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CONFERENCE REPORT

2019 Smart City Summit (SCS), Austin, TX, USA

By Fawzi Behmann, Summit Chair, USA; Director, IEEE ComSoc NA Region

We are pleased to report that a special 2019 IEEE full day summit was held November 1, in Austin at the Texas Advanced Computing Center (TACC). We had over 133 participants from different regions of the U.S. and other locations such as Italy, Namibia, and Africa. Remote connections were set up with Guadalajara, Mexico and Athens, Greece. There was a healthy mix of IEEE members (total 75) and non-members (58) in attendance.

One of the objectives of the summit is to attract new members. There were 30 ComSoc members of which 16 are new members. This brings Austin to be the second highest attracting new ComSoc members in 2019 in the content of ComSoc special services of membership development across multiple cities globally.

Over 60 companies and institutes were represented from cities/municipalities, the medical community, industry and startups, as well as multiple universities including professors, researchers and students. The theme of the summit was to examine the effect of disruptive technologies on potential innovative use cases for Smart Cities, Mobility and Healthcare. Disruptive technologies being considered include IoT, 5G, and analytics AI/ML/DL.

It was a full day program that started at 8 am and concluded by 6:30 pm. It had an opening segment followed by three keynote speakers, each followed by a deep dive session, followed by an executive round table discussion and then networking and showcase products and solutions.

Introduction and Welcome Segment

The opening of the summit was given by Fawzi Behmann, the Summit chair who spoke about the value proposition of the summit and differentiation being brought by IEEE-based events. He provided an outline of the program and invited the audience for engagement and leverage networking opportunities during breaks, lunch, and the product showcase and networking reception. This was followed by Stephen Elkins, CIO of the city of Austin, who welcomed the attendees on behalf of the city and the mayor and spoke about the challenge that Austin is facing. The summit host was Dr. Dan Stanzione, Executive Director of the TACC, a nationally recognized leader in high performance computing in the top five high performance systems in the world. Dan extended a warm welcome to TACC, highlighting the value of the institute, collaboration with IEEE and extended invitations to technical tours. The guest speaker from IEEE was Tom Coughlin, President of IEEE USA. He spoke on "Smart Cities and Public Policy" describing efforts by IEEE with collaboration from many societies working on Future Directions initiatives to develop the technology that enables the Internet of Things and powers Smart Cities.

Keynote Speakers and Panel Sessions

The first keynote speaker was Dr. Patricia Florissi, Vice President and Global CTO for Sales, Dell/EMC. She gave a talk on "Digital Cities: Ready or Not, Here They Come".

To many, AI still remains a research pilot or workload that only cloud-native companies, such as Netflix, can effectively execute. In reality, AI is becoming ever more pervasive and ever more mission critical. Take autonomous driving as the killer app of this decade, driving digital cities to become one of the next. In this talk, Florissi discussed several architectural patterns innate to the anatomy of AI-enabled, cloud-native digital cities. Following the first keynote was a deep panel session on "Smart Cities" delivered by five domain experts and a moderator and focused on advancement and disruptive technologies such as IoT, 5G, Analytics, Blockchain and security and their impact in building smart cities. The panelists provided a set of use cases and potential challenges.

The second keynote speaker was Mr. John Cole, Founder of SkyTran, who spoke about "Smart Infrastructure for Smart Cities". Elevated guideway transport networks like skyTran can serve as much more than a transportation system. They can be the infrastructure on which people, freight, power and data move with unprecedented efficiency and reliability. The second keynote was followed by a deep five-person panel session on "Mobility and Autonomous Vehicles" exploring the transformation from an Advanced Assisted Automated System (ADAS) to Full Autonomous Vehicles with AI/ML for mobility and last mile.

Dr. David Atienza, associate professor of electrical and computer engineering and head of the Embedded Systems Laboratory at EPFL, Switzerland, delivered the third keynote. He spoke about "Ultra-Low Power Wearables Systems: The Quest for Brain Efficiency". Smart wearable devices are poised as the next frontier of innovation in the context of Internet-of-Things (IoT)

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Executive Recap session (Left to right): David Atienza, Adam Drobot, Rebecca Hammons, Stephen Elkins, Stan McClellan, Joel Myers and Fawzi Behmann.

