

147TH

AES CONVENTION

Javits Convention Center
New York, USA

October 16–19, 2019

CONVENTION REPORT

AES NY
WELCOME

#AES19

Under the banner Inspire, professional audio's Annual family reunion, the 147th Audio Engineering Society International Professional Audio Convention—AES New York 2019—returned to New York City's Javits Center for four days, October 16–19, where inspiration was abundant as leading audio innovators shared their knowledge and experience. The personal contact that makes the audio industry a community was intertwined with educational experiences and the sharing of information crafted to provide attendees with resources to propel their careers forward.



"The program rocked, and the exhibits were packed with people. Everyone was very excited to be there," shares Agnieszka Roginska, AES New York 2019 co-chair and AES president-elect. "No time in AES's history has seen a more diverse, innovative, and forward-looking program." Convention co-chair and AES Secretary Valerie Tyler elaborates, "We expanded the comprehensive technical program to include more genres, a broader range of new technologies, and a wider breadth of voices than ever before."

EXHIBITS

MANN.BERLIN

"We're so proud of the team that came together to make this convention a reality," adds Jonathan Wyner, the third of the Convention's co-chairs. "From the technical program to the exhibition hall, the interests of every attendee were met. Expanded topics drew new attendees and let long-time attendees expand their horizons."

The convention's wealth of opportunity—more than 750 of professional audio's leading innovators presenting in the more than 330 sessions in the All Access Technical Program and the 130 sessions on the Exhibition

Hall's Inspiration Stages and in its topical Theaters, alongside 236 exhibiting brands—was evident in the registration numbers, according to Colleen Harper, AES executive director. "Registration for the Audio Engineering Society's 147th International Pro Audio Convention again topped 14,000," she says. "That includes a 20% increase in individuals opting for an All Access badge for the full Technical Program. The AES and our events are more relevant than ever to an industry where technology and its application are in a constant state of change."



Convention chairs Agnieszka Roginska, Valerie Tyler, and Jonathan Wyner welcome attendees to the convention.

THE EXHIBITION

"All the exhibitors brought their 'A Game!'" said producer/engineer and AES New York 2019 presenter Warren Huart. "Everyone's booths showed a massive range of products, and the diversity of modern and legacy products was the best it's ever been. It was so gratifying to see the huge amount of innovation on display!"

That blend of modern and vintage was exemplified by console maker API's presence at AES New York 2019, where the company celebrated its 50th anniversary. It was "a great show for API," says the company's owner and president, Larry Droppa, "aided by the museum display in our booth, which provided not only a history lesson for the younger generation, but a chance for our contemporaries to reminisce over the 'glory days' of tape-based recording. Attendees were enthusiastic about the state of the industry. We were particularly pleased with the number of student groups and younger audio engineer/producers who value the listening process as much as the advances in technology."

"Over the last few years," echoed Huart, "AES has actively been bringing in and cultivating young engineers. This year's show was amazing testament to this."

Familiar faces abound on the AES Exhibition floor, though not always where expected. For instance, Phil Wagner's return to Solid State Logic was simultaneous with a new distribution arrangement with Group One, Ltd along with the release of the all-analog, non-automated mid-sized Origin console designed to complement digital recording with an inline analog console workflow.

Venerable gear was noted for its longevity in the exhibits, like Audio-Technica's celebration of one its "most acclaimed and ubiquitous microphones," the AT4050 multi-pattern condenser mic. Gear was enhanced and lines extended, as with Genelec's flagship "The Ones" series of point source monitors with updated transducers in a new model, the 8361A, the updated 8351B, and the complementary W371A Adaptive Woofer System developed to deliver uncolored and neutral reference monitoring for a much wider range of room sizes, listening distances, and SPL requirements.

The new at the exhibition included software emulating hardware with Waves Audio's introduction of MyMon, an iOS/Android Personal Monitor Mixing App for the Waves eMotion LV1 Live Mixer giving musicians on stage direct control of their monitor mix. Lectrosonics had its the first showing of the D Squared digital wireless microphone system, utilizing the company's 4th-generation digital architecture allowing a compact package with "flexibility, ultra-fast setup, studio-quality audio, and ultra-low latency."

Demo Rooms off the show floor provided focused experiences for attendees with products like Meyer Sound's new ULTRA X-40, the heir apparent to the UPA point source loudspeaker; Sennheiser and Neumann's demo room was fitted with a 7.1.4 loudspeaker setup with KH 310, KH 420 and KH 870 loudspeaker models and hosted high-profile mixing, recording, and mastering engineers playing their immersive audio content each day; Amazon Lab126 and Analog Devices showcased each their latest world-class precision audio signal processing hardware and software technologies for high-performance audio.

The Exhibition aisles stayed packed throughout the convention with attendees offered ample opportunity to explore the latest hardware and software alongside the opportunity to learn and be inspired by the presentations at manufacturers' booths and on the Recording, Live Production, and Electronic Dance Music Stages, in the Software@AES and Audio Video over IP Pavilion Theaters and at the Audio Builders



A crowded exhibition hall at the Javits.



Learning to Mix with the Masters.



Dan Dugan, left, explains his automixing products.



The John Lennon Educational Tour Bus raffled off prizes to big crowds.

