea from the laboratory to the real world, automakers could use machine learning techniques to design batteries that will charge more efficiently. Engineers could also design charging stations with software that enables them to throttle charging speeds up and down to maximize efficiency with each battery. According to Dufek, the ultimate goal is to develop EVs that teach charging stations how to maximize their charging time. #GRN #AI #USA Daystech

→ **Honda and LG Energy Solution said Monday, August 29th, they plan to build a $4.4B electric-vehicle battery factory in the US**, the latest tie-up between auto makers and battery suppliers seeking to expand capacity by sharing upfront costs. The companies said they plan to begin construction of the factory early next year and start mass production by the end of 2025. The factory is planned for Ohio, the same state as Honda's longstanding auto plant in Marysville. The US plant represents the first major investment Honda has made in building out its own EV battery supply chain since announcing plans to go all-electric a little over a year ago. The Japanese automaker is targeting a full switch to EVs and fuel-cell cars by 2040. Honda and LG said they wanted their plant to produce 40 gigawatt-hours of batteries annually. That would be enough for more than 700k vehicles based on the International Energy Agency's estimate that the average EV's battery capacity in 2021 was 55 kilowatt-hours. With battery prices surging on the back of rising demand and skyrocketing raw material costs, auto makers are likely to opt for more tie-ups with battery makers and others to achieve economies of scale, according to S&P Global Ratings. #GRN #USA #JPN WSJ

ADVANCED MANUFACTURING

→ **North American companies acquired a record number of robots in the first half of this year as they struggled to keep factories and warehouses going in the face of a tight labor market and elevating compensation costs.** Companies ordered a record 12,305 machines in the second quarter valued at $585M, 25% more units than during the same period a year ago, according to data compiled by the industry group the Association for Advancing Automation. Combined with a strong first quarter, the North American robotics market accomplished its best first half ever, the group said. The incentives for companies to pursue a robot-enhanced workforce are clear in the current tight labor market. With nearly two open jobs for every unemployed worker, employers are bidding up wages: Total US labor costs - covering wages and benefits - surged 5.1% year over year in the second quarter, the most since the Labor Department began tracking it in 2001. #MFG Reuters

AUTONOMOUS SYSTEMS

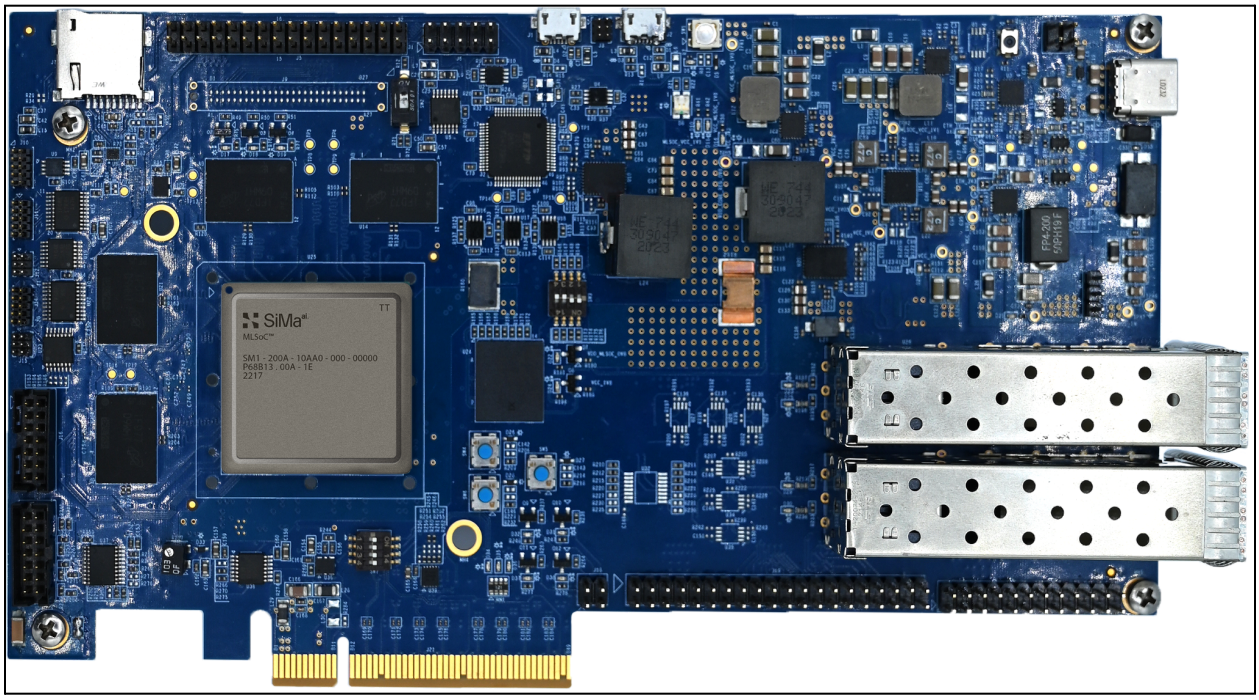
→ **Tesla is aiming to have its self-driving technology ready and widely available by the end of 2022, CEO Elon Musk announced August 29.** Musk made the remarks at an energy conference in Norway, claiming that the vehicles will not require human drivers. The company hopes to have the vehicles widely available in the US and Europe, but the timeline is dependent on regulatory approval. To add Tesla's current Full Self-Driving package, or FSD, to a vehicle costs $15k. The package enables the vehicle to stop at stop signs, park, react to traffic while in cruise control, and steer on freeways and city streets autonomously, according to the company. The updated version would allow vehicles to drive themselves, without the need for a human occupant. #AUT #USA #EUR NY Post

