

# Newsletter

{Vol.II, Issue 3 Sep 2019}



**KIET**  
GROUP OF INSTITUTIONS

Department of Computer Applications  
(MCA)

**TECHNICAL NEWS**

## In This Issue..

- Microsoft launches new center focused on societal impact of cloud & AI
- Intel Unveils Its First AI Chip Spring Hill, Says Facebook Already Using It
- Boosting Computing Power With Machine Learning for the Future of Particle Physics
- Hackers have at least 193 ways to take 'control' of your Android phone
- Unique electrical properties in quantum materials can be controlled using light
- Link Microtek designs and manufactures complex microwave assemblies
- Internet of Things (IoT) Managed Services Market to Witness Huge Growth in 2025:
- Another Google app gets the 'Dark Mode' treatment before Android 10 rollout



## Microsoft launches new center focused on societal impact of cloud & AI

SCAI collaborators will be provided with financial grants, access to world-class Microsoft researchers and technologies. Microsoft Research India announced the launch of a center for Societal impact through Cloud and Artificial Intelligence (SCAI). Part of the Microsoft Research (MSR) Lab in Bengaluru, this center will focus on creating and nurturing projects that can have real-world and large-scale societal impact. Through SCAI, MSR India will collaborate with a number of partners, such as academia, startups and NGOs.

"I am excited about the creation of the center for Societal Impact through Cloud and Artificial Intelligence and I am looking forward to the efforts and collaborations ahead. There are so many opportunities to leverage recent advances in cloud computing and AI technologies to address long-term societal challenges spanning multiple sectors and realms, including health and wellness, education, transportation, and agriculture," said Eric Horvitz, Technical Fellow and Director at Microsoft Research.

Sriram Rajamani, Managing Director of Microsoft Research India, said, "At MSR India, we have been conducting research in the ICTD space since our inception. We see SCAI as a natural evolution of this, and we will partner with like-minded collaborators to apply technology to solve some of the most pressing problems in today's world. I am looking forward to truly impactful projects emerging from SCAI."

SCAI collaborators will be provided with financial grants, access to world-class Microsoft researchers, technologies, as well as access to business insights from Microsoft for Startups. The physical space at MSR India will enable members to exchange ideas and create a collaborative ecosystem.

In collaboration with Microsoft for Startups, SCAI is also working with NavanaTech which focuses on building text-free, voice assisted technology and Three Wheels United which enables scalable lending to clients in emerging markets through technology.