Workshop events and the AES Mix With the Masters Workshops, the latter featuring a who's who of modern recording professionals sharing tips and techniques. Glenn Lorbecki served as the Convention's Expo

Theater Coordinator and host of numerous on-stage events.

Showing further appreciation for AES's nurturing of the audio professionals that are the future of both the Society and the audio industry, Genelec Inc.'s marketing director Will Eggleston sums up AES New York 2019 by declaring, "The AES audio community is alive and vibrant, indeed. It's so great to see so many enthusiastic young audio professionals participating and doing so many cool things."

OPENING CEREMONY AND AWARDS

The opening ceremonies on Wednesday, October 16, featured the presentation of this year's AES Awards, along with welcoming remarks that began with an address from AES Executive Director Colleen Harper that recognized the uniqueness of the AES community of members. "The AES membership is special," proclaimed Harper. "Your dedication and enthusiasm are extraordinary, and it's because of you that we are able to work toward advancing the science and practice of audio. There has never been a more exciting time to be an AES member or involved in pro audio."



Harper then introduced AES President Nadja Wallaszkovits, who in her own welcome to convention attendees, revealed her professional history to be a perfect example of the relevance of the Society and the impact it can have upon a life and a career.



Colleen Harper, executive director (top), and Nadja Wallaszkovits, president, (bottom) open the convention.

Wallaszkovits shared how, as a university student in Austria, she was introduced to the Society by a professor who invited her to participate and join. "It was my first chance to meet the well-respected audio professionals of our country, to listen to their presentations, to discuss current topics with them and to become involved in the audio community," shared Wallaszkovits. The "powerful" experience of her early AES involvement, she declared, "profoundly impacted my professional life."



Convention chairs: from left, Jonathan Wyner, Agnieszka Roginska, and Valerie Tyler.

AES AWARDS AT THE 147TH

SILVER MEDAL AWARD

Marina Bosi, in recognition of outstanding achievements in the development and standardization of audio and video coding and of secure digital rights management.

Louis D. Fielder, for extraordinary contributions to the field of perceptual audio coding, and years of service to the Audio Engineering Society.

FELLOWSHIP AWARD

Anthony Agnello, for the continuous invention of influential disruptive audio technologies.

Martha de Francisco, for conspicuous commitment to audio education and mentorship and support of the Audio Engineering Society.

Michael Kelly, for significant contributions to the Society's leadership in Game Audio.

John Krivit, for conspicuous commitment to audio student education and mentorship.

Jan Abildgaard Pedersen, for advancements in the field of loudspeaker design and for his substantial contributions to the Audio Engineering Society.

Josh Reiss, for valuable contributions to, and for encouraging and guiding the next generation of researchers in, the development of audio and musical signal processing.

Takehiro Sugimoto, in recognition of his diverse contributions to the development and standardization of 22.2 multichannel sound broadcasting systems.

Terri Winston, for providing training, resources, and leadership, greatly expanding the participation of young girls and women in the field of audio engineering.

DISTINGUISHED SERVICE MEDAL AWARD

Garry Margolis, in recognition of more than 20 years of dedicated service to the Society as a Section Officer, Governor, Treasurer and President.

CITATION AWARD

Pat Parker, for over 40 years of invaluable contributions to Audio Engineering Society conventions.

HONORARY MEMBER

Grandmaster Flash, for pioneering revolutionary and influential implementations of audio and music technologies for performance.

BOARD OF GOVERNORS AWARD

Gavin Kearney, in recognition of co-chairing the 2019 AES International Conference on Immersive and Interactive Audio.

Mariana Lopez, in recognition of co-chairing the 146th AES Convention in Dublin.

Michael Santucci, in recognition of co-chairing the 2018 International AES Conference on Hearing Disorders.

Jim Starzynski, for outstanding leadership and contributions to the AES Audio Guidelines for Over the Top Television and Video Streaming Technical Group within the Broadcast and Online Delivery Technical Committee.

Jonathan Wyner, in recognition of co-chairing the 145th AES Convention in New York.



Silver Medals are presented to Marina Bosi (L) and Louis Fielder (R)



Fellowship Awards are presented to, from left, Anthony Agnello, Martha de Francisco, Michael Kelly, and John Krivit



Fellowship Awards are presented to Jan Abildgaard Pedersen, Josh Reiss, and Terri Winston



Board of Governors Awards are presented to Jim Starzynski (L), Jonathan Wyner (R)



Best student paper award (L), and best peer-reviewed paper award (R)

147TH CONVENTION AWARDS PRESENTATION

Wallaszkovits recalled delivering her first AES convention presentation while a student, beginning a familiar pattern where the combined knowledge from her formal education, her growing experience, and the continuation of her education through AES resources allowed her to begin to give back to the Society and the audio industry.

President Wallaszkovits then introduced AES New York 2019 Convention Committee Co-chairs Agnieszka Roginska, Valerie Tyler and Jonathan Wyner who also welcomed attendees, recognized and praised the rest of the convention committee and promoted highlights of the convention including the expansion of the Technical Program to embrace diverse musical genres – the new Hip-Hop and R&B, Electronic Dance Music, Electronic Instrument Design and Applications Tracks – along with familiar core content. Wyner further addressed the Convention Committee's commitment to diversity and

inclusion, along with the Society's ongoing and developing diversity initiatives, with a heartfelt appeal to the audience to embrace AES's inclusivity efforts.

