

State of the Society

*Presented by Athina Petropulu
President, IEEE Signal Processing Society*

ICASSP 2023 | Rhodes Island, Greece

Welcome to ICASSP 2023!



A flagship conference of the
IEEE Signal Processing Society

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Congratulations and thank you!



ICASSP 2023 Delegates Continued Growth in the Community!

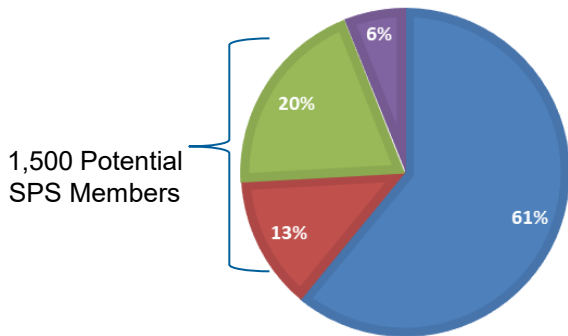
About 40% are First Time ICASSP Attendees!

Over 4,000 registered, over 3,000 here in Rhodes!

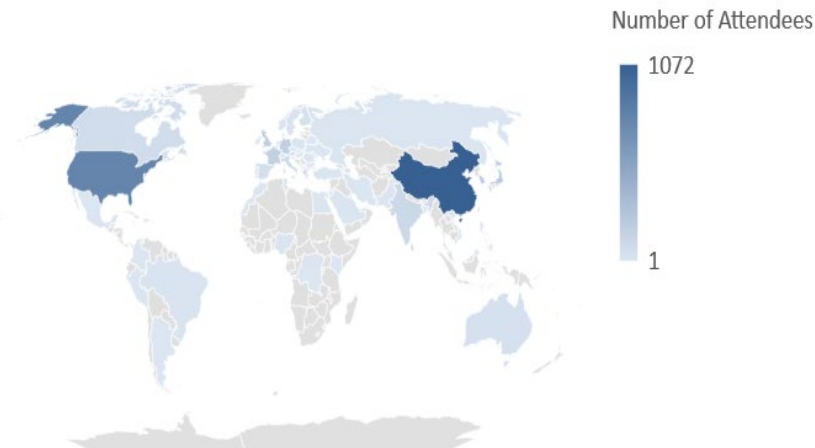
Attendees from 70 countries!

REGISTRATION PROFILE - MEMBERSHIP

■ SPS Member ■ IEEE Member ■ Non-Member ■ Unknown



Registrants by Country



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Signal Processing – The Science Behind our Digital Lives

DSP has played a crucial role in many technologies we rely on today

- Wireless communication systems and the smartphone
- Speech and audio recognition, virtual assistants, transcription services, customer service and support, aiding the disabled
- Medical imaging
- Radar, sonar, geophysics exploration
- Advanced control systems for robotics, aerospace, and automotive industries
- Autonomous systems
- Data Science and Artificial Intelligence



IEEE Signal Processing Society



- ▶ IEEE's first society is the world's premier professional society for signal processing scientists and professionals.
- ▶ More than 19,000 members across 120+ countries
- ▶ Through high quality publications, conferences, technical and educational activities, SPS
 - advances and disseminates state-of-the-art scientific information
 - educates the signal processing community
 - catalyzes advances in signal processing

➤ **75 Years of IEEE Signal Processing Society!**



75 Years of IEEE Signal Processing Society

Empowering the Growth of SP



1940s

1950s

1960s



The advent of digital signal processing (DSP)

- ▶ Invention of the integrated circuit by J. Kilby, R. Noyce
- ▶ Cooley and Tukey invent the FFT
- ▶ Emergence of digital domain processing
- ▶ First book on DSP by Gold and Rader
- ▶ First book on detection, estimation, and modulation theory by H. L. Van Trees
- ▶ Burg's linear prediction

In 1948, the IRE Professional Group on Audio is born

- *IEEE Trans. on Acoustics, Speech, and Signal Processing (T-ASSP)*
- *IEEE Transactions on Audio and Electroacoustics*

A. Petropulu, J. Moura, R. Ward, and T. Argiropoulos, "Empowering the Growth of Signal Processing: The Evolution of the IEEE Signal Processing Society", IEEE Signal Processing Magazine, June 2023

