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IEEE Future Directions Initiatives Report on New Developments

IEEE Future Directions is creating opportunities to advance next generation technologies. On 19-20 June 2019, the IEEE Future Directions Committee (FDC) held its meeting at the IEEE Meeting Series in Atlanta, GA, USA. FDC members, representatives from current and graduated Future Directions initiatives, and others across IEEE convened to discuss accomplishments, ongoing activities, and plans to grow their cutting-edge initiatives. Among their top priorities were efforts to build cross collaboration with other initiatives and IEEE organizational units, create and expand educational programs, build industry connections, foster engaging student activities, and collaborate with IEEE-SA to produce groundbreaking standards.



[Read the Summary Report](#)

IEEE Future Directions Technical Communities

In IEEE Future Directions, we're committed to bringing you the best knowledge, resources, and opportunities in emerging technologies within IEEE. As we evolve and expand our offerings, subscription to our current Future Directions Technical Communities for IEEE Society members will be free as a Society member benefit. IEEE Members and Non-members will pay a fee. These communities include: Blockchain, Brain, Digital Reality, Future Networks, and Rebooting Computing. Details of this change, including regular and student rates, can be reviewed in your IEEE account during the annual membership renewal for 2020.

As a participant of our Technical Communities, you will receive access to our growing suite of content, including online courses, webinars, white papers, videos, and more at discounted rates.

Thank you for being a part of our Technical Communities. We value your involvement and look forward to your continued participation in IEEE Future Directions.

Technology Policy and Ethics

IEEE Future Directions considers the reflection of technology through the lens of social implications a key tenet of our work as we incubate and promote technologies. We are currently seeking submissions of original content for 2019, articles of 800-1200 words on the social implications of technology, including but not limited to policy and ethics topics. If interested, please email FDPolicyEthics@ieee.org. Learn more about submitting an article through the [author guidelines](#).

Adaption of Autonomous Vehicles (via APIs) in Society

By Manish Rathore, Inderjit Rai, and Salah Sharieh, Ph.D

Autonomous Vehicles (AVs) were considered an interesting topic in science fiction movies such as Knight Rider, however, AVs are becoming a reality and will change the way we get around. Not only the major automakers but software companies such as Google, Uber, and Apple are all developing autonomous vehicle capabilities. Experts have categorized AVs into five different levels. In this work we will primarily focus on Level 5, which is defined as vehicles that “can do all the driving in all circumstances”. The human occupants are just passengers and need never be involved in driving. There has been quite a bit of discussion around the benefits of Level 5 autonomy; we would like to cover whether people are ready to embrace the autonomous vehicle future, or are all these companies wasting their time and won't see returns for the foreseeable future. [Read more](#).

Clinical Decision Support Systems Leverage Machine Learning for Predictive Analytics - Part 1

By Tahir Hameed

Medical practice has always remained at the forefront of data-driven decision-making. For instance, primary care physicians have commonly used several types of risk scores and diagnostic data to predict morbidity and mortality in their patients. However, with Terabyte (TB) size structured and unstructured data-sets abound, a massive shift is underway in the clinical decision support scene. The costs, efficiency, and effectiveness of decision-making for care planning, diagnosis, treatment, adherence monitoring and management of patient health outcomes have been improving at unprecedented rates in the last two decades. [Read more](#).

Offload Computation in Mobile Edge Computing with Wide-Band Support of Channel Bonding

By Ali Raza, Syed Hashim Raza Bukhari, and Farhan Aadil

Extensive enhancement in technology enables the use of mobile and Internet of Things (IoT) devices in the high demanding applications and services. The users' demands for quality of service (QoS) and computation intensive applications such as augmented reality, online gaming, e-health, smart home and environmental monitoring etc. are also increasing exponentially. Although, mobile and IoT devices have become much more powerful in the last decades and can perform a variety of tasks in an efficient manner, these are still incapable for computation intensive and time critical applications. [Read more](#).

Current Activities in our Technical Communities



IEEE DataPort™ is now available for use! Go to ieee-dataport.org to be connected to this valuable one-stop shop data repository which serves the growing Big Data technical community. [Sign up](#) for the IEEE DataPort™ Newsletter to get weekly updates, including the latest and most popular data-sets, delivered to your inbox.

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Join us at IEEE GLOBECOM 2019 for our Workshop on Blockchain for Telecommunications. This workshop, to be held on 13 December 2019 in Waikoloa, HI, USA, will introduce the basic concepts of blockchain applied to telecommunications (including 5G, IoT, Networking, Cloud, and more) and will discuss emerging trends and challenges ahead. It will also provide a forward-looking perspective on the emerging technologies and key applications in this new field. For details, visit the [workshop website](#).

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IEEE Brain is a sponsor of the upcoming SMR lecture program, Bioelectronic Medicines: Past, Present and Future, 1 October 2019 in London. Speakers from industry and academia will provide expert insights into successful strategies and emerging technologies that are driving the new wave of emerging bioelectronic medicines. Poster submissions are invited. Discounted registration for IEEE Members. Register on the [event website](#) and visit the [IEEE Brain web portal](#) often for details on more upcoming events and activities.