Awards presentations during the Opening Ceremony began with the announcement of the winners of the Best Peer-Reviewed Paper and Best Student Paper presented by Journal of the Audio Engineering Society Editor Bozena Kostek and Convention Papers Co-chairs Areti Andreopoulou and Braxton Boren. These awards highlighted outstanding contributions from among the submissions of 100 authors from around the world.

This year's Best Peer-Reviewed Paper Award went to Ulrike Sloma, Florian Klein, Stephan Werner, and Tyson Pappachan Kannookadan for their paper "Synthesis of Binaural Room Impulse Responses for Different Listening Positions Considering the Source Directivity."

The Best Student Paper Award went to Robert Hupke and co-authors Lukas Beyer, Marcel Nophut, Stephan Preihs, and Jürgen Peissig for their paper “Effect of a Global Metronome on Ensemble Accuracy in Networked Music Performance.”

Alex Case, AES Awards Committee chair, then spoke of the importance of the recognition of significant contributions to the audio sciences, the audio industry and to the AES as he and President Wallaszkovits began the presentation of highly deserving AES awardees with Citation, Board of Governors, Fellowship, Distinguished Service, and Silver Medal Awards. A full list of awards presented at the Convention are listed in the “AES Awards at the 147th” sidebar on the next page.

KEYNOTE

Making a theatric entrance to the stage, AES New York 2019 Keynote speaker and hip-hop legend Grandmaster Flash walked to a white board and wrote out the formula $4B=6CCR=Full\ Seamless\ Loop$ and labeled it “Quik Mix Theory” then proceeded to wordlessly lay down grooves using two turntables. After stating that “I speak better with my hands than a mic,” Grandmaster Flash nonetheless captivated the packed Special Events Room with his address entitled “Evolution of the Beat,” beginning with recollections of his career which started in the 1970s when as a teen he took DJing into new territory with the development of his Quik Mix Theory for remixing, looping, and extending breaks by alternating beats and loops between two turntables. The formula, he explained, backed a track by four musical beats by cueing vinyl cuts six counter-clockwise revolutions (visually aided by a crayon line across the radius of a record) to set up a loop of the track by alternating between two identical records on a pair of turntables. This concept, an innovative application of existing technologies, revolutionized music by laying the foundation used for the wildly successful hip-hop genre. Continuing with further demonstrations of his technique, with anecdotes about selecting tracks and protecting the contents of his collection of loops, and sharing how technology enabled his art, Grandmaster Flash energized the audience who left enthused to continue their convention experiences.

At the end of his Keynote performance, Grandmaster Flash showed pride and delight as AES President Wallaszkovits presented him with an Honorary Membership to the Society.

SPECIAL EVENTS

AES New York 2019 Special Events co-chairs John Krivit and Lisa Roy not only brought Grandmaster Flash to the Special Events stage for the opening Keynote address, but also a laudable assemblage of the leading minds in audio to address topics spanning many of the full Technical Program’s Tracks. As the Convention’s Special Events Track was open to all attendees, the Special Events program provided those with Exhibits-Plus badges a window into the depth and quality of the All Access Technical Program.

Special Events sessions covering recording production included “The Making of Sheryl Crow’s *Threads*” where Glenn Lorbecki interviewed mixer/engineer Dave O’Donnell, breaking down Crow’s latest duet-laden anthology and “The Making of the #1 LP *Help Us Stranger* by The Raconteurs” with Mark Rubel asking insightful questions to coax the inside story of the Jack White-led project from mix engineer Vance Powell.

The CALM act in the USA and similar global initiatives, and loudness management protocols in place that were developed with significant contributions by the AES, have largely ended the dive for the volume control when changing broadcast television and cable channels or when content on those delivery media changes between programs and commercials. Although level normalization like the Apple Sound Check function have helped address relative loudness issues in personal music playback, consistency in perceived loudness still varies widely across the music listening landscape now dominated by streaming. A ceasefire in the hypercompression-armed war on dynamics was called for in the session “The Loudness War is Over (If You Want It)” where George Massenburg led the powerhouse panel of audio production professionals—Ivan Barias, Gimel “Guru” Keaton, Bob Ludwig, and Thomas Lund—discussing how content creators can take ownership of, and take charge in addressing, streaming loudness issues.

Lunchtime keynotes in the Special Events series included the address “The Love of Recording” by multiple GRAMMY award-winning producer Emmy-winning musical director and A-list drummer Steve Jordan on October 17th. On the 18th, “Inspiring and Educating the Next Generation of Producers, Engineers, Creators” was the session title for a lunchtime keynote covering the evolution of education to prepare students for the realities of today’s music production business. Presenting the address were GRAMMY Award-winning



Grandmaster Flash during his remarkable keynote performance.



Loudness War panel: back row, from left, Thomas Lund, George Massenburg, Ivan Barias; seated Bob Ludwig, left, and Gimel “Guru” Keaton.

producer/instrumentalist and CEO of the 1500 or Nothin' production/songwriting collective Larrance Dopson, along with GRAMMY Award-winning producer and songwriter IZ Avila (half of The Avila Brothers production team).