## Intel Unveils Its First AI Chip Spring Hill, Says Facebook Already Using It

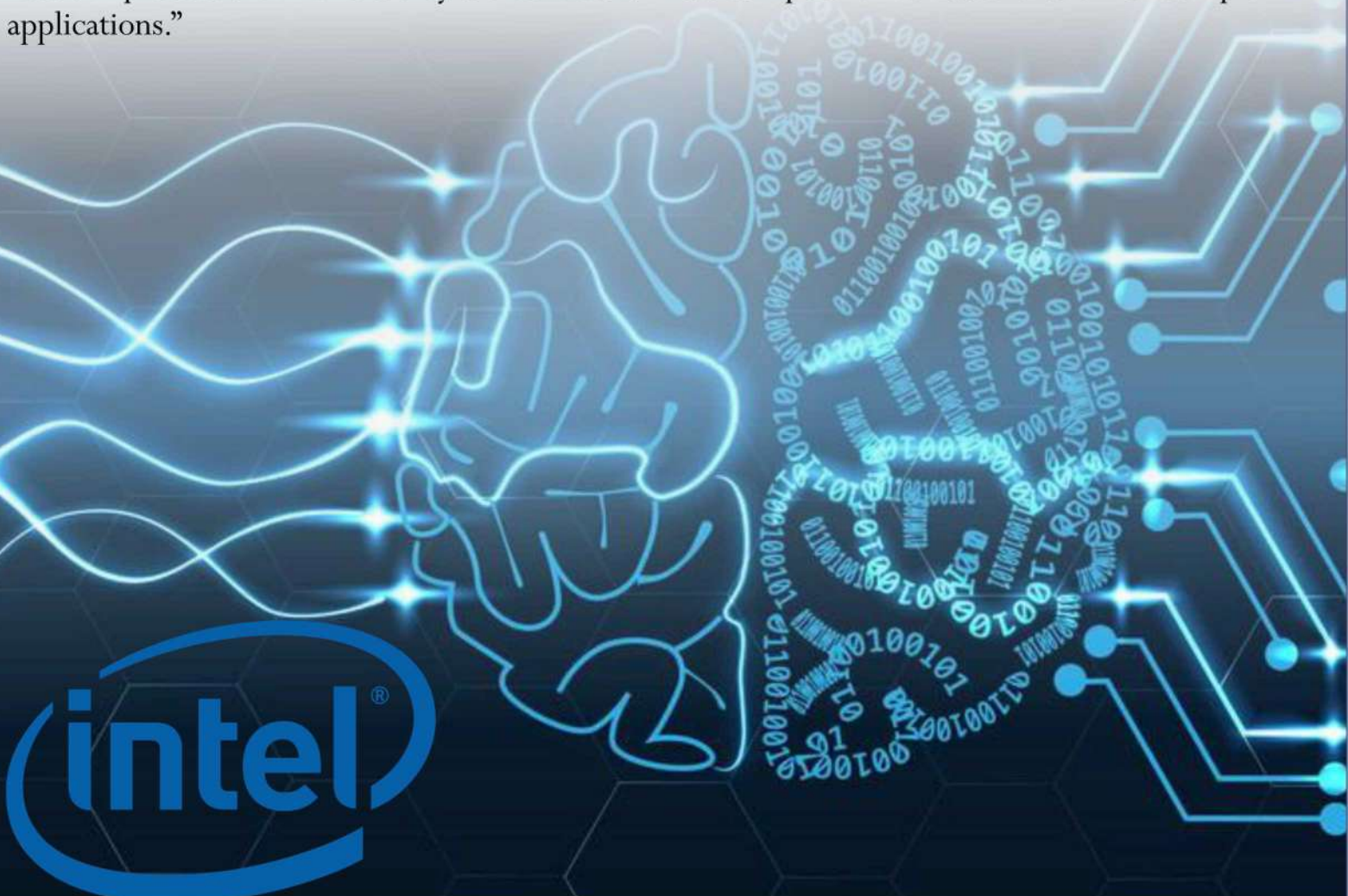
In a radical new step to deal with big data generated by organisations, Intel this week launched an artificial intelligence processor called Nervana NNP-I or 'Spring Hill'. According to reports, this processor has been designed for large computing centres.

Intel Nervana NNP-I is [based](#) on a 10 nanometer Ice Lake processor and is purpose-built specifically to accelerate deep learning deployment at scale, offering excellent performance for major data centre workloads. Intel also said that this processor also offers a high degree of programmability without compromising performance to power efficiency.

program, has short latencies and fast code porting while supporting all major deep learning frameworks, allowing the world's leading cloud service providers and enterprises to take advantage of advanced inference performance,” said Intel in a [statement](#).

A [noted wire](#) also said that Facebook has already has started using the product.

Naveen Rao, general manager of Intel's artificial intelligence products group, told the [news wire](#), “In order to reach a future situation of 'AI everywhere', we have to deal with huge amounts of data generated and make sure organizations are equipped with what they need to make effective use of the data and process them where they are collected. These computers need acceleration for complex AI applications.”





## Boosting Computing Power With Machine Learning for the Future of Particle Physics

A new machine learning technology tested by an international team of scientists including MIT Assistant Professor Philip Harris and postdoc Dylan Rankin, both of the Laboratory for Nuclear Science, can spot specific particle signatures among an ocean of Large Hadron Collider (LHC) data in the blink of an eye.

Sophisticated and swift, [the new system](#) provides a glimpse into the game-changing role, machine learning will play in future discoveries in particle physics as data sets get bigger and more complex.

The LHC creates some 40 million collisions every second. With such vast amounts of data to sift through, it takes powerful computers to identify those collisions that may be of interests to scientists, whether, perhaps, a hint of dark matter or a Higgs particle.

Now, scientists at Fermilab, CERN, MIT, the University of Washington, and elsewhere have tested a machine-learning system that speeds processing by 30 to 175 times compared to existing methods.

