

IEEE Signal Processing Society Flagship Conferences Over the Past 10 Years



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Throughout the IEEE Signal Processing Society's (SPS's) history, conferences have functioned as a main way to connect within the Society, bringing together the signal processing research community to discuss and debate, establish research collaborations, and have a good time. These immersive conference experiences, to which attendees travel from all over the world to be together for a set period of time, have certainly been challenged over these past years, but SPS leadership was able to guide and steer through the constant unanticipated changes, with continued financial stability and growing momentum for a more inclusive future. This article gives an overview of the evolution of SPS conferences in the past decade and presents the challenges ahead.

Introduction

SPS conferences are overseen by the vice president (VP) for conferences, who chairs the SPS Conferences Board and serves on the IEEE Board of Governors for a three-year term. The VP for conferences has the direct overall responsibilities for the development, design, operation, and improvement of the Society's conferences and workshops and their proceedings. Under the direction and guidance of the VP for conferences, throughout the years, all the SPS conferences and workshops have remained adaptive, flexible, and aimed at consistent improvement of the member and customer experience.

The two flagship conferences of the SPS are ICASSP and ICIP. An open call for proposals is held for each of these conferences annually, and members of the Society formulate a complete plan for the location, organizing committee, timeline, and innovations for the conference for review and selection by the SPS Conferences Board. For many volunteer conference organizers for ICASSP and ICIP, this is a five-plus year commitment. The SPS conference organizers have consistently shown their ability to be innovative in terms of new engaging programming and event formats, being versatile and proactive and able to lead an immense operation to

execute these conferences flawlessly throughout the years. The relationship between the conference organizers and the VP for conferences and SPS Conferences Board is a critical element to the success of the Society throughout the years, and none of the innovations highlighted in the following would have been possible without the effort of the conference organizers.

Due to the joint efforts of the SPS Conferences Board and the conference organizers, ICASSP and ICIP have been trending toward growth in terms of the number of papers submitted and attendees and the amount of content being offered throughout this period.

Throughout time, with the onboarding of each new VP for conferences, new ideas and priorities are infused into the SPS flagship conferences, but there are many consistent goals and efforts: 1) focusing on creating an equitable and inclusive Society by removing financial and access barriers and providing additional opportunities to engage as well as by adhering to a statement on diversity and inclusion, 2) maintaining the high quality of the technical content and presentations, 3) providing excellent opportunities for networking and idea exchanges, 4) streamlining operational tasks and offering transparent and supportive guidance to the conference organizers, and 5) leveraging metrics and data for decision making by the Society leadership.

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Evolution in the past decade

From 2015 to 2017: Growing competition from other conference models

In the period from 2015 to 2017, the major goals to be pursued were related to the search for a dynamic equilibrium in a changing world. On one hand, the tradition of the SPS with respect to quality and scope in flagship and Technical Committee (TC) workshops and conferences was consolidated. On the other hand, it was perceived that it was necessary to explore new scientific communication forms and ways to eliminate possible barriers to make possible the involvement of larger communities, such as students and industrial people. The Society, in that period, felt and tried to react to the growing competition from other conference models over the previous several years. At the same time, the SPS was confident that its members had strong scientific content that was used to communicate according to certain well-assessed modalities. For example, research works that were more consolidated typically targeted journal publications, while initial and limited works with promising results and interesting ideas were typically targeted for the conference format. All papers followed a careful and serious review process.

However, there may have been a gap in successfully reaching larger audiences, including the corporate and industry audience, that was avoided by other conferences

using alternative models. Examples that were often cited at that time were other conferences in computer vision and deep learning, which took advantage of the explosion of machine learning with deep learning and convolutional networks to grow considerably. In that case, submitted conference papers were subject to more severe selection and review, resulting in conference papers that were often more cited and more impactful than journal papers. Such conferences achieved large industrial participation, appearing to be more selective despite parallel workshops being created to collect papers in a less selective modality and keeping

the number of active people participating in the conferences high. The SPS made the decision to remain more open and inclusive for its members, with a lower rejection rate of around 55%. With this in mind, the SPS focused on being a top choice, offering highly attractive conference modalities for the community to show its research work. Many discussions and some experiments took place to see how new models of conferences could be

explored and which modifications to flagship ones could be defined. Some directions were continued from previous years, some lines within existing conferences were potentiated, and some experiments were evaluated and discontinued, such as the IEEE Global Conference on Signal and Information Processing (GlobalSip), a flagship conference originally introduced to increase industrial attraction within the SPS. Summing up, the attempt to modernize the conference offerings of the Society followed two main lines: 1) proposals of new services within existing conferences and 2) attempts to introduce new conferences.

New services in existing conferences

Strong cooperation in this direction was in place with the SPS Membership Board, as many of the ideas that were explored came from the objective to introduce new services for members. In addition to membership, the citation index became, in this period, a central issue for SPS conferences, as a matter related to the attractiveness and impact of research works and, consequently, to the careers of researchers in the field presenting their work.