The AES Diversity & Inclusion Committee, over 40 members strong, assembled with interested parties for a reception the first evening of the convention then, on the final day of AES New York 2019, hosted the "Diversity & Inclusion Town Hall" as part of the Special Events Track. D & I Committee co-chairs Leslie Gaston-Bird and Piper Payne were joined onstage by committee members to lead a discussion on the initiatives of the committee toward ensuring diversity in the AES worldwide and within the audio industry as a whole by improving accessibility, welcoming diverse genres, embracing emergent audio fields and research, and radiating inclusiveness to all gender and gender identities, races, physical abilities, ages, and nationalities, and to discuss issues faced by Town Hall attendees. Gaston-Bird also served on the 147th Convention Committee as Diversity & Inclusion Advisor.

HEYSER LECTURE

Louis D. Fielder, an AES Silver Medal awardee and a past president of the Society, presented the annual Heyser Memorial Lecture on the second evening of AES New York 2019. Fielder's talk was entitled "Psychoacoustics Applied to Dynamic-Range and Nonlinear-Distortion Assessment."

"The psychoacoustics of noise detection, measurements of noise in the digital-audio recording / storage / reproduction chain, and measurements of peak-acoustic pressures in music performances are combined to determine the requirements for noise-free reproduction of music," began Fielder's abstract for the lecture. "It is found that the required ratio between the maximum reproduction levels and the perceived audibility of noise can be as much as 124 decibels. When more practical circumstances are considered, this requirement is shown to drop to more feasible values." The lecture examined how auditory masking allows for the assessment of nonlinear distortions in digital-audio conversion systems operating at low-signal levels. Fielder's lecture concluded with a discussion of expanded use of masking and the presentation of a model for determining nonlinear distortions in head-

phones and low-frequency loudspeakers.

Fielder's industry experience includes 34 years at Dolby Laboratories on the application of psychoacoustics to the development of audio systems and the development of a number of bit-rate reduction audio coders for music distribution, transmission, and storage applications. Fielder has led research into perceptually derived limits for the performance for digital audio conversion, low-frequency loudspeaker systems, distortion limits for loudspeakers/headphones, loudspeaker-room equalization, and headphone virtualization.

"Louis Fielder's expertise and experience exemplify the stature of Heyser Lecture presenters," shared AES Technical Council Chair Steve Hutt. "As we celebrate the 20th year of the Heyser Lecture series, we were delighted to bring Louis to the stage to share his unique insights." The Richard C. Heyser Memorial Lecture series, hosted by the AES Technical Council at each convention, honors the extensive contributions to the Society made by Heyser, who was widely known for his ability to communicate new and complex technical ideas with great clarity and patience.



Danny Kortchmar, left, and Steve Jordan



African Americans in Audio panel: from left: Leslie Gaston-Bird, Paul "Willie Green" Womack, James Henry, Abhita Austin, Prince Charles Alexander, and Ebonie Smith.



Louis Fielder (center) is presented with a certificate to mark his presentation of the Richard C. Heyser Memorial Lecture.

TRACKING AN INDUSTRY

The new-for-AES New York 2019 Electronic Dance Music Track, co-chaired by Alexandra Bartles and Rick Snoman, featured Technical Program sessions including "The Art & Origins of Sampling: From Vinyl to DAW; From Hip-Hop to Dance Music" with Thavius Beck and Nate Mars, a master class on mixing with award-winning engineer Ariel Borujow, and a remixing tutorial with Snoman. The Track was supplemented by sessions on the dedicated Electronic Dance Music & DJ Stage on the Convention's exhibition floor.

Paul "Willie Green" Womack chaired the new Hip-Hop and R&B Track, which kicked off with the Thursday, October

17th session "Chopped and Looped—Inside the Art of Sampling for Hip-Hop" on the Special Events stage. Womack moderated the exploration of sample-driven production including searching for samples, composition, processing and mixing session with DJ icon Breakbeat Lou, DJ/producer/artist Hank Shocklee, producer/engineer/artist Ebonie Smith and, by phone, producer Just Blaze. Three additional Track sessions took place on the following day: "The Soul of an R&B

Mix” with Womack and Prince Charles Alexander, “Engineering for the Abstract: Recording Q-Tip and A Tribe Called Quest” with Gloria Kaba, and a panel discussing “Studio Design for Hip-Hop and R&B”.

Also new was the Electronic Instrument Design and Application Track, chaired by electronic musician, guitarist, composer, sound designer and Berklee College of Music faculty member, Michael Bierylo. Four Technical Program sessions on the second day of the Convention comprised the Track, led by leading contributors to the field, including David Rossum, co-founder of E-mu Systems which under his leadership developed the first digital polyphonic synthesizer among other ground-breaking innovations.

Broadcast audio is a perennial mainstay topic of AES conventions, with the new Track moniker—Broadcast & Online Delivery—indicative of the evolving nature of the field. Four full days of sessions covered the gamut of current topics in the mass distribution of audio, from the latest tools and techniques in audio processing, to foundational concepts and technologies in modern distribution including metadata and codec and streaming standards, to immersive and object-based audio production for broadcast, to podcast production and dedicated facilities for podcasting. The Broadcast & Online Delivery Track was chaired by David Bialik, with assistance from Fred Willard. With over three decades of dedicated and capable curation of convention broadcast content—for which he was recognized with Distinguished Service Medal in 2018—Bialik has not only consistently delivered comprehensive Track content, but also developed special experiential events.

