



Reflecting on the Successes of ICASSP 2023

As we gear up for the International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2024, it is essential to take a moment to celebrate the achievements and highlights of ICASSP 2023, which took place on Rhodes Island, Greece, this past June. ICASSP 2023 was a momentous event as it marked the first postpandemic ICASSP, and the return to in-person meetings. With the theme “Signal Processing in the AI Era,” the conference underscored the strong connection between signal processing and machine learning, highlighting the pivotal role of signal processing in shaping the development of artificial intelligence (AI).

ICASSP 2023 surpassed all expectations, with close to a 50% increase in submitted and accepted papers compared with previous submission records. More than 4,000 participants, with over 3,700 attending in person, demonstrated the key role of signal processing in both academia and industry, underscoring the importance of our community in advancing the field of AI. Spearheading the event were the general chair, Prof. Petros Maragos (NTUA, Greece) and cochairs Kostas Berberidis (U Patras, Greece), and Petros Boufounos (MERL, USA), led a committee of distinguished academics and practitioners who curated an outstanding technical program.

ICASSP 2023 coincided with the 75th anniversary of the IEEE Signal Processing Society (SPS), and the program was designed to commemorate this milestone. Various activities took place [1], showcasing the evolution and impact of signal processing over the decades.

Aligning with the conference theme, the role of signal processing in AI took center stage during the plenary talks. Distinguished speakers delivered captivating talks to shed light on this vital angle. Andrea Goldsmith’s “Disrupting NextG” plenary emphasized the outsized role of signal processing in next-generation wireless technologies. She highlighted the symbiotic relationship

between machine learning and signal processing, underscoring that knowledge of the application and data can lead to more effective and explainable machine learning algorithms for wireless communications. Richard Baraniuk’s talk, “The Local Geometry of Deep Learning,” provided a fresh perspective on deep learning algorithms by exploring them through the lens of approximation theory via splines. This novel approach opened a window into the inner workings of these algorithms, offering valuable insights. Michael Jordan’s plenary, “An Alternative View on AI: Collaborative Learning, Incentives, and Social Welfare,” envisioned a future AI landscape that is more collective and



ICASSP 2023 ingeniously incorporated outdoor poster sessions, effectively accommodating the substantial influx of participants.

autonomous, with a focus on statistical evaluation. Christos Papadimitriou's talk, "How Does the Brain Create Language?," delved into a model-based approach for understanding brain functions, with potential applications in emulating high-level cognitive phenomena. He discussed ongoing efforts to create a neuromorphic language organ within this framework.

The technical program at ICASSP 2023 was exceptional, adhering to the high standards set by this flagship conference of the SPS. Besides the well-established components, there were several special new features added by the organizing committee that added novelty to the event. For the first time in ICASSP's history, satellite workshops were included before and after the main conference. These 18 satellite workshops covered cutting-edge topics, contributing to General Chair Petros Maragos' vision of introducing thematic diversity and attracting nontraditional ICASSP audiences. The workshops touched upon various areas, such as the Data Science and Learning Workshop: Unraveling the Brain; Integrated Sensing and Communications: New Frontiers, Newer Challenges; Signal and Data Processing for Next Generation Satellites; Signal Processing for Autonomous Systems (SPAS); and Sign Language Translation and Avatar Technology. Three indus-



The welcome reception: an exquisite event showcasing local delicacies.

try workshops, offered by MathWorks, Huawei, and Meta, further enriched the program, showcasing real-world applications of AI and signal processing in various industries.

I will discuss some relatively recently introduced activities at ICASSP, with the hope that their success will continue.

Education-oriented short courses

An SPS strategic goal is the delivery of education-oriented short courses, aimed at transforming the education and training landscape. Since 2022, these courses offer participants an

opportunity to deepen their understanding of critical topics in the field. Unlike traditional tutorials, SPS's education-oriented short courses take a deep dive into various subjects, providing a comprehensive and multisided perspective on each topic. The courses consist of parallel tracks of 10-hour sessions conducted in three segments, offering participants an immersive learning experience. Upon successful completion of the course and quiz, participants are awarded professional development hours and continuing education units certificates.