SEMICONDUCTORS & CHIPS

→ **On August 29, TechInsights confirmed its earlier conclusion that China's top chipmaker SMIC has made a significant technological breakthrough that puts it on par with industry giants.** According to the updated research report, SMIC has achieved technological maturity, as measured by “standard cells” – the basic building blocks in logic chipset designs – that can compete with the world's leading foundries, such as TSMC, Samsung, and Intel. Industry analysts are closely monitoring SMIC's technological progress to see if sanctions imposed by the US and its allies will derail China's goal of achieving semiconductor self-sufficiency. According to TechInsights, SMIC achieved 7nm capability in only two years despite "without access to the most advanced Western equipment and technologies." In comparison, it took TSMC and Samsung three and five years, respectively, to achieve the same level. In July, the Ottawa-based firm reverse-engineered a SMIC MinerVA bitcoin mining processor and concluded that the Chinese chipmaker had achieved a technological breakthrough despite not having access to ASML's most advanced EUV lithography systems. Analysts and professionals believe SMIC can produce 7nm chips using existing deep UV

systems under the leadership of co-CEO Liang Mong Song, a semiconductor industry veteran who previously worked at TSMC. Over the weekend, SMIC also announced a $7.5B investment in the development of a new 12-inch wafer production line in Tianjin, China's northern industrial hub. #CHP #SCRM #Geopolitics #CHN SCMP

→ **SiMa.ai, a machine learning startup backed by Fidelity Management & Research Company, announced on Tuesday, August 30, that it has begun shipping chips and systems to customers for testing, an important step toward mass production.** The MLSoC (machine learning system on chip) is a product that is designed to process video and images using machine learning and traditional computing on a single platform. Its applications include industrial robotics, drones, security cameras, satellite imaging, and, eventually, self-driving cars. While data centers and cloud systems use cutting-edge chips for machine learning applications, chip development for gadgets such as security cameras and drones has been slower, despite the explosion of new internet-connected devices, according to Krishna Rangasayee, CEO and founder of SiMa.ai. Investors are drawn to the company's strategy of developing a software platform for the chip that supports all machine learning formats, allowing companies to use the chip in their products more easily. SiMa.ai semiconductors are manufactured by TSMC and designed with the chip software tool Synopsys. Mass production will begin in Q1 of next year.



#CHP #USA Reuters

→ **Chip software maker Synopsys is shifting investment and engineer training to Vietnam while being "careful" in China.** Synopsys is one of a few American companies that dominate the global market for electronic design automation (EDA), also known as chip design software. It announced on August 26 that it will train electrical engineers in Vietnam and donate software

licenses for the Southeast Asian country's chip design center. #CHP #SCRM #Geopolitics #USA #VNM #CHN Nikkei Asia

QUANTUM TECHNOLOGY

→ **Researchers at the Max Planck Institute of Quantum Optics set a new record by achieving the largest-ever quantum entanglement of 14 photons.** Quantum entanglement is a phenomenon in which particles become so intertwined that they cease to exist separately, and changing a specific property of one results in an instant change of its partner, even if it is far away. In this study, the researchers put a single rubidium atom in an optical cavity and bombarded it with light particles that bounced off electromagnetic waves. When an atom was struck by a laser at a specific frequency, it was prepared to have a specific property. A separate control pulse was then directed at it, causing it to emit a photon that was entangled with the atom. The process was then repeated until a chain of photons that were all entangled with each other was produced. The atom was rotated between each emission, which aided in the entanglement of the 14 photons. The researchers claim that not only is this the most photons entangled with an atom in a laboratory, but it is also the most efficient process developed thus far, with a 43% source-to-detection efficiency. In other words, for every second that a laser was fired, the researchers were able to produce one photon of light that could be used for a specific application. This has removed a long-standing impediment to scalable, measurement-based quantum computing, according to the researchers. #QNT #DEU Interesting Engineering