During this period, many new services were introduced. Among them was the SPS Signal Processing Repository (SigPort) platform, which made available the ability for authors to upload and share complementary materials to their papers and share with members and attendees. This was first tried at the GlobalSip conference, where slides and posters were made available to attendees. SigPort is still available today as a repository for SPS members and for supplemental conference materials.

Open Preview was also trialed at ICIP 2016 as a first-time offering within IEEE. This new service allowed for the possibility to speed up the citation of conference papers by publishing the preconference final papers in

IEEE *Xplore* as open access for the one-month period before the conference for anyone who visited IEEE *Xplore*. Following the results of the ICIP 2016 trial, this program is now a standard for ICIP, ICASSP, and other SPS conferences and workshops as well as other conferences within IEEE (see Figure 1).

Within this period, new criteria were designed to allow papers recently published in SPS journals to be presented during flagship conferences and TC workshop sessions, increasing the visibility of these papers and allowing authors to collect in-person feedback at conferences. At the same time, the consolidation of procedures allowing the management of events, such as the IEEE Signal Processing Cup, was begun to favor the involvement of younger active members, including students, in conferences.

The necessity of finding ways to actively attract and involve more industrial members was also a central point. A subcommittee was created to discuss which forms for industrial participation could be put in place to promote initiatives and activity, such as dedicated sessions and simplified review modalities for papers not to be published on IEEE *Xplore* but using SigPort. At that time, social media was not yet at full development despite having had a considerable advance in the previous 10 years. For example, the difference between the tools to manage the conference program for ICIP, in Genova, Italy, in 2005 and the one used in this period was a big jump. Review processes as well as tools for assessing conference programs were made

different, allowing organizers to concentrate on more specific aspects by relying on a more robust and spread digitalization. However, in the period under description, connectivity problems were not unusual at conferences, and while the progressive elimination of many hard materials (only the elders remember the weight of ICASSP and ICIP proceedings to be carried back to the lab on behalf of supervisors ...) in favor of digital counterparts progressively made easier the life of attendees, some transition issues were to be considered, implying the coexistence of hard and soft materials. This required much work in the SPS Conferences Board to determine and discuss initial guidelines that were updated progressively to help conference organizers in their job. Through the improvement of a continuous relationship with conference organizers along with the presentation of proposals, the selection, realization, and postconference closure procedures were continuously performed to keep the process under control. IEEE staff had a central role in that, especially in all administrative aspects. Also, communication related to technical aspects was considered to be improved. The SPS Conferences Board introduced, at that time, the liaison member for each flagship conference to try to guarantee better communication among the central boards and the conference committees. The participation in joint meetings with the TCs Board took advantage of liaison members to better synchronize the essential role of TCs in review processes with technical chairs of conference committees.

