Editorial

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"We Are What We Repeatedly Do. Excellence, Then, Is Not an Act, But a Habit."
—Aristotle.

The year 2019 is almost here! As always, we will be bringing you an exciting lineup of special issues covering a wide range of topics next year. Through the many special issues and papers, the PROCEEDINGS OF THE IEEE remains committed to covering the key technological developments in electrical and computer engineering, as well as computer science. By consistently delivering top quality, state-of-the-art coverage over many years, the PROCEEDINGS has made it a habit to excel at providing readers with insight into areas outside of their research.

The PROCEEDINGS also consistently ranks within the top ten of all electrical engineering journals. For instance, according to the 2017 Journal Citation Reports (JCR) released in June 2018 by Clarivate Analytics, the PROCEEDINGS received an impact factor of 9.107 and an article influence score of 3.278, thus ranking no. 6 by impact factor and no. 5 by article influence score in the electrical engineering category.

Before going into detail about the special issue topics, we would like to share some other developments for the Journal.

I. WEBINARS

Since 2015, the PROCEEDINGS team has been offering free webinars to complement some of our special issues as a way to provide researchers with an opportunity to interact with experts in the field. We held three such webinars in 2017, one on additive manufacturing for RF components, another on the future of brain research, and a third on emerging 3-D imaging and display technologies. In 2018, our July webinar on smart cities was very well received. We hosted another one on design automation for cyber–physical systems in October. You can find more details about the webinar series at: http://proceedingsoftheieee.ieee.org/connecting-the-past-and-future/webinar-series-2/ and also listen to the recording of past webinars. We plan to offer such webinars through 2019 so do check our website for updates early next year.

II. SOCIAL MEDIA AND WEBSITE

In a way to better communicate with our current and future readers, we have launched a number of new activities in the last few years. The PROCEEDINGS launched a social media presence in September 2015 with a Facebook and LinkedIn page. Since then the presence has been expanded to include an IEEE Collabratec community, a Google+ account, a YouTube presence, and a Twitter account which was launched in November 2017. In the last year, we have seen a significant increase in followers on Facebook (currently at more than 12 000), LinkedIn (currently at more than 650), and on IEEE Collabratec (currently at more 7000). These platforms provide an excellent option for staying informed about not just PROCEEDINGS related special issues and papers but also about technology in general. In addition, our new website at http://proceedings-oftheieee.ieee.org also serves as an excellent resource for keeping informed about new and forthcoming special issues. Feedback about the website and our social media activities is always welcome and can be sent to http://proceedings@ieee.org

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III. UPCOMING SPECIAL ISSUES

Now let us take a closer look at what we have planned for Volume 107 in 2019.

Special Issue Content: During 2019, we will be publishing special issues on a diverse range of topics with practical, fully referenced articles that will be of interest for researchers in electrical and computer engineering, and computer science.

A. Nonsilicon, Non-Von Neumann Computing

The future of computing is at crossroads. The technology advances driving "Moore's law" that have sustained the exponential growth of computing performance over the last several decades are slowing, and the roadmap for future advances is uncertain. The phenomenal expansion of computing power has made computers ubiquitous, spawning a $300 billion semiconductor industry, enabling unprecedented global economic growth, and transforming many aspects of society at large. Emerging technology needs will place further demands on computing, including the need to process a profusion of data from sensors, the internet, scientific experiments, social media, national security systems, and the financial world. Transmitting, storing, processing, and analyzing this data explosion with the requisite speed and performance may mandate a radical departure from the traditional computing paradigm, ranging from hardware to software to benchmarking, and may even involve rethinking the tasks that computing machines are designed to undertake. Recently, government, industry, and academia collectively recognized that addressing this critical technological problem requires a new, multidisciplinary research agenda for computing.

Thus, beyond Moore computing is addressed in this issue by showcasing current research on new nonsilicon materials and substrates for building faster switching devices for more power-efficient computing, novel architectures inspired by the brain or models of physics as alternatives to the traditional von Neumann model of computation as well as novel and emerging applications of domain specific architectures. The special issue will touch upon important advances being made in this broad spectrum of research.

B. Machine Ethics: The Design and Governance of Ethical AI and Autonomous Systems

The primary focus of this special issue will be on machine ethics, that is, the question of how autonomous systems can be imbued with ethical values. Ethical autonomous systems are needed because, inevitably, near future systems are moral agents; consider driverless cars, or medical diagnosis AIs, both of which will need to make choices with ethical consequences. Using the terminology of James Moor (2006) the guest editors have solicited papers that deal with both implicit ethical agents, that is, machines designed to avoid unethical outcomes, and explicit ethical agents, that is, machines which either explicitly encode or learn ethics and determine actions based on those ethics. Of course ethical machines are sociotechnical systems thus, as a secondary focus, papers that explore the educational, societal, and regulatory implications of machine ethics, along with the issue of ethical governance, will also be included. Ethical governance is needed in order to develop standards and processes that allow us to transparently and robustly assure the safety of ethical autonomous systems and hence build public trust and confidence.

In a Point of View article which appeared in the October 2018 special issue of the PROCEEDINGS, the PROCEEDINGS Editor-in-Chief provides insight into the value of publishing such an issue, especially at this time when the field is still in its inception and engineers are just beginning to embed ethics into hardware and software designs.