CONFERENCE REPORT

Virtual 2nd 6G Wireless Summit 2020

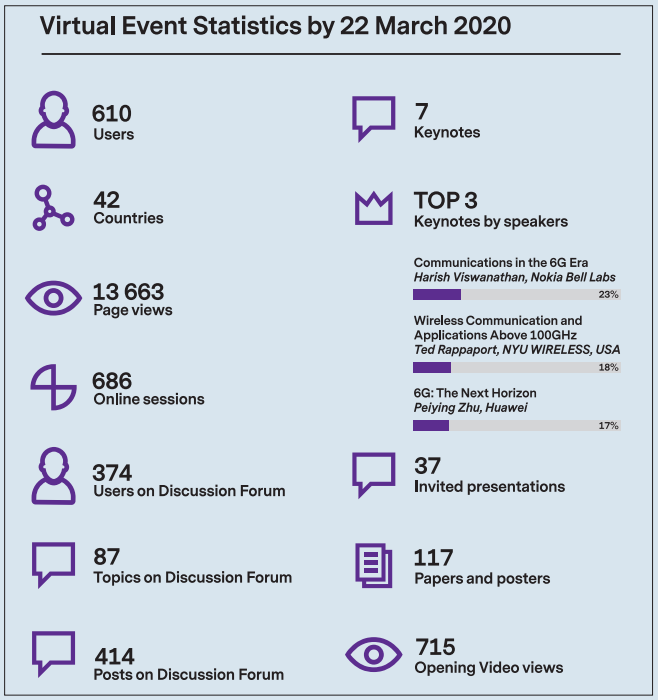
By Nandana Rajatheva, Hanna Saarela, and Nurul Huda Mahmood, Centre for Wireless Communications and 6G Flagship Program, University of Oulu, Finland

As the World Health Organization (WHO) declared COVID-19 a pandemic and the world began to go into lockdown, the organizers of the 2nd 6G Wireless Summit 2020 decided to transform the leading global 6G event into a virtual one. The organizing team at the Finnish 6G Flagship program concluded that the sharing of 6G visions, research results and challenges could be realized virtually. 6G Flagship is a vigorous research and co-creation ecosystem led by the University of Oulu, which explores essential technology components and solutions needed for the 2030 era in the interrelated domains of wireless connectivity, device and circuit technologies, distributed intelligent computing, and novel applications and services.

Until now, very few major events organized with technical support of the IEEE and ComSoc have taken place online. However, feedback received by the 6G Flagship underlines the team's landmark achievement leading the world toward other similar events realized virtually.

The virtual 6G Wireless Summit was launched in the morning of 17 March 2020, as originally planned for the physical event. A seven-member team including students, technical staff and technical program leaders had only two working days and a weekend to invent online collaboration methods and create a solid platform in conjunction with the event website at 6gsummit.com as there was no time to find another tool.

Attending the virtual 6G Wireless Summit, the 610 experts from 42 countries could stay safe in their homes or offices while having online access to 161 presentations. The virtual event demonstrated major progress since the first 6G Wireless Summit 2019, which was attended by 287 experts from 28 countries. The presentations of this year's edition included: seven keynotes; 37 invited presentations including 20 recorded videos and 10 slide presentations with audio; 75 technical papers including 29 recorded videos and 45 slide presentations with audio; and 42 posters. At the same time, the presented papers gained a wide global audience before publication in IEEE Xplore. All accepted papers underwent rigorous peer review after submission to an open call.



Event statistics by March 22nd, 2020.