→ **Chinese tech giant Baidu launched a self-developed quantum computer in Beijing and built a system that allows anyone to access the quantum computer using any device, including a smartphone.** The computer has only 10 qubits, which is a small number when compared to more advanced systems built by China's top universities and Western tech companies like Google and IBM. The quantum computer is known as Qianshi, and it can be accessed via a Baidu app downloaded from the Apple, Huawei, or Xiaomi app stores. Users can download the software and submit their own computing task to Qianshi, such as a quantum circuit experiment. The Baidu quantum computer generates an extremely low temperature for the quantum processor unit, which is similar to a CPU in a traditional computer, by using superconducting materials. #QNT #DIG #CHN SCMP

GEOPOLITICS

→ **Iran and Russia are forging closer ties than ever before, as their international isolation pushes the two American adversaries toward greater trade and military cooperation, alarming Washington.** Russia launched an Iranian satellite into space this month, marking a rare success for Tehran's space program. The US suspects that Tehran is using the satellite to monitor Ukrainian troop movements. In addition, Iran's military held joint drone exercises with Russian forces last week, as the US warned that Moscow is preparing to receive Iranian drones for use in the Ukraine war. A stronger Russia-Iran alliance would assist both countries in mitigating the impact of Western sanctions by finding new markets for their products and increasing military cooperation, which would aid Moscow's war in Ukraine and Tehran's regional

activities in the Middle East. The burgeoning Russia-Iran ties, according to US National Security Adviser Jake Sullivan, pose a "profound threat." Moreover on August 30, the US assessed that Russia now has weapons-capable Iranian drones that it will likely use on the battlefield in Ukraine, according to Biden administration officials. #Geopolitics #SAT #AUT #USA #UKR #RUS #IRN WSJ CNN

→ **On August 29, Republican Senator Marco Rubio condemned the US' regulatory approval of a $210M bid by chip IP company Alphawave IP to acquire US-based OpenFive, citing alleged national security risks posed by the buyer's ties to China's Wise Road Capital.** Alphawave IP, a Toronto and London-based company that licenses its technology to chipmakers, announced on August 26 that it had received all regulatory approvals, including from the Committee on Foreign Investment in the United States (CFIUS). Mr. Rubio called on CFIUS earlier this year to investigate the Alphawave IP transaction, citing Chinese private equity firm Wise Road Capital's 10% stake in Alphawave IP and their 2021 agreement allowing Wise Road Capital to license Alphawave IP technology to expand its customer base in China. Rubio on Monday accused President Joe Biden's administration of "yet again" demonstrating its "total unwillingness" to take seriously the threat of China aggressively buying and stealing US intellectual property. "American competitiveness will suffer in the long term as a result," he warned. #Geopolitics #CHP #SCRM #USA #CAN #GBR #CHN Reuters

→ **On August 31, chip designer Nvidia stated that US officials instructed it to stop exporting two top AI chips to China.** The ban, which affects its A100 and H100 chips designed to accelerate machine learning tasks, could impede the completion of the H100, Nvidia's flagship chip announced this year, according to the company. Furthermore, AMD stated that it has received new license requirements that will prevent its MI250 AI chips from being exported to China, but it believes that its MI100 chips will not be affected. According to Nvidia, US officials informed the company that the new rule "will address the risk that the covered products will be used in, or diverted to, a 'military end use' or 'military end user' in China." The announcement marks a significant increase in the US crackdown on China's technological capabilities, as tensions rise over the fate of Taiwan, where Nvidia and nearly every other major chip firm manufacture chips. Without American chips from companies like Nvidia and AMD, Chinese organizations will be unable to perform advanced computing tasks like image and speech recognition, among others, at a reasonable cost. #Geopolitics #SCRM #CHP #AI #USA #CHN #TWN SCMP

CYBERSECURITY

→ **The O.MG Cable, which was unveiled at Def Con, appears to be a standard USB cable, except that it is designed to intercept data and send commands to a phone or computer to which it is connected.** There's a Wi-Fi access point built into the cable itself, which existed in the original cable, but the newest version (the Elite version, which costs $179.99) comes with expanded network capabilities that make it capable of bidirectional communications over the internet. This means that it can listen for incoming commands from a control server and send data from whatever device it's connected to back to the attacker. The O.MG cable is capable of

keystroke injection attacks, which involve tricking a target machine into thinking it's a keyboard and then typing in text commands. That already gives it a wide range of potential attack vectors: it could launch software applications, download malware, or steal saved Chrome passwords and send them over the internet using the command line. When used to connect a keyboard to a host computer, the cable can record every keystroke that passes through it and save up to 650k key entries in its onboard storage for later retrieval. #Cybersecurity #USA The Verge