Three such evening events took place during AES New York 2019. On the first evening of the convention, two performances of the play “An Intimate Evening with Tesla and Twain” was held in the penthouse of NYC’s Radio Waves Building, offering insights into the unique relationship between inventor Nikola Tesla and author Mark Twain and their roles in technological innovation. Two evenings later, a pre-release screening was held at the Dolby Theater of the film *The Current War: Director’s Cut*. The film delves into the conflicts between Tesla, Thomas Edison and George Westinghouse as corporations battled to determine whether alternating (AC) or direct (DC) current would power the USA.

On the evening of Thursday, October 17th, the growth of the podcasting market was further reinforced with a tour of Stitcher studios New York. Stitcher—an early proponent of the podcasting medium, and the parent company of comedy podcasting network Earwolf and the advertising and sales firm Midroll—engaged the Walters-Storyk Design Group (WSDG) to create production facilities in both its NYC and LA offices. The recently completed NYC studio complex occupies a 2000-square-foot sector of the firm’s 20,000-square foot space in a midtown Manhattan office building. The suite of three studios, two edit rooms, and two additional ISO booths can accommodate productions ranging from a one-on-one interview to an eight-person roundtable and live music recording sessions.

Jessica Livingston served as the convention committee’s Tech Tours chair, facilitating off-site events.

Recording is another foundational topic for AES convention technical programs, and under the leadership of experienced co-chairs Jim Kaiser, Michael Romanowski, and Paul Womack, AES New York 2019 presented a diverse and relevant slate of sessions. Iconic productions and production techniques were explored in events such as “So Unforgettable—Two Iconic Albums from Two Non-Studio Spaces” in which engineer/mixer Kevin Killen and interviewer Alex Case explored



Performance Spaces for Broadcast panel: from left, Paul McLane, Gary Kline, David Bialik, Jason Ornellas, and Sam Berkow.



Archiving panel: from left, Jessica Thompson, Bob Koszela, Rob Friedrich, Cheryl Pawelski, Pat Kraus, Toby Seay, Jeff Balding, and Jamie Howarth.



Paul “Willie Green” Womack moderating Hip Hop panel.



Archiving the 90s panel: from left, Catherine Vericolti, Jason Bitner, Kaylie Ackerman, Kelly Pribble, and Eddie Ciletti.

TRACKING AN INDUSTRY AT THE 147TH

the making of U2's *The Unforgettable Fire* and Peter Gabriel's *So*—released just two years apart, and both featuring Killen's mixing/engineering work, and in the session “For the Record: Engineering Prince” with award-winning engineer Leslie Ann Jones moderating a panel of engineers who worked with the late artist: Lisa Chamblee, Sylvia Massy, Peggy McCreary, and Susan Rogers.

The evolution of recording technology and its application past and present was examined in sessions including “The Doppler Gang—A Panel of Pros Discuss the Pros and Cons of Pitch Change” which featured co-moderators Anthony Agnello and Richard Factor (both developers of disruptive technologies at Eventide) with panelists Alex Case, Bob Clearmountain, George Massenburg, Susan Rogers, and Tony Visconti—all noted recording professionals and educators. Analog tape recording invited tape speed manipulation and pitch-change processing became the basis for many tracking and mixing effects, with Agnello and Factor leading the development of digital pitch-change hardware in the mid-1970s. The panel shared their experience and expertise, along with anecdotes and audio clips that demonstrated the application of pitch change from the obvious to the subliminal and from the logical to the absurd.

The theme of music production's evolution was continued in the session “How We Make Music—Crossing the Decades from Analog to Digital” with noted mix engineer Chris Lord-Alge moderating a panel of engineers and producers. Lord-Alge, his brother Tom, Niko Bolas, Danny Kortchmar, and Dave Way discussed the changes in production techniques and workflows brought about by digital technologies and how the panelists creatively bridge the analog and digital domains.

Technology and the specific demands of various music genres have wrought sweeping changes to the roles of producers, engineers, and mixers, explored in the session “Changing Roles in the Audio Industry,” moderated by Track co-chair Womack with participants Ariel Borujow, Ken “Duro” Ifill, and Mike Kuz. That concept was further explored in the session “Evolution of Album Production from Start to Finish” which featured Women's Audio Mission founder and executive director Terri Winston leading a discussion with guest engineers Gloria Kaba, Heba Kadry, and Simone Torres.

Along with the 20 sessions within the Recording and Production Tracks, relevant and related topics were interleaved within the sessions comprising a number of Tracks, including the Immersive and Spatial Audio, Acoustics and Psychoacoustics, and Hip-Hop

and R&B Tracks, and featured prominently within the convention's Special Events Track.

Alex Case chaired the Acoustics and Psychoacoustics Track, which included an intriguing session sharing the Walters-Storyk Design Group's experience with two prototype Acoustic Lab listening rooms that use audio processing and VR simulations to provide pre-construction predictive auditioning of post construction performance. Additional sessions included both conceptual and practical insights into maintaining consistency in monitoring environment performance to avoid cognitive confusion along with discussions of the fundamentals

of listening tests, into organizing unbiased PA/SR shoot-outs and of using the 20-year-old PEAQ standard (or not) to objectively assess the audio performance of lossy codecs.