In the virtual 2nd 6G Wireless Summit 2020, industry representatives expressed their views on synchronizing 6G development with upcoming World Radiocommunication Conferences (WRC). The role of imaging and sensing, as integrated functions in 6G networks, was highlighted in several somewhat aligned visions of 6G systems toward 2030 with the Internet of Senses, or a similar entity, reshaping human-machine interaction. Experts also suggested possible 6G indicators that would not only measure the performance of future 6G systems but also assess novel societal and value-related aspects such as trust, open collaboration, flexibility and underserved areas. Value creation through new business models and private networks was also highlighted. Another major advancement was the political momentum behind 6G development expressed by the invited speaker from the European Commission. Major investments will be made in the new Horizon Europe program for 2021-2027 to prepare for 6G while technology development should take into account carbon neutrality by 2050 as proposed by the European Commission.

Welcome webpage for the registered attendees.

The technical program of the 6G Wireless Summit was divided into 22 sessions or thematic areas for presentations of accepted papers and a poster session, discussing key research areas toward 6G. Thematically, the papers can be broadly categorized into 6G visions, RF and hardware enablers for higher frequencies from millimeter wave (mmWave) to THz and even visible light communication (VLC), machine learning and artificial intelligence (AI) and novel networking paradigms.

While the keynotes discussed visions for 6G, several technical sessions delved into the same from technology and policy perspectives. Several papers also targeted specific verticals such as eHealth, automotive applications and general machine type communication, which started in 5G, and will evolve with more features for 6G.

There was also a dedicated session on global connectivity taking into account

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CHAPTER REPORT

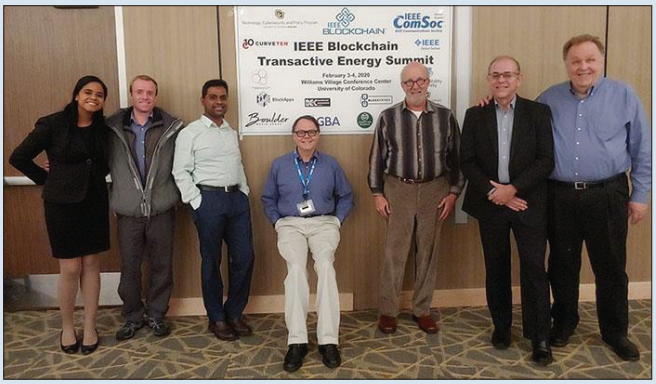
Workshop on Blockchain and Transactive Energy in Boulder, CO, USA

By Jason Rupe, IEEE Denver Section Chair, and Tim Weil, IEEE ComSoc Chapter Chair, USA

On February 3-4, 2020 the Denver IEEE Section and local ComSoc chapter partnered with IEEE's Blockchain Initiative to host a program on the use of blockchain distributed ledger technologies (DLT) in the transactive energy sector. The workshop was hosted by the University of Colorado at the Williams Conference Center in Boulder. The workshop was a coordinated effort by the Denver section, in partnership with our IEEE ComSoc chapter, several local companies, and three universities. Despite a heavy snowstorm we still presented a full program over the two days, with about 60 attendees on the first day, and over 30 the second.

Transactive energy (TE) will be an important technology enabler that will change today's utility business models toward the utility of the future. TE will also affect future energy markets, driven by new technologies, such as energy automation, distributed solar photovoltaic, distributed energy storage systems (DESS), smart metering, distributed energy resources (DER), and so one. However, current TE models lack the "trusted transactive layer" needed to implement new energy market dynamics capabilities. In this context, the presentations covered the full gamut of issues pertaining to transactive energy and distributed ledger technologies. The IEEE was also able to present their standards work and research in Colorado in the above areas.

The workshop covered many interesting topics. They included economic, public policy, new business models, legal challenges, research in microgrids and transactive energy, and supply-demand leveling, cybersecurity issues, controls, smart systems, and the IoT. Also, it presented real projects underway



The Blockchain for Transactive Energy Workshop Organizing Committee.

at utilities and municipalities. The participating companies and partners list included:

- IEEE Affiliates: Blockchain Initiative, Future Directions, ComSoc Denver Section.
- Universities: CU-Boulder, University of Denver, Colorado State (Fort Collins) and Carnegie Mellon University).
- Energy Sector: National Renewable Energy Labs, NREL, U.S. Department of Energy, Xcel Energy, Duke Energy.
- Blockchain Industry Companies: BlockApps, Pinnacle, EnLedger, BlockFrame, Global Blockchain Alliance.