The Low-Complexity Mini-Marathon: a unifying social affair among ICASSP 2023 participants.

ICASSP 2023, with the help of the SPS Education Board led by Chair Roxana Saint-Nom, organized the in-person delivery of these short courses, providing attendees the option to participate either live or remotely, catering to the diverse needs of learners from around the world. The four selected courses were as follows:

- “A Hands-On Approach for Implementing Stochastic Optimization Algorithms from Scratch”
- “Graph Neural Networks”
- “Graph Signal Processing and Geometric Learning: A Foundational Approach”
- “Learning Nonlinear and Deep Low-Dimensional Representations from High-Dimensional Data: From Theory to Practice.”

These courses will also be offered on demand for SPS members in the SPS Resource Center.

Fostering entrepreneurship in signal processing

Entrepreneurship has become another strategic priority for the SPS, recognizing the crucial role of innovation and startups in driving advancements in the field. Since 2022, the ICASSP conference has been offering an entrepreneurship forum, providing a platform for researchers, entrepreneurs, investors, and experts to come together and share their insights, experiences, and success stories. The ICASSP 2023 forum continued this tradition, organized by Dr. Costantinos Papadias (The American College of Greece), Dr. Nassos Katsamanis (Behavioral Signals and ATHENA RC), and Dr. Evita Fotinea (ATHENA RC), with an aim to inspire

the next generation of signal processing innovators to think outside the box.

The forum featured a diverse program agenda, including keynote speeches, panels, networking opportunities, and a startup fair, creating a vibrant and interactive environment for participants. Attendees, both present and remote, had the unique opportunity to listen to the entrepreneurship journeys of seasoned entrepreneurs who provided valuable insights into the challenges and opportunities they encountered in their ventures.

A highlight of the event was the startup fair. Organizations from Greece and other international startups showcased their products and innovations in an adjacent exhibition. Following the exhibition, a pitching competition was held, providing young professionals from the startup community with the chance to present their ideas and projects in various application areas, ranging from bioinformatics, health, and sound systems to autonomous vehicles, imaging radars, and wildfire prevention. The participants received invaluable feedback from experienced entrepreneurs, creating an environment of collaboration and knowledge sharing.

The keynote speaker of the forum was Alexandros Eleftheriadis, a partner at Big Pi Ventures, a renowned Greek venture capital firm that specializes in deep tech startups. He shared valuable tips about investments, criteria, entities, and terms, providing valuable insights into the funding landscape for aspiring entrepreneurs.

The forum also featured a panel discussion titled “Tech-Based Entrepreneurship,” which shed light on the challenges young entrepreneurs

face while establishing their startups. The discussion covered topics such as limited resources, the trend of bootstrapping, the protection of European companies, the importance of basic research, and the critical role of building strong teams.

The forum culminated with the announcement of the winners of the startup competition. The first prize was awarded to Treble, a cloud-based sound systems startup, Waveye, an AI-driven imaging radars venture, got the second prize, and Voinosis, a startup focused on diagnosing diseases like dementia based on voice analysis won the third prize.

Challenges at ICASSP

The Signal Processing Grand Challenges (SPGCs) demonstrate the community’s commitment to addressing real-world issues through signal processing advancements. By fostering an environment of cooperation and intellectual exchange, these challenges continue to drive progress in the field.

ICASSP 2023 featured a record number of SPGCs. Comprising 15 distinct challenges spanning various signal processing domains, including audio, speech, communications, biomedical applications, computer vision, and brain–computer interfaces, these events stimulated innovative discussions and collaborations. At the conference, each challenge was allocated a dedicated session where the top five submissions were presented, showcasing their winning solutions. Challenge organizers also offered valuable insights through overview presentations, shedding light on the significance and scope of each challenge.