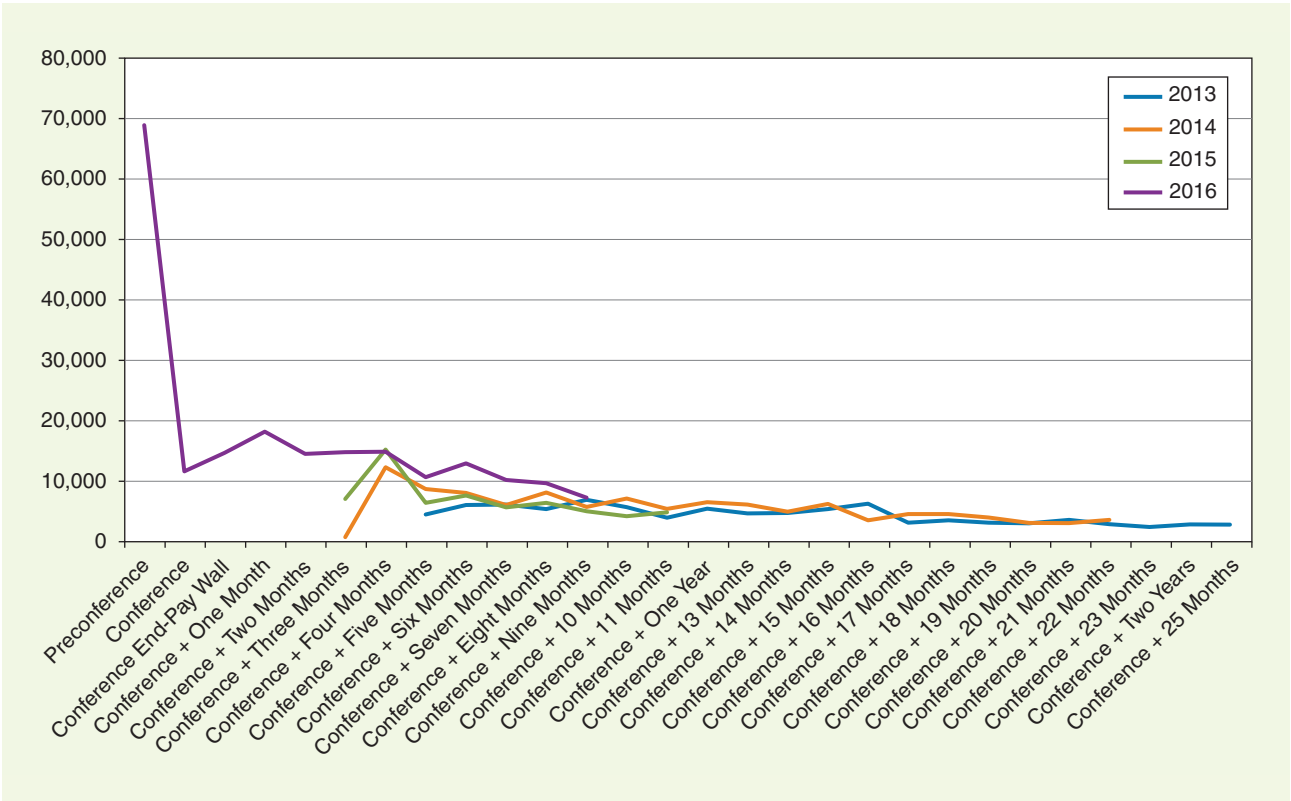


FIGURE 1. The total downloads from IEEE *Xplore* through time, using the conference itself as reference moment, including both PDF and HTML downloads.

New conferences

A second major point was related to defining a policy about new conferences. Together with the issue of maintaining high quality, budget issues also had to be considered. On the one hand, the income streams from conferences had to be kept limited so as not to increase too much the cost for organizers and attendees. On the other hand, conferences were becoming an important source for guaranteeing the capability of the Society to put new services in place. A good tradeoff could be reached only if the Society could identify new highly attractive research lines that captured the interest of its old and new members (including industrial ones) while providing new formats. So, in this period, attention toward making the Society able to monitor the growth of new research fields proactively was supported by the SPS Conferences Board and, in general, by the other governing boards. This activity led to results related to making plans to start new TCs and special interest groups that were coupled with conference events following a dedicated conference strategy. On the other side, a critical evaluation of experiments started in previous years was carried on, trying to efficiently learn from actions and, eventually, errors. The GlobalSIP conference is an example. The details here are not relevant to different positions and opinions in evaluating GlobalSIP and the evaluation of whether the conference was significant or should have been discontinued, but the end of the process is known. While GlobalSIP had merits in trying to address an enlarged set of members and was the place to do experiments (for example, SigPort usage was started there), it was perceived that the results obtained in terms of attendee numbers and the enlargement of Society membership as well as added value to the Society's conference offerings did not allow its continuation. Moreover, lessons were learned about the difficulty to set up an efficient promotion and review process for a new conference to allow results to be collected in the short time that characterizes our days. Some solutions were attempted to make the review process integrated with TC activities, but the high review workload perception in this domain was learned as a difficult obstacle. Reviews carried on by TCs for ICASSP and ICIP in addition to TC workshops were already a very huge load, and so having a third flagship conference was a major overload. Despite the efforts of GlobalSIP, the conference organizers were impressive, and the experiments carried on were useful lessons for activities moved later to other SPS conferences and workshops.

Human relationships

In this period, nothing of what happened in the following years was predictable, and the conference was a concept that could not be separated from traveling and meeting in person. So, the conference experience was mostly central despite some experiments on streaming plenary lectures and relevant moments for a virtual audience. For instance,

ICIP 2017, in Beijing, China, was very important for Society networking/social and global outreach (Figure 2 is a snapshot of the banquet at ICIP 2017). Fully virtual meetings were discussed but were theoretical, and no one could have forecast the speed at which the pandemic made them concrete and changed our behaviors. Meeting in person had some advantages for establishing personal contacts but also some issues. The duration of the SPS Conferences Board meeting in previous years was somehow legendary. During this period, there was a kind of competition between the Conferences Board and the SPS Publication Board, led by Thrastos Pappas, to arrive at reasonable durations while keeping the necessary discussion.

Also with conference organizers, the exchange of experiences was very rich. Just one of them is recalled here regarding Andre' Morin, who contributed to organizing a very successful ICIP meeting in Quebec in 2015. When we were informed that he passed some years later, his contribution was not forgotten in suggesting and realizing improvements to SPS conferences. In-person conferences concern meeting people and sometimes people quite different from typical attendees: someone may recall that at the Quebec conference, we had the opportunity to meet, in person, an iconic figure in our community. The unchanging woman from the Lena picture became a kind advanced-age Swedish mother who told her history. Someone said it was inappropriate and so on and so on. From the point of view



FIGURE 2. The banquet at ICIP 2017, in Beijing.

