IEEE Future Directions Initiatives Report on New Developments

IEEE Future Directions initiatives are creating opportunities to advance next-generation technologies. On 21 June 2017, representatives from Future Directions initiatives came together at the IEEE Meeting Series in New Brunswick, NJ, USA. They discussed accomplishments, ongoing activities, and plans to grow their cutting-edge initiatives, which currently have a combined +31,000 members. Among their top priorities were efforts to build cross-collaboration with other initiatives and IEEE organizational units, create and expand educational programs, build industrial connections, foster engaging student activities, and produce groundbreaking standards.
Below is a summary of reports from each representative.

IEEE Symbiotic Autonomous Systems Initiative
The IEEE Symbiotic Autonomous Systems (SAS) Initiative aims to take a leadership role in fostering consensus on how best to bring about symbiotic relationships between autonomous systems, and capitalize on the recognition that SAS are poised to have a revolutionary impact on society over the coming years. The initiative is producing a series of e-learning modules that focuses on the technology ethics/policy and social implications of SAS. This year, the initiative will hold a full-day SAS forum, featuring speakers and a panel discussion, at the 2017 IEEE International Conference on Systems, Man, and Cybernetics (5-8 October, Banff, Canada).

IEEE Rebooting Computing
With support from 10 IEEE societies and the IEEE Standards Association, the IEEE Rebooting Computing Initiative is revolutionizing the future of the computing industry by rethinking all aspects of the computer. The initiative is growing its Industry Summit into a series of events and is working to make the IEEE International Conference on Rebooting Computing the premier international conference for all rebooting computing approaches.

IEEE Brain
From its Brain Data Bank Challenges, to panels on neuroethics, the IEEE Brain Initiative is at the forefront of developing advances in neuroscience. It is

working to develop connections with industry CEOs and professionals and encouraging neuroethics dialogues in the engineering community.

IEEE 5G

With the [IEEE World Forum on 5G](#) conference set to launch in July 2018 (in Santa Clara, California), the [IEEE 5G Initiative](#) is already a major thought leader in 5G technologies. In addition to its newsletter, tutorials, and webinars, the initiative will be releasing a Technology Roadmap Whitepaper, will hold Standards Forum and Testbed workshops in the fall, and is hosting an industry panel at the [IEEE 20th International Conference on Intelligent Transportation Systems 2017](#).

IEEE GreenICT

Since its launch, the [IEEE GreenICT Initiative](#), hosted within the IEEE Communications Society, has organized and chaired expert panels and symposia at multiple IEEE events, and is currently planning its inaugural "[Greening through ICT Summit](#)" in October. As of January 2017, it created three working groups to develop nine new standards, which will be used to create a future definition of an IEEE "green label" certification. The initiative is developing a new partnership with [The Global e-Sustainability Initiative (GeSi)](#).

IEEE Cybersecurity

The [IEEE Cybersecurity Initiative](#) is fast becoming the go-to presence for security and privacy. From its interactive [Try-CybSI](#) platform, which provides cloud-based tools for practitioners and students to experiment with cybersecurity code and data, to its ambassador program, which brings expert speakers to student groups, non-security technical groups, and members of the public, the initiative is well on it way to enhancing our understanding of cybersecurity. The initiative is working to improve S&P designs and implementations by professionals.

IEEE Digital Senses

Having attracted more than 300 participants from over 200 companies and institutions worldwide, the IEEE Digital Senses Initiative is one of the largest (if not the largest) forces in the world dedicated to virtual reality/augmented reality. Under the initiative, 12 IEEE VR/AR standard working group projects are under development. The initiative is planning industry collaborations,

including a Digital Senses Centers for Excellence and applications in healthcare and education. It will co-organize a second International Digital Senses Conference and Expo, a Global Innovation Challenge for Immersive Technologies (co-organized with VR First), and the first issue of Digital Senses Technology Outlook, all by the end of 2017.

IEEE Software Defined Networks
The IEEE Software Defined Networks (SDN) Initiative has been leading IEEE efforts related to network softwarization and virtualization, taking into account technology aspects and the resulting socio-economic impact. In 2017, the initiative held the 3rd edition of its flagship conference, IEEE NetSoft, to address software-defined infrastructures and services. It also introduced a comprehensive Wiki catalog of SDN / Network Function Virtualization Toolkits and Testbeds to aid research in this area. IEEE SDN continues to increase awareness, understanding, and development of the SDN domain through development of upcoming e-learning modules, release of the IEEE Softwarization eNewsletter, and collaboration with the IEEE 5G Initiative on the 5G Roadmap.

IEEE Big Data
The IEEE Big Data Initiative continues to address the global community on the challenges of collecting, processing, and interpreting big data. The initiative recently conducted a successful symposium on data sciences, analytics, and technologies (DSAT) at IEEE COMPSAC 2017, which included an insightful panel session with subject matter experts on the convergence of big data and specific applications. IEEE Big Data also introduced IEEE DataPort, an online repository designed to store and provide access to big datasets. Further activities include the development of e-learning modules and collaboration with IEEE Standards Association on the development of big data related standards.

IEEE Environmental Engineering Initiative
The IEEE Environmental Engineering Initiative is creating an interdisciplinary forum for the community interested in the area of environmental engineering, including components in various societies and councils. The initiative is already participating in events, such as the IEEE Conference on Technologies for Sustainability (SusTech 2017) and Environmental, Energy, and Structural

Monitoring Systems Workshop (EESMS 2017), as technical co-sponsor. A vertical pilot within IEEE Environmental Engineering called "E-Waste" intends to create an interdisciplinary forum around the subject of electronic waste, and it will hold a workshop in December 2017 (date and location to be determined).

In addition to the current IEEE Future Directions Initiative reports, the following incubator reports for potential future initiatives were proposed to gauge interest and support from the IEEE Future Directions Committee.

IEEE Blockchain Initiative

This initiative plans to foster a community on Blockchain, a computing model that leverages secure transactions and consensus in distributed and decentralized computing networks. They intend to address the potential strengths, opportunities, and challenges of this disruptive technology and have already identified several IEEE societies and organizational units interested in this space. In October 2017, the initiative will host an open workshop featuring invited speakers and develop a white paper as a result (date and location to be determined).

IEEE Revolutionizing Communications Initiative

This initiative would have a goal to incubate the next revolutions in communications serving humanity, especially in under-served and under-developed communities, by sponsoring initiative summits and co-sponsoring workshops and conferences on related topics, with support from multiple IEEE societies, councils, and organizational units. It would outline a new communications paradigm with an associated IEEE roadmap.

First IEEE/Open Fog World Congress

The OpenFog Consortium and the IEEE have joined forces to launch the Fog World Congress (FWC) to foster industry-academia-government engagement through joint IEEE and OpenFog Consortium collaboration. The event will generate new IEEE standards on fog computing and networking.

For more information about IEEE Future Directions and our initiatives, please visit our web portal at ieee.org/futuredirections and contact us at ieee-fd@ieee.org.