

Sensor Array and Multichannel Technical Committee (SAM TC)

<http://signalprocessingsociety.org/get-involved/sensor-array-and-multichannel>

Major Technical Interests of the SAM TC (1)

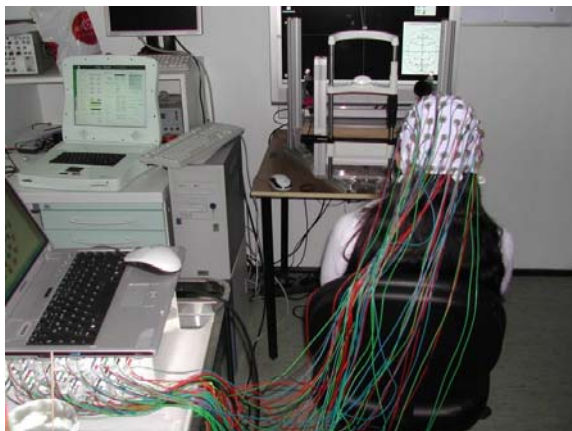
- Beamforming and space-time adaptive processing
- Direction of arrival estimation and source localization
- Multi-antenna communications
- MIMO systems and space-time coding
- Signal processing for sensor networks and network beamforming
- Array calibration
- Geophysical and seismic signal processing
- Remote sensing of the environment
- Radar and sonar
- Target tracking and estimation for networked sensor systems

Major Technical Interests of the SAM TC (2)

- Non-wave based array processing
- Synthetic aperture techniques
- Waveform diverse sensors and systems
- Multi-channel imaging
- Blind source separation and channel identification
- Intelligent multi-sensor/multi-channel systems and knowledge-based signal processing

Main Application Areas of the SAM TC

- Array signal processing for
 - radar
 - sonar
 - communications
 - microphone arrays
 - biomedical applications
 - radio astronomy
 - Internet of Things (IoTs), in which different sensors are collecting multi-modal data



Predominant Methodologies and Techniques used by the SAM TC

- Computational and optimization techniques for multi-sensor processing
- Multi-channel processing, estimation, and source detection
- Statistical modeling for sensor arrays
- Compressed sensing and sparse modeling
- Tensor-based signal processing
- Performance measures and bounds
- Channel characterization and modeling

Moving the Topics of the SAM TC to Real-World Applications (1)

■ State-of-the-Art

- High-resolution direction of arrival and beamforming methods approach theoretical limits
- Additional tools include compressive sensing, tensor signal processing, distributed computation over networks
- Internet of Things (IoT)
 - the sensors are having their data processed in a centralized fashion
 - there is no effort to jointly exploit this data in the sense of fusion, etc.

Moving the Topics of the SAM TC to Real-World Applications (2)

■ Challenges

- Computational issues exist, for example, as applied to massive MIMO systems and MIMO radar, where the problem scale is large
- SAM techniques must be shaped to non-traditional application areas such as graphical signal processing and social networks
- Internet of Things (IoT)
 - How to fuse data from multiple IoT devices for better inference
 - How to reduce communication of data to a centralized server to avoid congestion, privacy risks, etc.

■ Visions

- Stronger interaction with AASP-TC for microphone arrays
- Array signal processing applied to massive MIMO communications
- Major stakeholder in network signal processing applied to big data, social networks, and graphs
- Internet of Things (IoT)
 - Ongoing research in tensor data can be used for processing of multimodal data
 - Ongoing research in networks has the potential to change the way IoT devices would process their data.