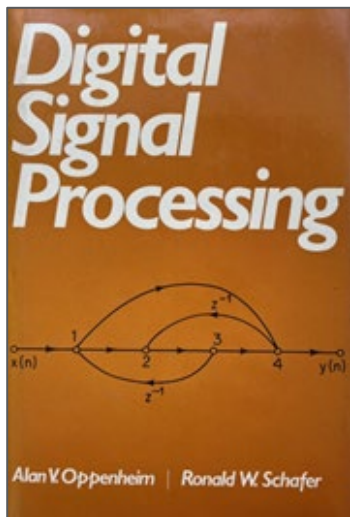


75 Years of IEEE Signal Processing Society

Empowering the Growth of SP



1970s



DSP receives public attention

- ▶ The first microprocessors emerge
- ▶ Digital filter design, digital filter structures, lattice filter structures, MUSIC algorithm, high-resolution subspace-based techniques
- ▶ Landmark books on DSP by Oppenheim and Schaffer (1975), Rabiner and Gold (1975)
- ▶ First book on digital speech processing, by Rabiner and Schaffer (1978)

The ASSP membership grew from 5,299 to 8,619 members

- Scope expands beyond audio to include SP in a broader sense
- First ICASSP held in 1976 in Philadelphia, PA, USA!



75 Years of IEEE Signal Processing Society

Empowering the Growth of SP



1980s



- ▶ Digital communications, spread spectrum methods
- ▶ Data storage
- ▶ Digital image processing laid the foundations for multimedia, computer vision, medical imaging, image and video compression
- ▶ Wavelets
- ▶ Development of new techniques for genetic engineering, gene sequencing

The ASSP membership grows from 8,619 to 15,925

- *In 1981, the ASSP Society joined three other societies to establish the IEEE Transactions on Medical Imaging*
- *The ASSP newsletter becomes the IEEE ASSP Magazine*



75 Years of IEEE Signal Processing Society

Empowering the Growth of SP



1990s



- ▶ World Wide Web
- ▶ Personal computers become more affordable and widespread
- ▶ Mobile phones become smaller, more affordable
- ▶ CD-ROMs become a popular storage media
- ▶ JPEG, H.261, MPEG
- ▶ Digital cameras emerge
- ▶ Compressed sensing

- **First ICIP held in 1994 in Austin, TX, USA**
- New publications – *IEEE Transactions on Image Processing*, *IEEE Transactions on Signal Processing*, *IEEE Transactions on Speech and Audio Processing*, *IEEE Signal Processing Letters*, *IEEE Transactions on Multimedia*, *IEEE Signal Processing Magazine*
- SPS co-sponsors *IEEE Transactions on Evolutionary Computing*, *IEEE Transactions on Fuzzy Systems*, *IEEE Trans. on Neural Networks*.
- *IEEE Signal Processing Letters* is made available online in 1997



75 Years of IEEE Signal Processing Society

Empowering the Growth of SP



2000s



- ▶ Streaming services
- ▶ Cloud computing
- ▶ The use of artificial intelligence (AI) became more prevalent with applications in speech recognition and image recognition
- ▶ Sensor networks, distributed and decentralized information processing and optimization

- *IEEE Transactions on Speech, Audio, and Language Processing*
- *IEEE Transactions on Information Forensics and Security*
- *IEEE Journal of Selected Topics in Signal Processing*
- *The SPS co-sponsored IEEE Biometrics Compendium and IEEE Transactions on Affective Computing.*
- *IEEE International Symposium on Biomedical Imaging co-sponsored by the EMBS*
- *IEEE International Workshop on Information Forensics and Security (WIFS)*
- ***Signal Processing Electronic Library (SPeL), later formed the emergent IEEE digital library, now IEEE Xplore***

75 Years of IEEE Signal Processing Society

Empowering the Growth of SP



2010s



- ▶ Smartphones
- ▶ 4G networks make it possible to access high-speed Internet on mobile devices
- ▶ Internet of Things
- ▶ The development of self-driving cars emerges
- ▶ Graph-based data proliferated, initiating a new area in SP, Graph SP
- ▶ AI, deep learning and machine learning

