Signal Processing and Computing for Communications (SPCC) TC
Student Challenge and Video Contest

The IEEE Signal Processing and Computing for Communications (SPCC) technical committee (TC) calls for participation in a contest for student teams that involves:
- innovative ideas and proposals to provide an answer to a technical challenge, to be chosen from a set of possible proposed ones
- and the preparation of video to present the proposal.

A jury of the IEEE SPCC TC will select the set of finalist teams and the winner team of the contest.
The SPCC challenge is complemented with the organization of an online workshop where the finalists present their proposals and an in-person event at IEEE Globecom 2024, where one student of the winning team will be invited to attend.

1. Technical challenges

The following technical challenges for the contest are proposed as a set of questions, all related to the application of signal processing and computing to communications.

Question 1: What waveform would you suggest for 6G?
Question 2: How can you overcome unique propagation challenges, such as atmospheric absorption and scattering, at terahertz frequencies in wireless communication systems?
Question 3: Do you think faster-than-Nyquist signaling will be a part of the standards in the future?
Question 4: Towards a greener and more energy efficient network, reconfigurable intelligent surfaces (RISs) are envisaged to be a promising 6G technology. Please identify one major challenge introduced to cellular networks in terms of signal processing after deploying RISs, and provide possible solutions.
Question 5: How can you use physical layer security techniques to address the security challenges in 6G?
Question 6: What multiple access (MA) techniques do you believe are candidates for next-generation wireless networks? Could you provide some typical or promising use cases for these MA techniques?
Question 7: Given the success of generative artificial intelligence (GAI), do you anticipate it becoming an enabling technique for next-generation wireless networks?
Question 8: How do you think that signal processing in next generation networks will be conditioned by AI?
Question 9: Do you think that analog processing can play a role in signal processing for future communication systems?
Question 10: What type of integration between RF and optical communications can you envisage in future communication systems?

2. Who can participate?

Teams of students where at least one of them is a member of SPCC TC are invited to prepare and submit a video with their ideas regarding one of the above challenges.
Membership to the IEEE Signal Processing and Computing for Communications (SPCC) Technical Committee is open to all members of the IEEE Communications Society (ComSoc) who share an interest in signal processing in communications.
If you are an IEEE ComSoc member, to join the SPCC you simply subscribe to the SPCC mailing list. The instructions may be found here:

https://spcc.committees.comsoc.org/join-us/
More information about the SPCC TC may be found here:
https://spcc.committees.comsoc.org/

3. How to participate?

Please submit your information and video through the following online form:
https://form.jotform.com/241426052378253

4. Online workshop

A committee will select a set of finalist teams. They will be invited to present their ideas in an online workshop, in which some talks from relevant researchers in the field will be also presented together with a panel discussion.

5. Judges and criteria

The committee is made of the following SPCC TC and SIG officers:

- Ana Garcia Armada
- Yuanwei Liu
- Fang Fang
- Rui Dinis
- Melda Yuksel
- Xidong Mu

Based on the videos and the presentations at the online workshop, the committee will decide a winner. The judging criteria are the following:

- Novelty and interest of the proposed ideas
- Engagement and communication skills
- The effectiveness of the way to achieve the results

6. Prizes

The winning team receives a certificate from the SPCC TC.
One member of the winning team is invited to present their ideas at the SPCC TC meeting at IEEE Globecom 2024. The expenses are reimbursed up to 3,000 USD.

7. Timeline

15 Jun 2024: call for video content proposals opens
15 Sep 2024: call for video content proposals closes
30 Sep 2024: finalists are announced and invited to prepare for online workshop
Oct-Nov 2024: online workshop, date to be determined based on availability of speakers
8-12 Dec 2024: SPCC TC event at IEEE Globecom with presentation of the winning team and award.

The contest is subject to the IEEE official rules that can be found here:
https://spcc.committees.comsoc.org/files/2024/05/Contest-Rules-IEEE-SPCC.pdf