of the Conferences Board chair at that time, it was a human moment in our conference, reminding us that behind our papers and professional activities, there is life. The lesson that was learned is that the way social events based on the history of a community like the SPS are chosen can generate different reactions at a conference. However, this cannot limit the choices of organizers in highlighting different moments of our past. In this way, they can take care of the way events are presented and different sensibilities are considered. A good conference organizer has to balance the program among consolidated parts and social events to enrich the human experience at a conference. Morin, in that case, was able to do that. Who among older SPS guys does not remember Magdy Bayoumi dressed as a pharaoh on a camel under a Pyramid in Egypt or guiding a jazz band in New Orleans? Behind the curtain, too, all the incredible and well-prepared work done by the SPS staff that, in this period, faced some changes, was enriched by the possibility to meet in person, for example, in the morning executive meetings of the Conferences Board as well as in the extended ones. More in general, each in-person meeting with all the volunteers who were involved deserves a final big thank you to all conference organizers, volunteers, and Conferences Board members and the staff that contributed to the success of SPS conferences in this period. So, human relationships were a crucial aspect at that point. Nevertheless, the Society would have to face different times....

From 2018 to 2020: Really changing times, one way or another ...

The three strategic cornerstones for this 2018–2020 period were certainly 1) to increase the efficiency and effectiveness of the conference organization processes, 2) to upgrade the conference experiences for all attendees, and 3) to effectively cherish inclusion and diversity beyond just words.

One of the surprising features of this period was the need to be flexible and adaptable to move many of the Society's flagship conference dates and/or locations throughout this period, starting with the last-minute move of ICASSP 2018 from Seoul, South Korea, to Calgary, Canada, due to the growing tension in the Korean peninsula but then quickly continuing with rescheduling the dates of all following confirmed ICASSPs so they would not be held during Ramadan. Then, the COVID-19 "earthquake" took place, which moved all 2020 SPS events to virtual. These were real changes and challenges, during which the Society focused on keeping the interests and values of its members and communities at the forefront of all decisions made, with a focus on opportunities for creating a more equitable, diverse, and inclusive conference ecosystem.

While much attention had always been given to the before- and during-conference periods, the same had not been happening with the postconference period.

Conference organization

To be able to effectively organize a successful conference, it was found critical to clearly define first what a "successful conference" is. After much discussion, it was agreed by the SPS Conferences Board members that the key factors for a successful conference would be

- participants' satisfaction, measured with surveys and feedback
- the involvement of students, young professionals, women, and industry
- the number of participants and number of submissions
- the impact of papers and number of IEEE *Xplore* downloads
- innovative initiatives and new forms of interaction
- financial health.

The financial factor was strategically included as the last one to signal to SPS members that healthy finances are critical but that certainly, attendees' satisfaction and fulfillment are above everything.

A key development in this period was the completion and continuous refinement of the SPS "Conference Organizer Guidelines" [1], built to play a key role in the relationship between the SPS and conference organizers for years to come. From the document, the SPS has created this set of guidelines for all SPS financially sponsored and cosponsored technical meetings, with the main purpose

to help organizers create coherent conference and workshop experiences over the years for the attendees while also accommodating innovations, creativity, and diversity. Since its first edition, this document has been consistently improved and completed to address all SPS conference and workshop procedures and customs and has contributed to significantly reducing conference organizers' entrance barriers, especially for newcomers, with a welcoming reference document to ensure transparency of expectations. Since the organizers initially sign their agreement with these guidelines, this is the closest thing to a contract between the SPS and conference organizers.

Naturally, all conferences start with a proposal by the organizers, and preparing a proposal is a process that may be long and complex. Since this process must be also transparent and fair, the conference proposal submission instructions and the proposal review procedures have been reviewed and improved to offer a clearer pipeline. The proposal outline was updated to include key SPS values, such as engaging students and the local community and encouraging inclusive activities and events for all attendees. To effectively see beyond proposal submissions, it was approved, in this period, that all candidate sites would be visited at some appropriate stage by an SPS senior staff member and an SPS Conferences Board member to cocreate a detailed report to be given to the SPS Conferences Board before any site selection. This process has allowed having a much clearer idea of candidate sites'

strengths and weaknesses and even the strength and dedication of an organizing committee.

To help the conference finances through greater sponsorship, a patron and exhibitor prospectus template has been created and a sponsorship sales support company contracted to help build longer-term relationships with sponsors in a more proactive and time-stable way. This was an important move from the previous stage, where each organizing committee would restart the sponsorship gathering process, without much coherence over the years and thus without much stability and sustainability.

While much attention had always been given to the before- and during-conference periods, the same had not been happening with the postconference period, notably regarding automated and consistent conference data collection to better inform decisions about future conferences and workshops. In fact, it often happened at many SPS management meetings that attendees asked questions about the statistics from previous conferences, and the reply was commonly “not available” or “not consistently reported.” Many decisions and choices really depend on past statistics. How many students? How many young engineers? How many low-income countries’ participants? How many local participants? How many students are at banquets? And the list is endless For this reason, it has been decided to start a more effective conference data collection process and adopt an appropriate management and query system to be able to answer the coming questions, benchmark performance, and set targets.