The Sound Reinforcement track of the convention was again chaired by Henry Cohen. Session topics included sound system design and optimization, what sound engineers need to know about psychoacoustics, IP-based live production intercoms and a dialog conceived to promote communication between live sound professionals with disparate training, skill sets, and responsibilities yet all working toward the goal of superlative audience experiences.

The three-hour “RF Super Session” filled Thursday morning, first with a James Stoffo moderated discussion of the issues surrounding RF spectrum issues and trends in wireless gear with leading specialists Mark Brunner (Shure), Joe Ciaudelli (Sennheiser), and Karl Winkler (Lectrosonics). An

advanced practices panel filled the rest of the morning with power users discussing best and leading-edge RF practices including filtering techniques and RF over fiber.

A second morning super session took place the following day: “AC Power, Grounding, and Shielding.” AES Standards chair Bruce Olson and the iconic Bill Whitlock provided authoritative guidance on how to provide AC power properly and safely, without causing noise problems. The session covered power and interface concerns for small to large sound systems—from a pair of boxes on sticks up to large-scale installed and touring systems. Along the way, the pair debunked the significant misinformation that persists in our industry.

The Audio Builders Workshop Track returned for its second year, with co-chairs Owen Curtin and Chris Kincaid stepping up their game to include not only DIY fundamentals for kit construction and gear restoration/modification projects and basic DSP coding, but also providing soldering training on their exhibition floor booth through-



How We Make Music panel: from left, Danny Kortchmar, Dave Way, Chris Lord-Alge, Eddie Kramer, and Tom Lord-Alge.



Audio Builders Workshop panelists: from left, Owen Curtin, Peterson Goodwyn, Brian Newell, Matthew McGlynn, Chris Kincaid, Michael Swanson, and Brewster LaMacchia.

out the onvention. A Saturday DIY Build Clinic allowed attendees to purchase a metronome, passive reamp box, or microphone kit and construct it with guidance from the workshop team.

Maintaining ties to the industry's roots is the purview of the AES' Historical Committee and Committee co-chair Gary Gottlieb brought that perspective to the convention technical program as chair of the Historical Track, with sessions sharing views on team-building and success from the first woman broadcast engineer, teaching audio history, and covering the development and refinement of the compression driver. Track events included homage to industry pioneers with a screening of the documentary *Tom Dowd and the Language of Music*, a panel discussing the legacy of AES Gold Medal Award winner Rudy Van Gelder and "Spike Jones: Preposterous Precision," a retrospective into the life and work of the musical-mischief-maker and production innovator. On hand for the tribute and the Q&A was his daughter and audio engineer extraordinaire, AES Fellow Leslie Ann Jones.

Steve Martz co-chaired the popular Game Audio and XR Track with Scott Selfon, covering eXtended Reality and Game Audio topics including machine learning, mixed reality, spatial storytelling, the future of binaural audio, and insights into the use of Dolby Atmos in *Borderlands 3* and creative collaboration for *Just Cause 4 OST*. A highlight was the "Abbey Road Spatial Audio Forum—Music Production in VR and AR." Martz also co-chaired the Immersive and Spatial Audio track with Gavin Kearney that included sessions covering immersive sound panning, music production for immersive formats, atmosphere recording with Florian Camerer, the immersive productions of Morten Lindberg, 7.1.4 and 4.0.4 recordings by Hyunkook Lee, building listening tests in VR, and sessions on using Ambisonics for sound capture.

Bob Lee returned as chair of the Networked Audio Track, which covered solution-based use of networked audio in live production, an AES70 tutorial, and a number of sessions detailing various audio networking protocols and their application.

Jessica Thompson chaired the Archiving & Restoration Track, moderating a session on the long-term preservation of audio assets. Thompson curated sessions covering metadata, funding archive initiatives, and the unique archiving and preservation needs of the hip-hop genre, podcasts, music of the 90s, and multitrack recordings.

The Audio for Cinema Track included Track chair John Whynot's session "The Portable Score Mix: Cinematic Scores on an Episodic Budget" and sessions addressing re-recording mixing best practices, recording cinema audio remotely, and the use of Ambisonics in cinema sound.

The Product Development Track has become an integral element of the Technical Program due to the efforts of chair Scott Leslie. Horn performance prediction by way of simulations, microphone electroacoustics, directivity optimization of passive loudspeakers, the practicality of using DSP to "fix" a bad speaker, the A2B low-latency digital audio bus standard, production vehicle audio system diagnostics, materials, deep learning and AI for audio applications, and adding AES70 networked control to products were among the topics covered in the track.

Following on the model of the AES New York 2018's half-day Facebook 360 media production hands-on training sessions, two similar events were held during the 2019 Convention. The "Ambisonics Tools for Immersive Audio Capture and Post-Production" event provided an in-depth explanation of the workings of Ambisonics and how it can be a central piece of an immersive audio workflow. The

"Audio Repair and Restoration for Music and Post: Build Your Skills" event provided an overview of how single-ended noise reduction and audio repair tools can be used to solve audio challenges in music and audio post. The events required an additional registration and participants brought their own headphones and laptops with pre-downloaded software and content elements for an interactive, skill-building learning experience.