C. Tactile Internet

Within the past few years, the Tactile Internet has seen an explosive growth of interest in the wireless communication society for enabling remote control in perceived real time within an underlying fifth-generation (5G) network. The purpose of this special issue is to assemble and publish recent research on the Tactile Internet and related research within the 5G of communication networks to realize the Tactile Internet. The articles in this special issue will cover a range of topics, including techniques to achieve key requirements of emerging use cases with 5G communication networks. Further focus will be on the architecture design of the Tactile Internet and the wireless edge, human-in-the-loop and machine-in-the-loop use cases, physical layer solutions for low latency and high reliability, and resource management approaches to achieve these requirements.

D. Adaptive and Scalable Communication Networks

This special issue aims at collecting and presenting recent works on innovative approaches and emerged technologies for coping with dynamicity, heterogeneity, and the scale that have been central to (or even enablers of) recent advances in communications and networking technologies. At a time of an ever-increasing demand for networking resources and a larger scale, communication networks have faced challenges due to the heterogeneity of the demands, the diversity of communication mechanisms, the high dynamicity of the environments, the virtualization of functions, and the stringent and dynamic quality requirements.

E. Real-Time Networks and Protocols for Factory Automation and Process Control Systems

Modern factory automation and process control systems are strongly based on communication networks, which have to ensure timely and reliable data exchange among their components. In this context, which is often characterized by hostile operational conditions (EMC disturbances,

low/high temperatures, movements of people and equipment, high voltage discharges, etc.), industrial networks started to be introduced roughly at the end of the 1980s. Since then, their deployment has impressively grown, involving networks such as Fieldbuses, Real-Time Ethernet and wireless systems, in various heterogeneous application fields characterized by different topologies, configurations, and performance figures.

This special issue involves selected teams of researchers and practitioners from academia as well as from the industry. It has been conceived, on the one hand, to address topics that are of prominent importance today while, on the other hand, it aims at investigating new perspectives, by exploring new developments and expected fields of application. In this respect, specific attention will be paid to practical applications, particularly to those concerned with the Industrial Internet of Things (IIoT), the paradigm that claims for the world-wide reliable, possibly fast, connection of heterogeneous nodes such as commercial devices such as smartphones and tablet PCs, industrial equipment, sensors, and actuators.

F. Electricity for All: Access to Electricity Issues and Solutions for Energy-Disadvantaged Communities

Millions of people have limited or no access to electrical energy. The United Nations has been working on initiatives to address this issue, which is considered by many a human rights problem. This is not only a challenge for developing economies, but also for remote areas in rich countries, such as arctic, island, and jungle communities. In this context, this special issue will concentrate on discussing various relevant topics associated with how to bring green and sustainable electricity to energy-limited communities, based on local renewable energy sources and storage systems, to provide reliable and affordable electricity. Although there are technical challenges associated with making this vision a reality, policy, economic, and social issues also play a very important role that will be discussed in this issue, since these inform and define the technical approaches and solutions to address this important problem.

G. E-Skin: From Humanoids to Humans

This special issue will focus on e-skin sensors and related technologies and the applications they enable in the areas such as robotics and healthcare. With high-quality contributions from well-known experts in the field from several countries, this special issue will consolidate the research in the newly emerging area of e-skin-type sensory systems. The scope of the special issue will include e-skin and flexible and printed sensing/electronics systems with various types of sensing devices and systems that are flexible, bendable, and/or stretchable, developed with particular focus on robotics and healthcare.

H. Molecular Communications and Networking

The new emerging field of molecular communication aims to develop communication systems that are constructed from natural components and systems that are found in nature. Since the birth of this new field in the mid-2000s, the community has witnessed a number of novel molecular communication systems. This includes pure diffusion models, as well as specific cell types that diffuse molecules for communication (e.g., calcium signaling in excitable cells such as neurons), bacterial nanonetworks, as well as microfluidic communication systems. Most recently, this new communication system has also been applied to healthcare applications such as precision drug delivery, and even new paradigms for the Internet of Things, known as the Internet of Bio-Nano Things.

This special issue for the Proceedings will explore the recent history and current developments of this new emerging field, and at the same time establish the ground works for the future transformation of molecular communication. This will be established through articles that will bridge to other domains and fields, and in particular in molecular biology, including synthetic biology. The articles will feature reviews and surveys of current theoretical models developed in molecular communication, and articles in experimental biology and nanotechnology that have been developed to control and engineer communication.

I. Edge Computing

This special issue covers recent developments in edge computing, which is a computing paradigm in which the computing resources are placed at the edge of the Internet, in close proximity to mobile devices, sensors, end users, and the emerging Internet of Everything. There has been a wide range of progress in this field, particularly in the past five years, spanning topics from systems and tools, which provide the basis for the edge computing; through innovative edge networks; edge computing applications in multiple domains, such as smart cities, public safety, and autonomous driving, industry IoT, to topics involving new security and privacy threats.

IV. REGULAR PAPERS

During 2019, we will continue to publish invited and contributed papers in the Journal. We are pleased to bring to you tutorial and survey papers, which will provide insight into a broad range of areas and applications.

V. CONCLUSION

We hope that you find our lineup of special issues to be as exciting as we do. Going into our 107th year, we will continue to deliver excellent content and enhance our offerings. Last but not least, you can reach us via e-mail at http://proceedings@ieee.org or via our social media pages on Facebook and LinkedIn. We look forward to hearing from you, our readers, and look forward to continuing on this journey together. ■