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The *IEEE Transactions on Cloud Computing* is a scholarly journal dedicated to the multidisciplinary field of cloud computing. It publishes peer-reviewed articles that present innovative research ideas and application results of cloud computing, focusing on key technical issues related to theory, algorithms, systems, applications, and performance.

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IEEE Security & Privacy magazine provides articles with both a practical and research bent by the top thinkers in the field along with case studies, tutorials, columns, and in-depth interviews and podcasts for the information security industry.

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In the latest IEEE Digital Reality podcast, Bill Tonti, Senior Director, IEEE Future Directions, shares his views on potential applications of digital reality and spatial or 3 dimensional (3D) computing across several fields, including autonomous vehicles and medical home care. He also covers the importance of ethical considerations in these technologies and how future advancements will enable Industry 4.0. [Listen to the podcast.](#)

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Registration is now open for the [IEEE 2nd 5G World Forum](#), jointly organized by IEEE and 5G Lab Germany in conjunction with the [IEEE 4th 5G Summit Dresden](#). Held in Dresden, Germany from 30 September through 2 October 2019, the IEEE 5G World Forum and 5G Summit will take a holistic approach to 5G system design, ranging from silicon hardware, wireless interfaces, networks, and edge clouds, all the way up to Tactile Internet applications. This three-day event offers a unique platform for industry leaders, innovators, and researchers from industry and academia to collaborate and exchange ideas that will help drive standards and rapid deployment. [Register today.](#)

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Learn about how IoT will connect highways, street lights, vehicles, drones, and traffic-awareness services to manage traffic situations due to congestion, weather, wildlife, or construction and road conditions in the article "Smarter Roads and Highways" in [IEEE Internet of Things Magazine](#). Read an overview in [IEEE Spectrum](#).

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The Life Sciences Technical committee continues to be committed to establishing and communicating the efforts in medical and engineering edging areas. Extreme environments, as well as veterinary applications, constitute two unique application areas in medical engineering, which require specialized and transdisciplinary research.

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The June 2019 issue of *Computer* focuses on Quantum Realism. It explores what has been accomplished in quantum computing, ideas that have been demonstrated, and where the path to the future lies. Read the [Guest Editors' introduction](#), which examines the realistic challenges facing the future of quantum computing, authored by Travis Humble and Erik DeBenedictis, Co-Chairs, IEEE Quantum Initiative.

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The 2018 Edition of IRDS™ is now available. It features an Executive Summary, chapter updates on a variety of device technologies and system applications, and a new chapter on Cryogenic Electronics and Quantum Information Processing. The Roadmap is open access to subscribers of the IRDS™ [Technical Community](#), which is free to join.

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View the latest IEEE Smart Cities webinar called "[A Distributed Traffic Management System for End-to-End Dynamic Routing of Intelligent Vehicles](#)". Visit the IEEE Smart Cities portal for access to all webinars.

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Register for the latest complimentary live [Smart Grid Webinars](#) covering varying aspects of global grid modernization, and read the July 2019 issue of the [Smart Grid Newsletter](#), titled "[Improving Electrical Insulation Using Smart Grid Technology](#)" and authored by members of the [IEEE Dielectrics and Electrical Insulation Society](#).

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IEEE SDN now offers a collection of online courses in the field of Software Defined Networking, Network Function Virtualization, and related technologies. Learn from industry experts about topics that include the fundamentals of SDN and NFV, security and management challenges, the latest SDN open source platforms, and more. Participants also have the opportunity to earn Continuing Education Units (CEUs) and Professional Development Hours (PDHs) with each course. [Access the courses](#).



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Charles Despins, an IEEE Senior member and Co-Chair of the IEEE Sustainable ICT Initiative, provided his thoughts about "Making Information and Communications Technology More Sustainable" in a Q&A article. Read more at [IEEE Transmitter™](#).

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Register for our upcoming Webinar: [Power-Dense High-Efficiency-Coolant-Capable 200kW Silicon Carbide Inverter for Heavy-Duty Vehicles](#), presented by Brij N. Singh, Wednesday 14 August 2019, 11:00 am EDT.

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IEEE Future Directions Events

[AIAA/IEEE Electric Aircraft Technologies Symposium \(EATS\)](#), 22-24 August 2019, Indianapolis, IN, USA

[2019 IEEE Secure Development \(SecDev\)](#), 25-27 September, 2019, McLean, VA, USA

[2019 IEEE 5G World Forum \(5GWF'19\)](#), 30 September - 2 October 2019, Dresden, Germany

[2019 IEEE International Smart Cities Conference \(ISC2\)](#), 14-17 October 2019, Casablanca, Morocco

[2019 IEEE Rebooting Computing Week](#), 4-8 November 2019, San Mateo, CA, USA

[Workshop on Blockchain in Telecommunications: Emerging Technologies for the Next Decade and Beyond](#) at [IEEE Globecom](#), 9-13 December 2019, Waikoloa, Hawaii, USA

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