 *(continued from page 188)*

skepticism and is very much on the way, and fast.

The current rush for low-hanging fruits that are ripe for ML will eventually slow. When it does, a general consensus of where—and for what purpose—the data-driven ML techniques are appropriate will emerge. Already, and even more so at that stage, it is and will be important to innovate in the space between the established communication system models with provably optimal solutions and purely data-driven methods. One advantage of the SPCOM area is that well-developed models exist based on the physics of electromagnetic propagation. Our research community has historically invested significant efforts to refine stochastic channel models and develop software packages for simulating the full communication chain, including the more complex ray-tracing simulators of the wireless environment. Yet, we are all keenly aware that all models have their limitations; thus an interesting future direction will be to make use of these models in conjunction with the data-driven approaches, not only for the testing and evaluation of proposed solutions but also for data generation.

The SPCOM-TC very much welcomes SPS members from diverse backgrounds to participate in our technical activities. In particular, research within many signal processing research communities has been accelerated by the creation of open and easily accessible software tools. The SPCOM community could be similarly helped by common and open simulators of complex communication systems, with a number of predefined scenarios that make it easy to get research started and allow for ready comparisons of competing solutions. While this need has existed previously, it will be exacerbated by the proliferation of data-driven approaches. It will also be necessary to raise the scientific quality of such works, in particular when it comes to reproducibility.

We invite SPS members to get involved by signing up as affiliated members of SPCOM-TC from the SPS website (https://signalprocessingsociety.org/get-involved/signal-processing-communications-and-networking). The TC membership election takes place in October every year. We sincerely hope to continue this discussion on the future technical directions of our TC with many of you in an intellectually stimulating environment at our annual workshop SPAWC or at the next IEEE International Conference on Acoustics, Speech, and Signal Processing.

## Authors

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# Highlights from the Sensor Array and Multichannel Technical Committee

*Spotlight on the IEEE Signal Processing Society Technical Committees*

The IEEE Signal Processing Society Sensor Array and Multichannel Technical Committee (SAM TC) promotes activities within the technical areas of sensor array processing and multichannel statistical signal processing, including

- beamforming
- direction-of-arrival estimation
- source localization
- multiple-input multiple-output (MIMO) systems
- compressed sensing
- sparse modeling
- tensor-based signal processing
- deep neural networks
- machine learning for sensor arrays
- signal processing for sensor networks
- network beamforming
- blind source separation
- channel identification
- array processing for radar, sonar, communications, microphone arrays, and biomedical applications.

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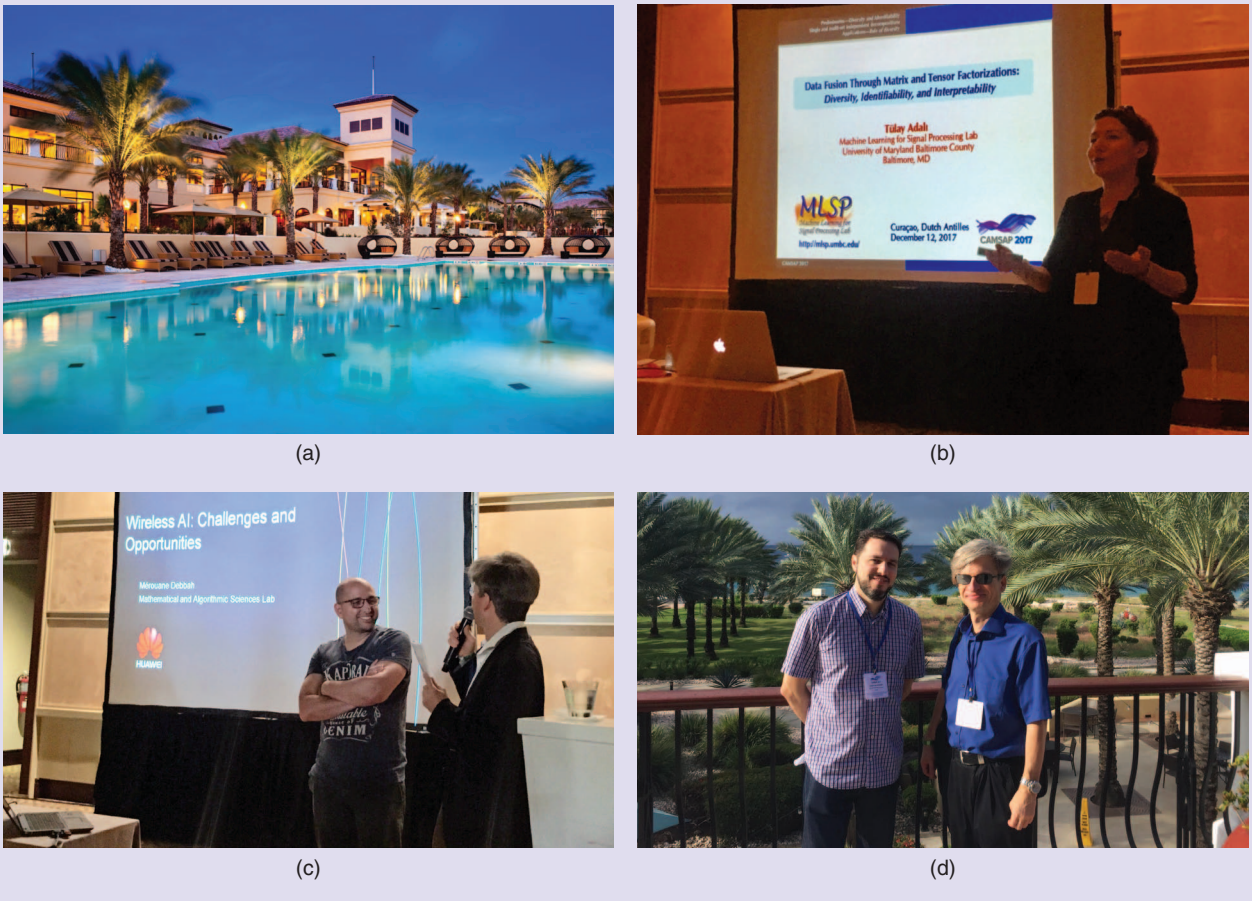
**Table 1. Statistics of recent CAMSAP workshops (regular and special session papers).**