Conference experience

It was often commented that the SPS flagship conference format was too static and not evolving as much as it should, maybe excluding the technological paraphernalia. In this period, the vision was again to upgrade the overall conference experience, starting from the submission and reviewing process and continuing to the interactions and connections among all participants at an event. At the core of this vision are the people, i.e., the paper submitters, the reviewers, the authors, the conference participants, the session chairs, the local people, and so on. And all these people should communicate, connect, interact, discuss, enjoy, and have fun in old and novel ways.

Again, the before-conference period deserved much attention, notably the reviewing process, which is always very critical, especially for the authors whose papers are rejected. The feedback from authors and attendees was that the SPS paper review process was largely considered “rigid” and nonerror resilient; moreover, the conference technical program chairs struggled to find enough reviewers as well as increase the quality of the reviews. At this stage, the key objectives were to increase the efficiency of the reviewing process (e.g., immediate rejects), the quality of the reviews,

the involvement of the authors (e.g., rebuttals and reviewer discussions), the transparency of the entire reviewing process, and the reviewers pool (notably, with younger people) and create a pipeline for new reviewers and more potential SPS members.

At conference time, a critical issue to surpassing “old style” experiences was the exploitation of the increasing amount of technological paraphernalia available beyond the individual usage of computers and mobile phones. This has taken two key directions, one related to hardware and the other to software. The best exploitation example of new hardware were the e-poster sessions at ICIP 2019, in Taipei, Taiwan, where the usual paper posters were substituted by large screens and the poster presenters could exploit many

new forms of presentation and communication (see Figure 3). The key lesson was that it takes time for people to learn to use these new capabilities since most e-posters were still “old style” static images, but there were also many creative surprises. On the software front, a single SPS Events app was created for all SPS flagship conferences, which really makes

attendees’ life much easier and is ecologically friendly since much paper program printing is avoided.

Ideally, SPS conferences should leave a positive mark by compensating for their carbon footprint. This led to the idea of organizing events with the local community, not only researchers, academics, and companies but also high-school students and teachers. This could involve bringing them to the conference venue but also taking top scientists attending the conference to the local schools. This initiative should have had its first blast at ICASSP 2020, in Barcelona, Spain, but COVID-19 changed those plans. Naturally, in 2020, the COVID-19 pandemic totally changed, in weeks, the critical conference organization issues and the attendees’ experience, but this is a topic for a following section.

Diversity and inclusion

Diversity and inclusion were major goals in this period, and these goals assumed multiple facets. The first one to

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FIGURE 3. The e-poster session at ICIP 2019, in Taipei.

mention could be geographical diversity. During this period, the first SPS flagship conference happened in the Persian Gulf area, i.e., ICIP 2020, in Abu Dhabi, United Arab Emirates (unfortunately moved to online due to COVID-19 but returning in 2024). Moreover, the first SPS flagship conferences in India and Malaysia have been approved for ICASSP 2025 and ICIP 2023, respectively. The second goal to mention could be restrictions for SPS flagship conferences now that all major religious holidays have been identified to avoid any time clash with these conferences out of respect for all faiths; several ICASSPs had to be rescheduled to follow this new rule.

Another important inclusion direction was toward low-income countries. To include more people from these areas of the world, discounts and travel grants have been defined; for example, authors from these countries now have very discounted registration fees (e.g., US\$210 at ICIP 2022), and all people from these countries have symbolic tutorial fees (e.g., US\$20 at ICIP 2022) and totally free virtual attendance. While the attendance numbers from these countries are still low, there has been growing hope that these actions will facilitate increased participation in the future.

Finally, student participation opportunities have required major attention to make students feel more included in all conference functions and avoid a two-tier conference sensation. Students are the future of the Society. Although maybe not the most important, a very symbolic initiative was the inclusion in the SPS “Conference Organizer Guidelines” of the sentences “Although not mandatory, it is strongly recommended that the banquet is included in the registration fees for all types of attendees at no additional cost.... Banquets do not have to be formal and expensive, and emphasis could be placed on creating an inclusive environment for all attendees.” Only a very low percentage of students usually participate in the conference banquets, thus creating a segregation impression. However, more initiatives have been taken to include students, notably, organizing student luncheons with top researchers, defining very low tutorial fees (e.g., US\$20 at ICIP 2022), allocating travel funding for students and young professionals (also for workshops), and creating student cups, 5-min video clip contests, job fairs, and student research networking events.