Recognizing the importance of sharing knowledge, the challenge organizers were invited to contribute overview papers to a special issue in the *IEEE Open Journal of Signal Processing*. Additionally, the winning teams were also provided with the opportunity to publish papers detailing their successful approaches.

PROGRESS Workshop at ICASSP

Supporting the SPS goal to make signal processing a more inclusive field, the 6th Promoting Diversity in Signal



Conference banquet: immersing in festive Greek-style celebration.

Processing (PROGRESS) Workshop was held during the ICASSP week. The goal of this workshop is to motivate and support women and underrepresented minorities to pursue academic careers in signal processing. We know that women and minorities are underrepresented on the faculties of universities around the world, which limits the diversity of perspectives in academic research and also deprives students of diverse role models. Role models and mentors play a crucial role in inspiring students, instilling confidence in their abilities, and demonstrating the potential for success in their chosen fields. The PROGRESS Workshop recognizes the significance of diversity in academia and seeks to bridge gender and cultural gaps through its empowering initiatives.

Since its inception at International Conference on Image Processing (ICIP) in 2020, the PROGRESS Workshop has gained substantial momentum. It is now an institutionalized part of SPS, featuring prominently during both ICASSP and ICIP conferences. The workshop is overseen by the SPS Diversity Subcommittee in Membership and Development under the Membership Board, with the support of a representative from the respective conference organizing committees, further emphasizing the commitment of the signal processing community to foster inclusivity.

At ICASSP 2023, the PROGRESS Workshop was successfully led by Dr. Theodora Chaspari from Texas A&M University assisted by the local committee of Dr. Maria Flouri and Dr. Nancy Zlatintsi. Dr. Chaspari, along with a distinguished international lineup of speakers, including Dr. Vasileia Filidou (Athena RC), Dr. Xiaoli Ma (Georgia Tech, USA), Dr. Urbashi Mitra (USC, USA), Ana Perez (Center Technologic de Telecomunicacions de Catalunya), Yuejie Chi (Carnegie Mellon University, USA), and Yonina Eldar (Weizmann Institute of Technology, Israel), engaged both present and remote graduate and undergraduate students, as well as postdoc researchers. The speakers discussed their cutting-edge research and also shared valuable insights into

the academic career path. Their experiences and success stories demonstrated the opportunities and possibilities available in the field, encouraging attendees to envision their own rewarding academic journeys in signal processing.

One of the significant highlights of the PROGRESS program was the professional development training session conducted by NaturalScience Careers. This session equipped participants with essential tools for building a successful academic career, such as crafting an engaging CV, effectively promoting their skills and accomplishments, and mastering the art of the interview process.

One of the most noteworthy aspects of the PROGRESS Workshop is that it is open and free for all registered ICASSP attendees, ensuring access and inclusivity for anyone interested in participating, even if they do not feel they belong to a specific technical or socio-cultural category. Additionally, non-ICASSP attendees had the opportunity to partake in the workshop upon the review of their application materials, reflecting the workshop's commitment to embracing diversity and community outreach.

The PROGRESS Workshop is supported by the SPS and external funding agencies. This year, in a significant move to support students and early-career academics, the SPS offered competitive travel grants of US \$1,000. The recipients of these prestigious PROGRESS travel grants hailed from India, Switzerland, USA, Canada, Taiwan, and Australia, underscoring the workshop's global reach.

Celebrating diversity at ICASSP 2023

The SPS remains dedicated to fostering diversity and inclusion. This year's conference saw several notable instances of inclusivity. Attendees appreciated the lactation room, the childcare services and the provision of gender-neutral restrooms offered by the ICASSP organizers.

A significant milestone was achieved this year with the introduction of an LGBTQI+ event during ICASSP 2023. This "unofficial" ICASSP gathering was attended by 58 individuals spanning various signal processing domains and academic tiers, from students to associate professors, as well as esteemed IEEE SPS colleagues. Together, the attendees enjoyed good conversations with lots of laughter, in a relaxing atmosphere. The positive feedback from attendees was overwhelming, with many expressing their immense joy over the establishment of an LGBTQI+ event. Gratitude is extended to the organizers, Lucas Thomaz, Odette Scharenborg, and the IEEE SPS staff, who orchestrated this groundbreaking event. We hope that such gatherings will gain official recognition in future editions of ICASSP.