| Year | Location | Number of Accepted Papers | Attendance |
|---|---|---|---|
| 2009 | Aruba, Dutch Antilles | 103 | 114 |
| 2011 | San Juan, Puerto Rico | 133 | 124 |
| 2013 | Saint Martin, French Antilles | 125 | 140 |
| 2015 | Cancun, Mexico | 136 | 142 |
| 2017 | Curaçao, Dutch Antilles | 168 | 196 |

Our biannual IEEE International Workshop on Computational Advances in Multisensor Adaptive Processing (CAMSAP) has been organized in December every odd-numbered year since 2005. The statistics of recent editions are summarized in Table 1. The seventh edition was held 10–13 December 2017 at the Santa Barbara Beach and Golf Resort, Curaçao, Dutch Antilles (https://signalprocessingsociety.org/CAMSAP2017/). After Josef A. Nossek and Georgios B. Giannakis delivered instructive tutorials on 10 December, we had six exciting plenary presentations (given by Yonina C. Eldar, Daniel P. Palomar, Antonio Ortega, Tülay Adalı, Nikos Sidiropoulos, and our plenary speaker from industry Mérouane Debbah), 19 special invited sessions, and ten regular sessions. As indicated in Table 1, CAMSAP 2017 received the highest number of submissions thus far and attracted a record number of attendees—38% of whom were student participants. Some photos from the workshop are shown in Figure 1. An IEEE SPS questionnaire was distributed to all participants to evaluate how satisfied they were with the workshop. The results were extremely positive. CAMSAP 2019 will be held in December in Guadeloupe, French West Indies.

The Tenth IEEE Sensor Array and Multichannel Signal Processing (SAM) Workshop took place 8–11 July 2018 in Sheffield, United Kingdom (http://www.sam2018.group.shef.ac.uk/). SAM is a biannual series of workshops that takes place midyear of even-numbered years. The ninth edition occurred 10–13 July 2016 in Rio de Janeiro, Brazil, about a month before the 2016 Summer Olympic Games. This ideal timing ensured




(a) (b) (c) (d)

**FIGURE 1.** Impressions from CAMSAP 2017 in Curaçao, Dutch Antilles. (a) The conference venue, the Santa Barbara Beach and Golf Resort Curaçao. (b) The plenary presentation by Tülay Adalı. (c) Mérouane Debbah answers questions after his plenary presentation. (d) (From left) General chairs of CAMSAP 2017 André de Almeida and Martin Haardt.

that plenty of cultural activities and festivities (in addition to the excellent scientific highlights) made SAM 2016 a memorable experience. The statistics of the last five editions of SAM are summarized in Table 2. SAM 2016 received a record number of submissions and the highest number of attendees. Two very attractive proposals (from China and Mexico) for the 11th SAM Workshop in 2020 were presented at the recent SAM TC meeting in Calgary, Canada. For the first time in its history, the SAM workshop will be organized in Asia, in Hangzhou, China, 8–11 June 2020 (http://www.isee.zju.edu.cn/sam2020/).

Recent joint activities of the SAM TC and the SPS Audio and Acoustic Signal Processing TC include a joint special session, "Speaker Localization in Dynamic Real-Life Environments," at the 2017 International Conference on Acoustics, Speech, and Signal Processing (ICASSP) and a special issue in *IEEE Journal of Selected Topics in Signal Processing* on acoustic source localization and tracking in dynamic real-life scenes.

In addition to our regular lecture and poster sessions, we also organized a panel discussion, "An Industry Perspective on Emerging Signal Processing Challenges," at ICASSP 2018 that will be summarized in a future issue of *IEEE Signal Processing Magazine*.

Hot topics within the technical fields of sensor array processing and multichannel statistical signal processing include sensor fusion, machine learning, tensor-based processing for multidimensional data, sensor data integrity, and security. New challenges are posed by upcoming applications in the power grid, mobility of people and goods, and massive multichannel signal processing as they appear in biomedical applications and fifth-generation wireless connectivity. This is a fast-moving arena with ample opportunities.

If you are interested in the activities of the SAM TC, please register as an affiliate member on our webpage (https://signalprocessingsociety.org/get-involved/sensor-array-and-multichannel).

**Table 2. Statistics of recent SAM workshops (regular and special session papers).**

| Year | Location | Number of Accepted Papers | Attendance |
|---|---|---|---|
| 2008 | Darmstadt, Germany | 118 | 124 |
| 2010 | Kibbutz Ma'ale Hahamisha, Israel | 68 | 80 |
| 2012 | Hoboken, New Jersey, United States | 136 | 171 |
| 2014 | A Coruña, Spain | 134 | 161 |
| 2016 | Rio de Janeiro, Brazil | 156 | 215 |

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