After a full day and a half of presentations, breakout sessions began. The attendees selected important topics that emerged during the presentations. Then they broke into individual groups to discuss areas and generated ideas of what the community should do in that area. Furthermore, a number of important topics were discussed during breaks, in ad hoc fashion. They included topics such as what the next steps for this group in the Denver-Boulder area will be. While there was a wealth of topics discussed, most of the discussions were focused on important areas, and well-treated topics were only cursorily examined.

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CHAPTER REPORT

IEEE Leadership Summit Webinar: Engineering in COVID-19

"When the most important technology is teamwork" Organized by IEEE Indonesia Section, IEEE Region 10 and IEEE Singapore office

By Ewell Tan, Project Manager, IEEE Asia-Pacific Operations Office, Singapore

The global pandemic of COVID-19 has impacted our lives significantly. As we weather the global health crisis together, many of us are adapting ourselves, coping with strategies and developing new ways to combat this pandemic. Engineers, researchers, innovators and businesses from various sectors are also working on leveraging technology to alleviate the effects of these unprecedented challenges.

The advancement of technology and digital communication play a vital role in the current situation where most people have to work from home and students are required to continue their studies through online platforms. With this new model of digitalization in many sectors, the IEEE Indonesia Section took this opportunity to organize a webinar series on the IEEE Leadership Summit: Engineering in COVID-19, collaboratively with IEEE Region 10 and the IEEE Singapore office (a.k.a IEEE Asia-Pacific office). The first webinar was conducted on 2 May 2020 to mark Indonesia National Education Day, with the theme "When the most important technology is teamwork."

IEEE Indonesia Section Chair, Prof. Wisnu Jatmiko, and IEEE Region 10 Director, Prof. Akinori Nishihara, delivered welcome remarks and applauded the success of this webinar with 237 attendees. To grace the event, Prof. Bambang Brodjonegoro, the Indonesia Minister of Research and Technology, National Research and Innovation Agency, gave a keynote speech and shared his perspectives on the importance of creating new opportunities, new jobs and new initiatives collaboratively while we fight against this global health crisis. This pandemic is a wake-up call to all sectors; only through collaborative efforts. governments, industry, academia, researchers, scientists, and engineers can fight through this together.

IEEE Indonesia Section Industry Relations Chair, Agnes Irwanti, presented an overview of activity report of this webinar series. Prominent speakers included IEEE Region 10 Director-Elect, Mr. Deepak Mathur; IEEE R10 Industry Relations Committee Chair, Dr. Chris Lee; Arief H. Gunawan from Telkom Indonesia; Dr. Patrick Liew, the Chairman of GEX Ventures Pte. Ltd.; Dr. Denny Setiawan from the Indonesia Ministry of Information and Communication. The apeakers presented their insightful perspectives on how the technologies, digitalization, engineering and innovation play a part collaboratively to face these global challenges.

After the presentations, Mr. Kuncoro Wastuwibowo from Telkom Indonesia and Dr. Ford Lumban Gaol, the Chapter Chair of IEEE Indonesia Computer Society, chaired the open discussion session.

The webinar was successfully concluded with a closing remark by Mr. Satriyo Dharmanto from PT. Multikom Global – Indonesia and by Mr. Kuncoro Wastuwibowo. Through teamwork, we all shall overcome our common enemy together.

SMART CITY SUMMIT/*Continued from page 1*

to be able to provide personalized healthcare by also interacting with everyday objects. This new family of smart wearable devices provides a great opportunity for the next-generation of artificial intelligence (AI) based medical devices. However, major challenges remain in achieving this potential due to the inherent resource-constrained nature of wearable systems, coupled with their (in principle) limited computing power and data gathering requirements for Big Data medical applications, which can result in degraded and unreliable behavior and short lifetime. This new trend of smarter wearable architectures will need to combine new ULP multi-core embedded systems with neural network accelerators, as well as including energy-scalable software layers to monitor medical pathologies by event-driven monitoring. This was followed by a five-person deep panel session on Healthcare. The focus was to explore the transformation to smart health and wellness, diagnosis, treatment and prevention, smart hospitals/tele-health/telemedicine and personalization.