The pandemic

While much brainstorming had been dedicated to virtual events and virtual participation, only small developments happened before March 2020, e.g., streaming plenaries and keynote talks on Facebook Live, and nobody was really ready for the landslide that happened with the emergence of the COVID-19 pandemic. The migration to fully virtual events was meteoric and total in a couple of months, and the impacts may last for a long time; it remains to be seen. What did not happen for decades happened in a few weeks,

and, surprisingly, with the intense efforts of all involved and the amazing readiness of technology, the SPS flagship conferences entered a new era, with rather limited suffering. Naturally, the move to virtual raised many difficult issues, some more legal, e.g., what to do with the contracts related to the physical venues already contracted (ICASSP 2020 was in May, just a couple of months after the pandemic began), others about the attendees’ experience, e.g., what application, presentation, and communication functionalities to use for the virtual conference, and, finally, others more financial, e.g., what registration fees model to use for the virtual conferences. For the first SPS flagship conference during COVID times, i.e., ICASSP 2020, in Barcelona, the decision was for fully recorded presentations, including the keynotes, although

with real-time questions at the end; this has changed over time, with more and more presentations happening in real time and recorded for later viewing, notably, in different time zones. For all of 2020, it was decided that nonauthor registrations would be totally free, which led to record registration numbers, notably,

around 16,000 for ICASSP 2020 (rising from around 3,500 at ICASSP 2019, in Brighton, United Kingdom). While it was great to have access to these new members of the community, it was soon clear that free registrations do not necessarily imply participation, and thus, the decision for 2021 and beyond was to have minimum registration fees for virtual participation.

After the shocking forced experience, the SPS started thinking about the post-COVID future, notably, how conferences should be in the future after what was learned in 2020. Clearly, virtual conferences allow remote participation and increase inclusion but also prevent the warm connections that only physical conferences allow. What about hybrid conferences, allowing people to choose to be present or not, including authors? The impression was that many people would simply stay at home because they could and that the “amazing” atmosphere of past SPS flagship conferences would never return. Are conferences really essential beyond journals if they do not produce physical human contact? And what about the technical discussions around a dinner table, with opinions from all around the world, with real laughs and real beer? These are some of the questions that the years to come will help to answer.... Overall, 2020 was a year of forced change, but it allowed the SPS to show its strength, resilience, and commitment to an inclusive future. And that was great to see.

From 2021 to 2023: Toward a marketplace model

Against all odds, 2021 was still restricted by the pandemic. However, the SPS tried to use that to its advantage. ICASSP 2021 and ICIP 2021 were finally held virtually, in Toronto, Canada, and Anchorage, Alaska, respectively, and this helped the Society to keep on learning about the

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best virtual platforms and how to organize virtual technical programs. Not only must the virtual lecture and poster sessions offer the best experience to the attendees but the conference networking and social events should not be lost. The survey that the SPS is now regularly doing after each of its two flagship conferences helps to steer the organization of future events. Clearly, people are longing to meet in person at the conferences, and 2022 seemed to slowly bring things back to normal in terms of COVID-19. In any case, the organizing committees are still working with plans A, B, and even C to adapt to the possibly changing situation. This was the case of ICASSP 2022, in Singapore, planned to be held mainly in person until a new pandemic outbreak appeared in China just two months before the conference. Once more, the SPS thanks its volunteers for the great job that they do when facing these complicated situations.

Despite the roller coaster that the organization of events has become, building on the achievements of the past years helps to continue offering attractive conferences of high quality. Figure 4 describes the evolution of ICASSP in the past 10 years and how the number of submitted papers and the ratio of the number of attendees versus submitted papers in the

past three editions are the largest ever. The planned strategic cornerstones for this 2021–2023 period are 1) to stabilize the hybrid model, 2) to make the industry program and participation grow, and 3) to incorporate other kinds of submissions, which can enrich the conference papers. Since our conferences should be a powerful tool to help SPS membership grow, we will continue fostering initiatives that promote diversity and new services and liaise with other sister Societies and events. The vision for this period is that our flagship conferences should be a bubbling marketplace with heterogeneity and a wide range of products to offer.

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Hybrid conferences

The discussions that have been carried out within the SPS Conferences Board and some ad hoc meetings stated the positive

aspects that the virtual component brings to our conferences: increasing the range of attendees that can participate (e.g., students and members of industry), promoting the green and sustainable aspect of our events, and allowing joint nonco-located events, among others. For this reason, the SPS has intensively helped the organizing committees of our flagship conferences to include this component, even in an in-person event. That has led to a central track, around which