SPS membership grew from 14,897 to 18,730

- *Creation of SPS Membership Board and Regional Directors-at-Large*
- *Committees formed to support emerging special interest groups – Students, Young Professionals, Women in Signal Processing*
- *Formation of IEEE Foundation Student and Young Professionals Fund*
- *SPS visibility initiatives*
- *Creation of SigView and SigPort*
- *SPS Members vote for SPS President-Elect*
- *Special Interest Groups (SIGs) in big data, IoT, computational imaging*
- *New publications – IEEE Transactions on Signal and Information Processing Over Networks , IEEE Transactions on Computational Imaging, IEEE/ACM Transactions on Audio, Speech, and Language Processing*
- *New SPS logo!*



75 Years of IEEE Signal Processing Society

Empowering the Growth of SP



2020s



- ▶ The COVID-19 pandemic increases demand for digital technologies
- ▶ 5G deployment
- ▶ AI applications are being used in a wide range of industries
- ▶ Autonomous Systems
- ▶ Data science
- ▶ **SPS publications and conferences continue exploiting a priori information about structure in problems/data, connections to physical applications and connection to computational platforms**

- *New Initiatives - Autonomous Systems (ASI), Data Sciences (DSI)*
- *Webinars on brain research, signal processing on graphs*
- *Co-sponsors IEEE Journal on Indoor and Seamless Positioning and Navigation (open access), IEEE Transactions on Radar Systems (hybrid), and IEEE Transactions on Machine Learning in Communications and Networking (open access)*
- *Technical Working Groups (TWG) on industry, integrated sensing and communication, synthetic aperture*
- *Education-oriented 10-hour courses at ICASSP, ICIP*
- *SPS Entrepreneurship Forum at ICASSP*
- *Commitment to diversity and inclusion – PROGRESS workshop, DEI website and pledge*
- *Guidelines on ethical use of technology*



Education-Oriented Short Courses at ICASSP 2023

Happening this week – it's not too late to sign up – visit the registration desk!



Parallel tracks providing deep and multi-sided understanding of a topic

- ▶ 10-hour courses in three sessions (Tuesday-Friday)
- ▶ Hands-on experience and deep dive into topic areas
- ▶ Professional development certificate (PDH) for training hours provided upon completion of course and quiz

Short Courses

A Hands-on Approach for Implementing Stochastic Optimization Algorithms from Scratch

Learning Nonlinear and Deep Low-Dimensional Representations from High-Dimensional Data: From Theory to Practice

Graph Neural Networks

Graph Signal Processing and Geometric Learning: A Foundational Approach

**Thank you to all the
volunteers who made this
possible!**

**ICASSP Education
Program Chairs:**
Helen Meng, Yannis
Stylianou

SPS Education Board

**All of the Course
Instructors!**

Courses will also be offered on-demand for SPS Members in the SPS Resource Center!



Second SPS Entrepreneurship Forum

Held on 5 June 2023



Training a new generation of signal processing entrepreneurs!

Full day Forum consisted of:

- ▶ Sharing of entrepreneurship journeys
- ▶ Educational talks
- ▶ Challenges and opportunities in translating signal processing research into commercial applications
- ▶ Forum for pitching ideas

Sessions will also be offered on-demand for SPS Members in the SPS Resource Center!

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volunteers who made
this possible!**

Chairs:

Nassos Katsimanis
Evita Fotinea
Constantinos Papadias

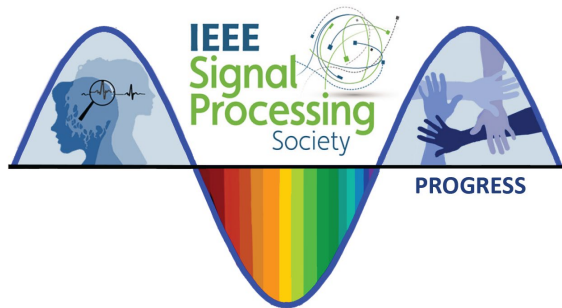
**And all the speakers and
panelists and organizers!**



Promoting Diversity in Signal Processing (PROGRESS)



Held 4 June 2023



www.ieeeprogress.org

**Thank you to all the
volunteers who made
this possible!**

PROGRESS Chairs:

S. Farokh Atashzar
Theodora Chaspari
Maria Flouri
Athanasia Zlatintsi

SPS PROGRESS
Oversight Committee
Panel Organizers
Speakers

- **Diversity and inclusion are pillars of innovation**
- The key to increasing diversity and inclusion in signal processing is a more diverse faculty, who will offer role models, draw women and underrepresented minorities to the field and inspire them for excellence.
- PROGRESS aims to motivate and support women and underrepresented minorities to pursue academic careers in signal processing



SPS Scholarship Program

New in 2023!