The three keynote speakers were outstanding and the three panel sessions brought the best from domain experts in the areas of mobility, healthcare and smart cities.

The executive panel recap session covered technology and the impact on key use cases, describe the rational pushing of autonomous vehicles vs. personalized healthcare, and which areas need to be addressed in future events.

As commented by many, the summit was a great success and was of high quality reflecting the commitment, dedication and sacrifice by many. The event included a host of talented and skillful speakers, exhibitors, an organizing committee and advisory committee, and host of dedicated volunteers.

6G WIRELESS SUMMIT/*Continued from page 2*

United Nations' Sustainable Development Goals, which is further discussed in one of the 12 6G white paper groups currently led by 6G Flagship experts.

In the research area of higher frequencies from mmwave going into sub THz, the papers discussed implementation issues at the RF level for the solutions proposed, and challenges and a technology roadmap toward higher frequencies. On the adaptation of AI and machine learning for wireless, there were several dedicated sessions. On the networking side, on the other hand, relatively novel areas such as intelligent reflecting systems (IRS) and changes in networking bringing toward more user centric approaches were discussed. In this regard, security, block chain and edge networking for dependable communication were also highlighted in several presentations.

The poster session, which featured 42 extended abstracts, had almost the same coverage as the technical papers albeit with only brief details. Posters also provided ample evidence to new technology directions.

The timeliness of the topics was evident in the discussion forums, created for all 161 conference presentations and for general themes, where experts wrote as many as 414 posts in 87 topics in just six days, by 22 March. The live Q&As by all seven keynote speakers were the highlight of the discussion forum, defying the limitations of time zones, and providing the attendees an opportunity for direct interaction with leading experts.

Patrons of the 6G Wireless Summit – Ericsson, Huawei, ZTE, Keysight Technologies, Nokia Bell Labs, Rohde&Schwarz, Virginia Diodes, InterDigital and Wipro – were all active in different program roles, contributing to keynotes, invited talks as well as Q&A sessions.

Sharpening both 6G research visions and introducing intriguing research and development paths, the event achieved its goal. Although the virtual space at 6gsummit.com/virtual-event could hardly compete with the winter wonderland in Levi, Finland, it came with other benefits. Attendees could focus on their specific topics of interest while the pre-recorded video presentations provided deeper insights than mere slides and papers in Proceedings ever could. In addition, the online forum gave even the most silent attendees a voice and supported a more elaborate exchange of ideas in comparison with speedy Q&As in regular conference sessions.

Now, organizers have openly published all keynote presentation videos at 6gsummit.com. Work on essential 6G research topics is pushed forward in twelve 6G white papers to appear in June 2020. The 3rd 6G Wireless Summit will be held in conjunction with IEEE PIMRC 2021 on 13–16 September 2021 in Helsinki, Finland. See you all there!

WORKSHOP ON BLOCKCHAIN/*Continued from page 3*

For example, one breakout session discussed the cybersecurity aspects of blockchain in transactive energy applications. This group discussed several issues in this space and concluded with an action item to review a set of papers that came out of a task force that addressed this topic. This was typical of the activities during this workshop and led to many new ideas within this space.

In the end, this workshop advanced even more actions, beyond what the groups identified. Going forward, the IEEE blockchain initiative is developing several projects in the transactive energy sector, including standards work, reference architectures, and possibly conformity assessment.

One effort we believe will be needed is a reference deployment of the evolved architecture. The first of these may be in Colorado as a result of this workshop. We also identified several contributors to the education content we are cultivating as well. Also, several attendees expressed concerns around privacy in this space, and privacy will be a focus area for the initiative going forward, so we now have more experts interested in working with us. Watch blockchain.ieee.org for presentations and video content from the event.

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