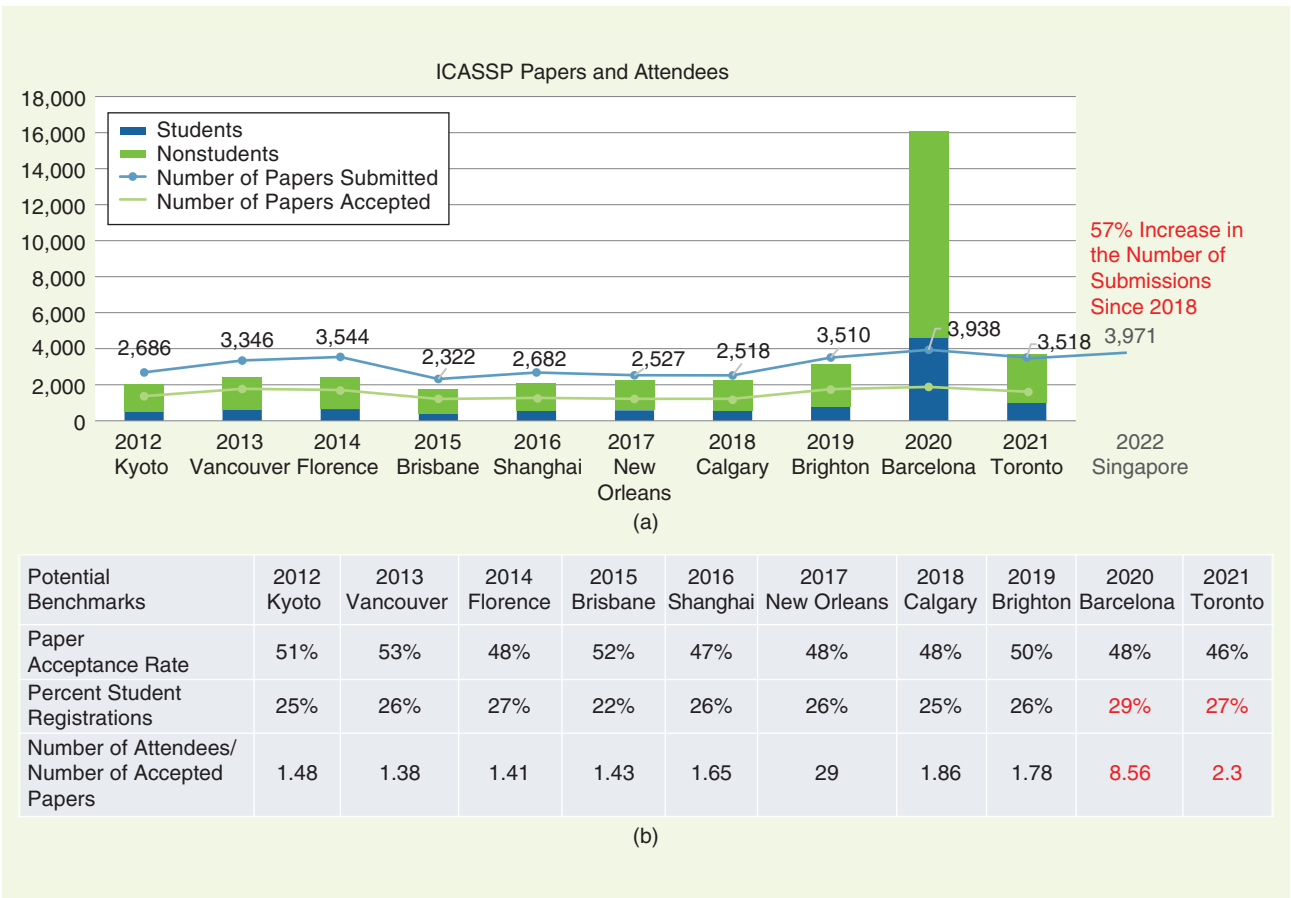


FIGURE 4. (a) ICASSP paper and attendee counts and (b) potential benchmarks (2012–2021).

a conference is structured, that is held in an auditorium with real-time streamed activities all day long and during all the days of the conference (e.g., keynote talks and panels). The regular and special oral and poster sessions are still looking for their best format and depend very much on the organizing committee's decisions and the conference venue's capabilities. The imaginative and good solutions that are devised then remain for the next editions. Importantly, the virtual platforms that can be used are well-known now, as is how to link them with the regular paper submission platforms, which helps very much in the whole process.

Authors' participation is still an open topic for discussion regarding whether they must attend in person or not. However, those that have already experienced going back to the in-person conferences feel happy with the experience and realize that it is indeed a very important aspect of our job as researchers. The spontaneity of in-person encounters cannot be replaced by any virtual tool so far—maybe when the metaverse comes, who knows, but let us live the present and midterm future, which is already difficult to predict. Also, among the authors, there is a feeling that the virtual component has brought in much work with all the material that has to be submitted: papers, videos, slides, and posters (all of it in quite a short period of time). The SPS is still looking for ways to combine different kinds of participation so that it ends up with a win-win situation for all attendees.

Industry program and participation

The flavor of SPS conferences is mainly academic, and the events stand out because of the academic quality of their technical programs. However, the presence of industry lags a little bit behind that in other Societies. We assume that one of the main reasons is that there is no main supporting signal processing industry, as, for instance, is the case in communications and power electronics, but several industries. In any case, signal processing has become the “silent” core of many different industries, and we can play this in our favor, together with the deep connection between signal processing and artificial intelligence. To help increase the participation of industry in our flagship conferences, we have defined some key performance indicators (KPIs) and set some thresholds to be met: 1) the number of sponsorships and exhibitors, 2) the size of the industry program, and 3) the number of attendees and papers.