Acknowledging the heroes behind the success of ICASSP 2023

The resounding success of ICASSP 2023 would not have been possible without the dedication and hard work of an outstanding team of volunteers and staff. As we reflect on the



Embracing diversity: An LGBTQI+ gathering at ICASSP 2023.



The closing ceremony: expressing gratitude to the organizers, participants, and supporters of this exceptional conference.

achievements of this remarkable conference, it is essential to express gratitude to those who played a pivotal role in making it a grand success.

At the helm of the event was General Chair Petros Maragos, whose vision, leadership, and oversight were instrumental in orchestrating every aspect of the conference. His tireless efforts ensured a seamless organization and delivery of the conference, and his unwavering commitment set the tone for the entire team.

Co-chairs Kostas Berberidis and Petros Boufounos deserve heartfelt thanks for their invaluable contributions behind the scenes. Their dedication and hard work complemented the efforts of the general chair, ensuring that every detail was meticulously taken care of.

The technical program cochairs, including Shri Narayanan, Constantine Kotropoulos, Ken Ma, and Athina Petropulu played a vital role in shaping the technical program of the conference.

The SPS technical committee chairs also deserve recognition for their exceptional efforts in handling the unprecedented number of submissions. Their competence and efficiency ensured a well-curated technical program.

Every volunteer involved in ICASSP 2023 dedicated their best self to the conference, and their hard work and commitment are commendable. Their collective efforts contributed to the success of the event, making it a memorable experience for all attendees. The SPS Board Chair Ana Isabel Pérez Neira and the Conference Board provided important oversight of this conference and all SPS conferences and workshops.

ICASSP 2023 experienced a tremendous increase in attendance, and so the general chair and the team had to navigate uncharted territory to meet the needs of the conference effectively. They efficiently utilized the available space and introduced innovative ideas, such as holding poster sessions in garden areas and extending coffee breaks, to avoid overcrowding and ensure a smooth conference experience. Many thanks to the local professional conference organizer Matina Gika and her team, who played a big role in the planning.

The organizers also delivered a wide range of social events that brought the attendees together. Events like the Low-Complexity Mini-Marathon, the welcome reception, the open-air fair, the banquet, and the open-air concert provided ample opportunities for network-

ing, making new friends, and enjoying the nontechnical aspects of the conference beyond the technical sessions.

The unwavering support of the SPS staff was crucial in making ICASSP 2023 a success. Rich Baseil, Theresa Argiropoulos, Caroline Johnson, Bill Colacchio, Nicole Allen, Debbie Blazek, Michelle Demydenko, Jessica Perry, Jaquie Rash, Rebecca Wollman, and others worked tirelessly behind the scenes, providing essential support and ensuring that the conference ran smoothly. Conference Catalysts, led by Chris Dyer, also provided tools and support.

As we eagerly await ICASSP 2024, set to take place during 14–19 April at COEX, Seoul, South Korea, we look forward to another exciting event. General Chair Hanseok Ko promises an outstanding conference, building on the successes of ICASSP 2023.

In the meantime, our second annual flagship conference, ICIP, is set for 8–11 October 2023 in Kuala Lumpur. It will have similar attractions to those of ICASSP, such as industry workshops, entrepreneurial presentations, short courses, membership events, and young professional and diversity discussions. Its technical program features cutting-edge advances in image processing research and technology.

See you all in Kuala Lumpur and Seoul!

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Reference

[1] C. Jutten and A. Petropulu, "IEEE signal processing society 75th anniversary during ICASSP 2023: Remembering the past, engaging with the present, and building the future [From the Editor]," *IEEE Signal Process. Mag.*, vol. 40, no. 5, pp. 4–11, Jul. 2023, doi: 10.1109/MSP.2023.3286188.