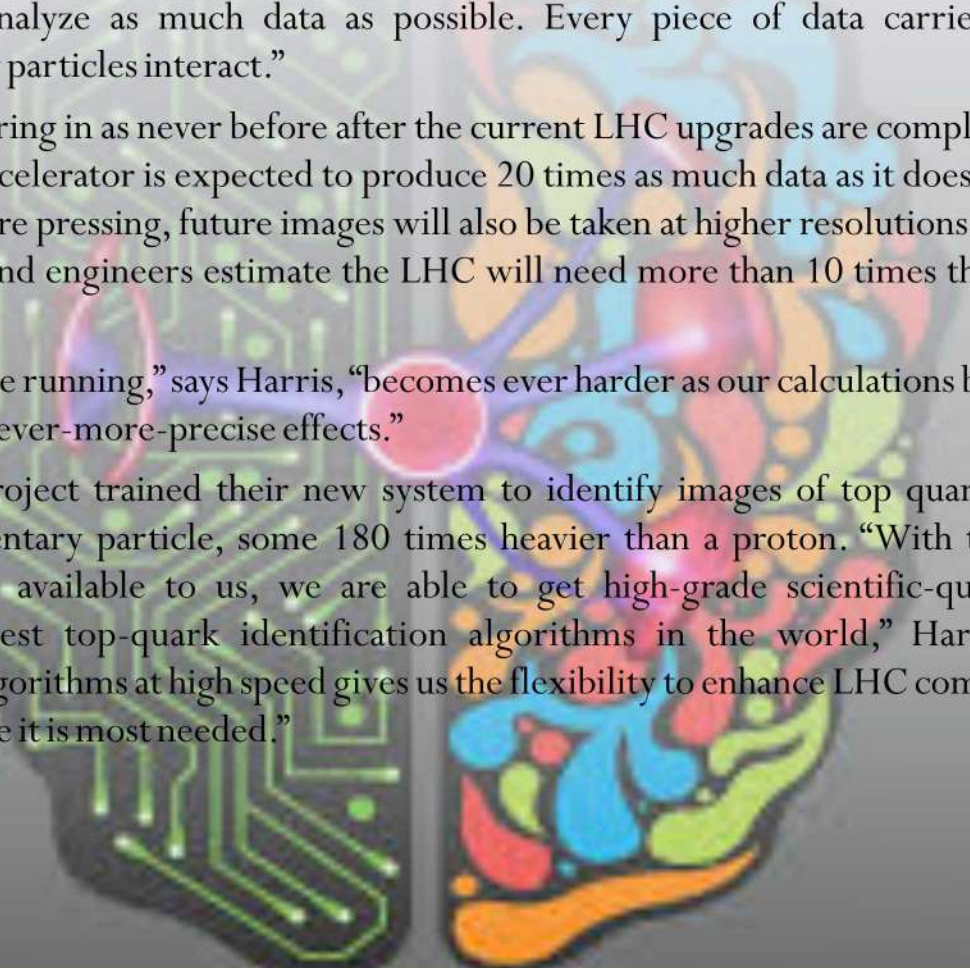
Such methods currently process less than one image per second. In contrast, the new machine-learning system can review up to 600 images per second. During its training period, the system learned to pick out one specific type of postcollision particle pattern.

“The collision patterns we are identifying, top quarks, are one of the fundamental particles we probe at the Large Hadron Collider,” says Harris, who is a member of the MIT Department of Physics. “It’s very important we analyze as much data as possible. Every piece of data carries interesting information about how particles interact.”

Those data will be pouring in as never before after the current LHC upgrades are complete; by 2026, the 17-mile particle accelerator is expected to produce 20 times as much data as it does currently. To make matters even more pressing, future images will also be taken at higher resolutions than they are now. In all, scientists and engineers estimate the LHC will need more than 10 times the computing power it currently has.

“The challenge of future running,” says Harris, “becomes ever harder as our calculations become more accurate and we probe ever-more-precise effects.”

Researchers on the project trained their new system to identify images of top quarks, the most massive type of elementary particle, some 180 times heavier than a proton. “With the machine-learning architectures available to us, we are able to get high-grade scientific-quality results, comparable to the best top-quark identification algorithms in the world,” Harris explains. “Implementing core algorithms at high speed gives us the flexibility to enhance LHC computing in the critical moments where it is most needed.”