Taking the baton from the past VP for conferences, who put in place a patron and exhibitor prospectus template and promoted contracting with a sponsorship sales support company for ICASSP and ICIP, the SPS recently signed a multiyear contract with the company to build longer-term relationships. The KPIs were part of the contract. Also, there are several industry members of the Society that should regularly attend ICASSP and ICIP but do not. In addition, to

share some of the motivations of the academic attendees, the Society should further work into its conferences other kinds of motivation that are more specific to industry members, such as recruiting (i.e., it is good to have direct contact with potential candidates) and stay up to date with latest trends, which is seen as an essential part of their job. They strongly appreciate that a conference deploys a specific industrial program with specific workshops, panels, special sessions, and keynotes. For this reason, in 2021 and 2022, the Society consolidated and enhanced the industrial program, especially regarding industry-driven keynotes, talks, tutorials, and workshops. Also, industrial forums and panels are good to showcase the industrial trends in the near, medium, and long terms. The more the sponsors get closer involvement in the elaboration of the conference program the better, and it is important that this be reflected in the patron prospectus and planned from the very beginning. Closer involve-

ment of industry in Society activities must be achieved: the Signal Processing Cup, SPS Video and Imaging Processing Cup, and SPS Grand Challenges should not be exclusively organized by academic TCs. The Show and Tell Demonstration, for instance, is a good forum for quick presentations of new products and technologies. These and other new activities should be envisaged by the Society and the Conferences Board, which has already

incorporated in the conference guidelines the new structure that the conference organizing committees must have to be able to cope with the increasing number of activities and promote growth. One very good example of the new industry-oriented activities is the Entrepreneurship Forum, which was successfully organized for the first time at ICASSP 2022, in Singapore.

Finally, keeping the participation hybrid (both virtual and in person) is necessary to including our industry members, who may have more travel restrictions than in academia. Also, planning for alternative participation formats in a conference that do not necessarily require a full paper can help. This leads to the next topic about incorporating other kinds of submissions, which can enrich the conference papers.

Enrich the types of conference submissions

The goal of our flagship conferences is to offer a vibrant marketplace that gives the possibility to interact and network around the signal processing topic. To open the floor to admitting different types of conference paper submissions and planning for alternative participation formats that do not necessarily require a full paper can help to advance in this direction. For example, workshops and sessions with short papers and extended abstracts targeting participants from industry have already begun to be implemented, at ICASSP 2022. Papers/abstracts may be part of the proceedings but do not really need to be published in *IEEE Xplore* (mitigating the <50% acceptance ratio).

The spontaneity of in-person encounters cannot be replaced by any virtual tool so far—maybe when the metaverse comes, who knows, but let us live the present and midterm future.

Another avenue is that authors of papers published and accepted in SPS journals may present their work at ICASSP and ICIP in appropriate tracks. These papers will neither be reviewed nor included in the proceedings. It is high time to promote this alternative, which was a little bit hidden in the call for papers. In addition, at ICASSP 2023, for the first time, *IEEE Open Journal of Signal Processing (OJSP)* will provide a special track for longer submissions, with the same processing timeline as ICASSP. Accepted papers will be published in *OJSP* and presented at the conference but will not be included in the conference proceedings. With this, the Society begins its journey toward open access for conferences. This is a topic that has already taken many brainstorming sessions within the Board of Governors and that will continue to do so. In the absence of a disruptive and clear winning solution, the strategy is to try different alternatives that have previously been well discussed and build on them.

The discussions about how to further increase the quality of our conferences, at least within some specific tracks, are still open. In our opinion, this must be so and reflects the continuous aim for improvement and adaptation in our Society.

And much more ...

Importantly, the SPS Conferences Board keeps track of different trials and discussions in the past so as not to repeat past actions that failed. However, it also keeps an eye on how the world and circumstances evolve. A brilliant idea in the past may not have succeeded because it did not come at the right time. The Conferences Board agreed that ICIP, much smaller in size than ICASSP, can be a good testbed for new ideas. This can also help the conference to revive in front of others that are currently doing extremely well and create a very strong competition.

Other original activities that are enriching our conferences are the series of educational courses that were initiated at ICASSP 2022 and the Promoting Diversity in Signal Processing workshop (already in its fifth edition). The Society keeps having many open questions to debate around the key factors for a successful conference, which is very good, as it means that the SPS is continuously observing its competitors and searching for improvement. The increasing capabilities that have been gained in data analytics will help very much in shaping a good strategy. Also, the better advertisement tools that the Society has acquired in different social media reinforces the beacon role of our flagship conferences.

Conclusions

In these few pages, we have tried to show how SPS flagship conferences have become a platform to share the latest and innovative ideas with peers all around the world. As we have commented, the conferences are in a continuous adaptation process to create the best ecosystem in every moment to help science grow with the exchange of the top ideas. Diversity, inclusion, and quality are the ultimate goals, and new changes will keep being introduced so that they become more and more a reality.

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Reference

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