→ **Chinese hackers likely targeted energy companies operating in the South China Sea and the Australian government, the latest accusation of coordinated cyberespionage by China to advance its geopolitical goals, according to US cybersecurity firm Proofpoint.** Researchers discovered a year-long phishing campaign aimed at projects such as the Kasawari gas field and a wind farm in the Taiwan Strait. The researchers stated that it had "moderate confidence" that the hacking was carried out by a group known as TA423, which is based in China and is motivated by espionage. The report stated that emails used in the phishing campaign impersonated Australian media organizations including *The Australian* and *Herald Sun* to deliver ScanBox malware. PwC Threat Intelligence, which assisted Proofpoint in its research, "assesses it is highly likely that ScanBox is shared privately amongst multiple China-based threat actors." A ScanBox campaign running from April to June targeted agencies of the Australian government at both the local and federal level, according to the report. An earlier phishing effort centered on a European maker of heavy equipment for a wind farm in the Taiwan Strait, the report added. According to Proofpoint's VP of threat research and detection, TA423's "focus on naval issues is likely to remain a constant priority in places like Malaysia, Singapore, Taiwan and Australia." #Cybersecurity #Geopolitics #USA #CHN #TWN #AUS #MYS #SGP Bloomberg

→ **Montenegro's security agency warned Friday, August 26, that hackers from Russia have launched a massive, coordinated cyberattack against the small nation's government and its services.** The Agency for National Security, or ANB, said Montenegro is "under a hybrid war." The Adriatic Sea state, once considered a strong Russian ally, joined NATO in 2017 despite strong opposition from Moscow. It has also joined Western sanctions against Russia for its invasion of Ukraine. In addition to most European countries, Russia has added Montenegro to its list of "enemy states" for acting against the Kremlin's interests. The Montenegrin government earlier last week reported the first of a series of cyberattacks on its servers but said it managed to prevent any damage. However, the attack seems to be ongoing. The US embassy in Montenegro warned that the attack may disrupt the public utility, transportation (including border crossings and airport), and telecommunication sectors. #Cybersecurity #Geopolitics #MNE #RUS #USA Local10

→ **On August 30, Google announced the launch of an open source software vulnerability bug bounty program, offering cybersecurity researchers up to $31,337 in rewards for detecting bugs that can lead to supply chain compromises or other issues.** According to Google, the Open Source Software Vulnerability Rewards Program (OSS VRP) is one of the first prominent open source-specific vulnerability programs of its kind. The tech giant currently maintains several open source projects, including Golang, Angular, and Fuchsia, and is also one of the world's largest contributors and users of open source projects. The program will

concentrate on all current versions of open source software stored in the public repositories of Google-owned GitHub organizations, as well as the third-party dependencies of those projects. While the top awards will be given to bugs discovered in Bazel, Angular, Golang, Protocol buffers, and Fuchsia, the company intends to expand the list following the initial rollout. Google is looking for flaws that could compromise the supply chain or design flaws that could lead to product vulnerabilities. Other security issues, such as sensitive or leaked credentials, weak passwords, or insecure installations, will also be accepted by the program. #Cybersecurity #DIG #SCRM #USA The Record

SUPPLY CHAINS

→ **TSMC said its ultra-advanced 3nm chip production technology will go into production "soon," but inflation and ongoing supply chain issues are driving up the cost of constructing new plants.** To make chip production possible, the semiconductor supply chain is extremely complex, requiring hundreds of pieces of equipment and thousands of individual components, materials, and chemicals. Even shortages of relatively minor components can disrupt supply lines. Cutting-edge extreme-ultraviolet (EUV) lithography machines, for example, cost more than $100M each, but a shortage of a chip costing as little as $10 can prevent their shipment, according to TSMC CEO C.C. Wei, while a shortage of 50 cent radio chips can halt delivery of a $50k car. He believes supply chain management will become more important as governments in the United States, Europe, and Asia all push to localize chip supply chains. TSMC anticipates that its 3D chip stacking technology, known as SOIC (system on integrated chips), will enter mass production this year, and that its initial capacity will be increased 20 times by 2026. The smaller the nanometer size, the more difficult it is to fit more transistors on a chip. The time frame and production schedule for such chips are viewed as indicators of chipmakers' technological prowess. Only TSMC, Samsung, and Intel have a plan for furthering the development of such nanotechnologies. TSMC reiterated its previous prediction that 2nm chip production would be ready by 2025. Apple and Intel will be the first TSMC customers to use 3nm chips. #SCRM #CHP #TWN Nikkei Asia