TECHNICAL PAPERS, POSTERS AND E-BRIEFS

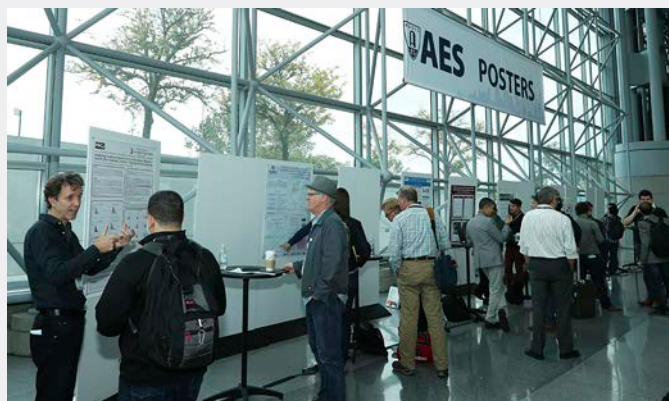
147th AES Convention Papers Co-chairs Areti Andreopoulou and Braxton Boren curated over 100 individual poster and peer-reviewed paper presentations delivering the latest audio research and innovations across 18 themed convention sessions addressing topics including room acoustics, transducers, audio signal processing, perception, recording and live sound production, spatial audio, semantic audio, audio education, and product development.

Intriguing paper presentations included "Accurate Reproduction of Binaural Recordings through Individual Headphone Equalization and Time Domain Crosstalk Cancellation" by digital reverb pioneer and researcher David Griesinger in which he introduced software apps that "allow a user to non-invasively match headphones to reproduce the identical spectrum at the eardrum as that from a frontal source. The result is correct timbre and forward localization without head tracking. In addition, we have developed a non-individual cross-talk cancelling algorithm that creates virtual sound sources just outside a listener's ears."

Continuing on the headphone theme and building upon their work to improve personal listening experiences, Harman International researchers Todd Welti, Omid Knonsaripour, AES Past President Sean Olive, and



From top, authors Matthew Cheshire, Jonas Braasch, and Parichat Songmuang



Poster presenters explain their work to convention attendees.

Dan Pye presented the paper “A Comparison of Test Methodologies to Personalize Headphone Sound Quality” sharing their investigation of different methods to gather subjective equalization preference data from listeners. The tests involved test subjects setting filter gain values for bass and treble shelving filters, and thus selecting their preferred response curves for listening to music through headphones.

Also intriguing was the paper “Concert Hall Acoustics’ Influence on the Tempo of Musical Performances,” presented by Jan Berg of the Luleå University of Technology, Piteå, Sweden. Working from the knowledge that the acoustics of a concert hall is an integral and significant part of a musical performance as it affects the artistic decisions made by performers, Berg sought to quantitatively analyze the effect of concert hall acoustics—mainly reverberation—on musical tempo for a selection of different genres and ensemble types. The study utilized audio recordings made in a concert hall equipped with a movable ceiling enabling a variable volume and thus a variable reverberation time.

The sweeping span of poster sessions, where research is presented in an interactive dialog with attendees, included the presentations “Comparison of Human and Machine Recognition of Electric Guitar Types,” “A Qualitative Investigation of Soundbar Theory” and “Analyzing Loudness Aspects of 4.2 Million Musical Albums in Search of an Optimal Loudness Target for Music Streaming.”

Through engineering briefs, presenters share the results of practical and experiential investigations of a wide range of topics. Included during AES New York 2019 was the presentation “Machine Learning Multitrack Gain Mixing of Drums” by Dave Moffat and Mark Sandler of Queen Mary University of London. Moffat and Sandler shared an approach using human-produced audio mixes, along with their source multitrack, to produce a set of mix parameters for automatic gain mixing of drum tracks.

The engineering brief “MEMS Loudspeakers—A New Chip-Based Technology for Ultra-Small Speakers” was presented by staff of the Fraunhofer Institute. Micro-electro-mechanical systems (MEMS) have become the state-of-the-art solution for many miniaturized components like microphones and inertial sensors. The presentation shared details of efforts to exploit the miniaturization potential and the advantages of semiconductor manufacturing processes to create ultra-small loudspeakers.

STUDENT AND CAREER DEVELOPMENT

AES conventions host a remarkable wealth of content and activities aimed specifically at students; even more remarkable is that the students themselves take responsibility for the organization of these events. In conjunction with AES Education Committee chair Magdalena Piotrowska, outgoing Student Delegate Assembly (SDA) chair for North and Latin America Justin Chervnoy served as the Student and Career Development Track chair. Track session topics included a discussion of resources for continuing education after graduation, ear training, and improving mixes and mix workflows.

Student competitions are a key element of the Track, organized by the SDA with top professionals as judges. In the recording competitions, students submitted entries in the categories of traditional acoustic recording, traditional studio recording, modern studio recording and electronic music, immersive, remix and sound for visual media. The AES Saul Walker Student Design Competition is an opportunity for aspiring hardware and software engineers to submit



Top: Judge Nick Squire comments on student recording.
Middle: A bustling Education and Careers Fair.
Bottom: Some of the many student competition winners.