## Hackers have at least 193 ways to take 'control' of your Android phone

Google is all set to release the tenth version of Android which will be called Android 10 and Q, however, what is important to note that there are still 193 security vulnerabilities in Android that Google is yet to fix and with the release of Android 10, Google is hopeful that will completely patch all these vulnerabilities in one release. “Android Q devices with a security patch level of 2019-09-01 or later are protected against these issues (Android Q, as released on AOSP, has a default security patch level of 2019-09-01),” said Google in its Android security bulletin.

The security vulnerabilities include remote code execution, denial of service along with issue with Android run time. All these issues can be advantageous for hackers as Google has rated them as “moderate” in the scale of severity. Despite having so many of these vulnerabilities, Google has confirmed that they have not got any reports from any abuse of these vulnerabilities yet. This means it is all the more important for users to get to the latest Android 10 version. “Exploitation for many issues on Android is made more difficult by enhancements in newer versions of the Android platform,” added Google.

While it would take considerable amount of time for all users to migrate to Android 10, Google has made some changes to its app store. Google has now made it mandatory that all new Android apps would need at least three days for approval. This means you simply cannot publish your Android app instantly on Google Play. Also, the developers will not be given any specific date or time frame as to when the “approval process” would get over. The reason for this minimum three days approval process is “to help better protect users”.

This app approval process is separate and is not related to the “closed alpha review” which Google does. After going through the “closed alpha review”, the app would be stuck for at least another three days for the final nod from Google. As Android apps are one of the main sources of malware infection, the new policy makes it difficult for mischievous Android apps to make their way into Google Play.





## Unique electrical properties in quantum materials can be controlled

Insights from quantum physics have allowed engineers to incorporate components used in circuit boards, optical fibers, and control systems in new applications ranging from smartphones to advanced microprocessors. But, even with significant progress made in recent years, researchers are still looking for new and better ways to control the uniquely powerful electronic properties of quantum materials.

A new study from Penn researchers found that Weyl semimetals, a class of quantum materials, have bulk quantum states whose electrical properties can be controlled using light. The project was led by Ritesh Agarwal and graduate student Zhurun Ji in the School of Engineering and Applied Science in collaboration with Charles Kane, Eugene Mele, and Andrew M. Rappe in the School of Arts and Sciences, along with Zheng Liu from Nanyang Technological University. Penn's Zachariah Addison, Gerui Liu, Wenjing Liu, and Heng Gao, and Nanyang's Peng Yu, also contributed to the work. Their findings were published in *Nature Materials*. A hint of these unconventional photogalvanic properties, or the ability to generate electric current using light, was first reported by Agarwal in silicon. His group was able to control the movement of electrical current by changing the chirality, or the inherent symmetry of the arrangement of silicon atoms, on the surface of the material.

"At that time, we were also trying to understand the properties of topological insulators, but we could not prove that what we were seeing was coming from those unique surface states," Agarwal explains. Then, while conducting new experiments on Weyl semimetals, where the unique quantum states exist in the bulk of the material, Agarwal and Ji got results that didn't match any theories that could explain how the electrical field was moving when activated by light. Instead of the electrical current flowing in a single direction, the current moved around the semimetal in a swirling circular pattern. Agarwal and Ji turned to Kane and Mele to help develop a new theoretical framework that could explain what they were seeing. After conducting new, extremely thorough experiments to iteratively eliminate all other possible explanations, the physicists were able to narrow the possible explanations to a single theory related to the structure of the light beam.

"When you shine light on matter, it's natural to think about a beam of light as laterally uniform," says Mele. "What made these experiments work is that the beam has a boundary, and what made the current circulate had to do with its behavior at the edge of the beam." Using this new theoretical framework, and incorporating Rappe's insights on the electron energy levels inside the material, Ji was able to confirm the unique circular movements of the electrical current. The scientists also found that the current's direction could be controlled by changing the light beam's structure, such as changing the direction of its polarization or the frequency of the photons. "Previously, when people did optoelectronic measurements, they always assume that light is a plane wave. But we broke that limitation and demonstrated that not only light polarization but also the spatial dispersion of light can affect the light-matter interaction process," says Ji.