- ▶ Provides financial support to undergraduate and graduate students committed to pursuing signal processing education, and subsequently, careers.
- ▶ Students (undergraduate and graduate) with a minimum B grade point average (or international equivalent) are eligible.
- ▶ A total prize of up to US \$7,000 could be received across 3 years
 - Year 1: Up to US \$2,000
 - Year 2: Up to US \$2,000
 - Year 3: Up to US \$3,000
- ▶ Accepting submissions through **30 June!**



IEEE Signal Processing Society



Members enjoy:

- ▶ Access to the latest leading-edge signal processing research
- ▶ *IEEE Signal Processing Magazine*
- ▶ Discounts on SPS conferences
- ▶ Access to SPS continuing education materials
- ▶ Networking, events and resources and grants for students, young professionals, and women
- ▶ **Scholarship program** – *new in 2023!*
- ▶ **Build** your network, receive **recognition**, and **amplify** signal processing research, mission, and initiatives



Volunteer Opportunities

- Join our global network of more than 1,000 volunteer leaders making their mark across Society activities. Opportunities available Society-wide, including:

- Technical Activities
- Membership
- Publications
- Conferences
- Education
- Awards
- Public Visibility
- Diversity and Inclusion
- and more!



75th Anniversary at ICASSP 2023



Visit us at the 75th anniversary lounge all week long!

- ▶ Photo booth
- ▶ Join our Live Mosaic
- ▶ Meet and greets with signal processing leaders
- ▶ 75th Anniversary issue of *IEEE Signal Processing Magazine*
- ▶ Learn about SPS and signal processing history
- ▶ Cake cutting ceremony
- ▶ Society information
- ▶ Events being held daily – stop by!



Executive Committee



Athina Petropulu
President



Min Wu
President-Elect



Alle-Jan van der Veen
Vice President-Technical Directions



Ana Isabel Pérez-Neira
Vice President-Conferences



Roxana Saint-Nom
Vice President-Education



Kenneth Lam
Vice President-Membership



Marc Moonen
Vice President-Publications



Rich Baseil
*Executive Director
(non-voting)*



Thank you for your service!



K.V.S. Hari

*Vice President-Membership
2020-2022*



Shrikanth (Shri) S. Narayanan

*Vice President-Education
2020-2022*

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Rich Baseil
Executive Director



Theresa Argiropoulos
Director, Operations

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- ▶ **George Olekson**, *Chapter & Operations Associate*
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- ▶ **Jaqueline Rash**, *Membership Program & Events Administrator*



Caroline Johnson
Senior Manager, Conferences

- ▶ **Nicole Allen**, *Senior Conference Admin*
- ▶ **Samantha Esposito**, *Conference Admin*
- ▶ **Dena Watkins**, *Marketing Analytics Manager*
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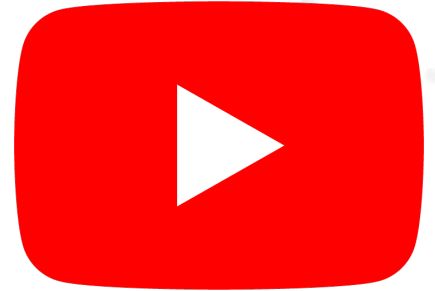
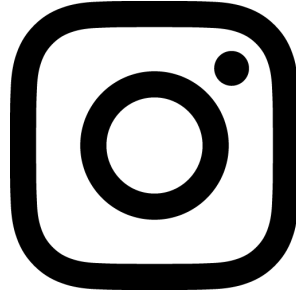
William Colacchio
*Senior Manager,
Publications & Education*

- ▶ **Rupal Bhatt**, *Web Administrator*
- ▶ **Michelle Demydenko**, *Peer Review/Educ Prog Admin*
- ▶ **Nanette Januszkiewicz**, *Peer Review/Educ Prog Admin*
- ▶ **Mikaela Langdon**, *Peer Review/Educ Prog Admin*
- ▶ **Rebecca Wollman**, *Publications Administrator*



Stay Connected

Follow SPS on social media for more Society events, resources, and more!



@ieeeSPS on all platforms

**Thank you, and enjoy
your time at
ICASSP 2023!**