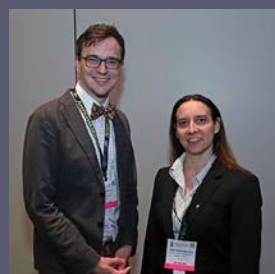
working projects as entries, while the AES MATLAB Plugin Student Competition evaluates student’s VST plugin entries. Student recording competitions and recording critique sessions were graciously hosted by Genelec and PMC in immersive-capable listening environments (as were sessions from a number of tracks where high-quality reproduction was required).

Additional opportunities for students included resume reviews, SPARS and SoundGirls hosted mentoring, the Education and Career Fair, and the Student Delegate Assembly meetings which included the election of Hannah Gallop of Webster University as the SDA vice chair for North and Latin America. Gallop will serve a one-year term as vice chair followed by a one-year term as chair.

Friday at this year’s convention was High School Day. About 200 students with an interest in audio or in an audio program at one of the 10 participating regional high schools made the trek to the Javits Center to experience a warm welcome from audio professionals, a dedicated session on developing listening skills, time on the exhibition floor, and participation in the Education and Career Fair. AES now has its first high school student section and the convention’s High School Day is a way to inspire future audio professionals and to reach out to schools and with encouragement and support.



The 147th Convention Committee gathers for a group photo.



Papers chairs Braxton Boren and Areti Andreopoulos



Game/Immersive chairs, from left, Scott Selfon, Steve Martz, Gavin Kearney



Facilities chairs Michael Hagen and Maggie Tobin



Broadcast and Online Delivery track leaders David Bialik, left, and Fred Willard



Student volunteers with coordinators Matt Kulewicz, Parichat Songmuang, and Kathleen Zhang

AES THANKS THE 147TH CONVENTION COMMITTEE

LET'S TALK

The Society's business is advanced during its conventions through the meetings of various standing committees, the Standards Committee Working Groups, and the Technical Committees of the Technical Council.

Led by chair Bruce Olson and manager Richard Cabot, the AES Standards Committee is charged with defining and codifying best practices for audio engineering. As the premier organization developing standards for audio engineering, 70 years of work on international standards to improve gear and hardware performance, interconnection and the workflows of researchers and practitioners on a daily basis. Eleven working groups met during AES New York 2019 to continue progress on standards including digital audio measurement and interface, metadata, audio file transfer and networking, loudspeakers, microphones,

room equalization, acoustic annoyance, audio connectors, and grounding practices.

Under the leadership of Chair Steve Hutt, the various committees of the Technical Council worked across 23 meetings under their mandate to provide the AES membership with technical and tutorial information via conferences, conventions, workshops, and publications, and to track and report on the very latest advances in technologies and applications. As noted on the descriptions of numerous session descriptions for the 147th, the TC also assists papers chairs and convention and conference chairs in preparing papers sessions and in facilitating meaningful demonstrations of new technologies in order to increase the experiential awareness of our members. Additionally, Technical Committees work to identify important technical issues and recommend them to the Standards Committee for further exploration.



Top left: Josh Reiss chairs the Publications Policy Committee meeting. Top right: Steve Hutt and Jürgen Herre at the Technical Council meeting. Middle left: Agnieszka Roginska speaking during the Conference Policy Committee meeting. Middle right: from left, Nadja Wallaszkovits, Colleen Harper, and Valerie Tyler at the business meeting. Bottom left: Magdalena Piotrowska chairs a meeting of the Education Committee.

All of the AES's standing committees, including the Education, Membership, Diversity and Inclusion, Publications Policy, Conference and Convention Policy, Awards, Nominations, Historical, and Laws & Resolutions Committees met during the Convention. A meeting of the Society's Board of Directors preceded the Convention and the full Board of Governors met as the Convention concluded.

BEHIND THE SCENES

An event of the magnitude of the 147th AES Convention is the result of an enormous amount of work by unsung heroes. The small professional staff of the Society worked tirelessly to ensure smooth and efficient registration, preparation of physical and online program materials, Member Center management, exhibitor support, and convention marketing.

Volunteers perform a myriad of tasks during AES conventions,

aiding staff and helping attendees find their way, this year under the leadership of Matthew Kulewicz, Volunteers chair, assisted by Volunteer coordinators Parichat Songmuang and Kathleen Zhang

Industry Advisors for the convention were past convention co-chairs and industry icons Paul Gallo and Michael MacDonald.

The vast infrastructure required to support the exhaustive technical program, exhibition hall stages and Society meetings was capably managed by Facilities co-chairs Michael Hagen and Margaret Tobin, with valuable assistance by Facilities advisor and past Facilities chair, Julia Caruso.

The Audio Engineering Society convention series will return to the Javits Center October 21–24, 2020 for the 149th AES International Professional Audio Convention.





The AES Board of Governors gathers for a group photo before its meeting after the convention.

MEMBERSHIP COMMUNITY EVENTS AUDIO SCIENCES EDUCATION & CAREER STORE ABOUT Q

AES E-Library

<http://www.aes.org/e-lib/>

Gain immediate access to over 17,000 fully searchable PDF files documenting audio research from 1953 to the present day.

The E-library includes every AES paper published at a convention, conference or in the Journal.

**AES
E-LIBRARY**

SEARCH

All individual AES members receive a FREE subscription to the AES E-Library. A subscription allows you to download any document in the E-Library at no additional cost.
Cost per paper without subscription: \$33
Institutional annual subscription: \$1800 per year