This work allows researchers to not only better observe quantum phenomena, but it provides a way to engineer and control unique quantum properties simply by changing light beam patterns.



## Link Microtek designs and manufactures complex microwave assemblies

**H**ampshire-based Link Microtek designs and manufactures microwave and RF subsystems and components. Its latest project has been a complex microwave feed assembly for a customer's Ku-band mobile satellite-communications antenna system. It interfaces with the system's transmit amplifier, conical feed horn and receive LNB, and incorporates a feed arm, transmit filter, receive filter, rotary joint and an orthomode transducer (OMT).

“In addition to satisfying the tight space constraints imposed by the compact nature of the antenna system, the feed assembly had to achieve strict performance criteria regarding low transmission losses and cross polarisation, as well as high isolation between transmit and receive channels,” according to Link.

The feed arm is formed of WR75 waveguide to handle the Ku-band from 13.75 to 14.5GHz for transmit and 12 to 13GHz for receive. This is linked via a length of semi-rigid waveguide to a transmit filter, which bends round to interface to the rotary joint – the purpose of which is to accommodate one of the degrees of movement as the foldaway satcom system unfurls once in-situ.

“It was certainly no easy task to bring together the various elements of the assembly and ensure that as a whole it delivered the requisite performance and reliability,” said the firm's MD Steve Cranstone.

As an example of the system's complexity, Cranstone cites the rotary joint, which consists of over 40 separate precision-engineered parts, including connectors, pins, cages, spring mounts and bearings.

On the other side of the rotary joint is the OMT – which separate the transmit and receive signals. In conjunction with the receive filter the OMT achieves >100dB isolation.

Ku-band mobile satellite-communications are, according to Link Microtek, used around the world from remote locations by news crews, first responders, government agencies and military units.





Internet of Things (IoT) Managed Services Market Report provides detailed insight, industry knowledge, market forecasts, and analytics. Report on Global Internet of Things (IoT) Managed Services Industry also illuminates economic risk and environmental compliance. Global Internet of Things (IoT) Managed Services Market Report assists industry leaders to make confident capital investment decisions, develop strategic plans, optimize their business portfolio, innovate Internet of Things (IoT) Managed Services successfully and operate safely and sustain-ably.

The report on the global Internet of Things (IoT) Managed Services market furthermore offers a chronological factsheet relating to the strategically mergers, acquisitions, joint venture activities, and partnerships widespread in the Internet of Things (IoT) Managed Services market. Superb recommendations by senior specialists on strategically spending in innovative work may help best in class contestants and in additionally trustworthy organizations for improved invasion in the creating portions of the global Internet of Things (IoT) Managed Services market players might accomplish a clear perception of the main rivals in the Internet of Things (IoT) Managed Services market in additionally to their future forecasts.





## Another Google app gets the 'Dark Mode' treatment before Android 10 rollout

Google has been hard at work this year, bringing the much requested 'Dark Mode' to several of its apps including Messages, YouTube, Maps and more. While most of them have received it already, one of the apps that didn't really get the 'Dark Mode' treatment was Google Pay. Now, this app has also received the same theme. The update comes weeks before the rollout of Android Q or Android 10, which also supports system-wide Dark Mode

As found by Android Police, Google Pay's new Dark Mode comes as a part of version number 2.96.264233179. The app is said to automatically enable the dark theme when the handset does in the battery saver mode. Look-wise it has been mentioned that the app is not completely black but more of a dark gray tone. The 'G' in G Pay icon on top stays coloured and the tabs at the bottom with 'Payment method' and 'Pass' buttons are in light blue-ish tone. From the activity page to the one where all your saved cards are shown, the app has a uniform theme. It is said to be in the process of rolling out on the Play Store and you may get the app after a few days. With Google Pay receiving the 'Dark Mode', the company seems to have covered pretty much all the major apps. Some of the apps that have got or will get the new theme as a part of Android 10 include Google Fit, Google Photos, Google Keep, Google Drive, Google Calendar, Google Chrome, Google Calculator, Google Discover Feed and more.

Google has not yet given an exact date as to when it will be rolling out Android Q. However, we believe it could be around the Pixel launch, which usually happens in October.

