



A recent recording session at the Atlanta Symphony Orchestra—and just some of the audio tech it requires.

Atlanta Symphony Orchestra

Sounds

from a Distance

Thrilling sound is one of the defining characteristics of orchestra concerts. But the pandemic has reordered priorities: outdoor performances and safety protocols like masks and distancing require new approaches to acoustics. Plus, audiences are listening on laptops, phones, earbuds, and more. How do audio engineers convey the sound of music?

by Brian Wise

When orchestras began moving their activities outdoors amid the pandemic, recording engineers were often thrust to the front lines. At the New York Philharmonic's series of amplified pop-up concerts, using a rented pick-up truck dubbed the Bandwagon, Audio Director Lawrence Rock enabled the music of the small chamber groups to rise above the urban cacophony, be it in Manhattan's Herald Square or a neighborhood park in Brooklyn.

When the Boston Pops' brass and percussion sections took to the outfield of

Fenway Park for a filmed performance of Christmas music, Lead Audio Engineer Nick Squire set up a remote studio in the Red Sox dugout, adjusting mic levels over the din of helicopters and highway noise. In Chicago, Charlie Post, the Chicago Symphony Orchestra's audio engineer, reported a cornucopia of sounds of "traffic, kids, pets, and nature" as he mixed the Virtual Day of Music on June 21, a day of digital premieres of videos featuring CSO musicians, filmed in living rooms and backyards and posted every half hour on the orchestra's social-media channels.



This summer, the New York Philharmonic's Bandwagon brought music and musicians to neighborhoods throughout a famously noisy city.

[Full disclosure: I am the producer of the Chicago Symphony Orchestra's national radio broadcasts.] In these and similar settings, recording engineers had to deliver an acoustic that matched the setting—a generous reverb would be inappropriate to a front porch—but was nonetheless pleasing to the ear.

Yet some of the biggest recent revelations for engineers have occurred on the stages where they have worked for years, if not decades. Dmitry Lipay, the Seattle Symphony's Grammy Award-winning recording engineer, said that physical distancing measures, which create a minimum six-foot gap between adjacent musicians in order to limit the spread of aerosols, can upend the sense of balance, pitch, and tonal cohesion. "This is my biggest challenge," he says of the distanced setups, which take place on the stage of an empty Benaroya Hall for streamed video releases. "The musicians are not hearing each other like when they were shoulder to shoulder, breathing together and tuning to each other." Without the sensation of being part of a dense mass of sound, violinists risk overplaying to be heard over the brass. "Of course, we have some tools and I can rebalance the orchestra myself," says Lipay, "but performance-wise, I would prefer them to be more comfortable with each other."

Lipay's experience shows the extent to which American orchestras are now rely-



At the Seattle Symphony as at other orchestras, mics and other high-end tech are increasingly familiar.

League Webinars

The League of American Orchestras has recently presented timely, practical webinars on how and why orchestras are utilizing audio technology and digital platforms during the pandemic. "Balancing Acoustics and Physical Distancing as Orchestras Return to Their Halls," sponsored by Threshold Acoustics LLC, examines how to create safe spaces for performers and audiences while maintaining the unique acoustics of orchestras. The "Shifting from Stage to Screen" webinar explores multiple aspects of digital concerts and events, including technical, strategic, and marketing considerations, led by digital experts and orchestra executives. Watch the webinars on demand at <https://americanorchestras.org/conferences-meetings/on-demand-webinars.html>.



Tommy Joe Anderson, recording engineer at the Atlanta Symphony Orchestra

60-by-60-foot stage for video. “I thought, I’m going to have to completely rethink what I do.” Sayles began supplementing his omnidirectional microphones, which are hung over the stage to get a blended room sound, with spot mics, placed in front of individual players, to achieve the right balances. But other

challenges emerged. During a rehearsal of Mozart’s “Prague” Symphony, the woodwinds seemed to be lagging behind the violins. “It sounded fine in the hall but then I went in my [studio] and it sounded like they weren’t together,” he says. Knowing that sound travels at about one foot per millisecond, Sayles measured a distance of about 40 feet from the concertmaster to the woodwind mics and entered that into his mixing console. It automatically compensated for a 40-millisecond lag.

American orchestras are now relying on their engineers’ ears to find their signature sounds amid a thicket of new safety protocols.

Other, more mundane adaptations during the pandemic involve everything from hygiene (heavily-touched microphones are

notorious vehicles for germs) to aesthetics (nothing ruins a perfect camera shot like a forest of mic stands and cables). Face masks, while crucial, do not come naturally to some violinists or violists, whose chins come into contact with their instruments, and wind players have to figure out how to deal with masks for

themselves and their instruments. For some orchestras, safety protocols mean that technicians are no longer in auditoriums during recording sessions—and thus unable to make quick adjustments.



Nick Squire, recording engineer at the Boston Symphony Orchestra



Boston Symphony Orchestra

A holiday video by the Boston Pops shot at Fenway Park presented unusual challenges for recording engineers and musicians.

Prioritizing Audio or Video

The Detroit Symphony Orchestra has live-streamed concerts from Orchestra Hall since 2011 but has encountered some unexpected twists since relaunching the series in an empty auditorium in September. “It’s been a big adjustment for us to put video first, rather than putting it after the ‘regular concert,’” says Marc Geelhoed, the orchestra’s director of digital initia-

tives. “Typically, we have anywhere from 1,500 to 2,000 people in the hall and we are filming that. Now, we are taking the approach that the cameras come first.”

Detroit’s safety protocols include up to twelve feet of spacing around woodwinds and brass, supplemented by some modest plexiglass shields. In chamber music repertoire, spot mics are sometimes attached to music stands, or to a soloist’s clothing.



At the Boston Symphony Orchestra, health precautions including masks and social distancing, which requires a stage extension, mean that audio engineers have had to adapt.



The Chicago Symphony Orchestra's "CSO from Home" videos require sophisticated sound coordination. In photo: Assistant Principal Oboe Michael Henoeh, flute/piccolo Jennifer M. Gunn, horn Oto Carillo, Assistant Principal Bassoon William Buchman, and Assistant Principal Clarinet John Bruce Yeh.

In a September performance of Bach's Brandenburg Concerto No. 5, Principal Flute Hannah Hammel donned a Broadway-style headset mic. "I don't know if we would have done that in a live concert," Geelhoed admits. "I highly doubt that we would have amplified her through the

a main pair of mics over the orchestra for the majority of the sound," he explains. "That method doesn't work as well anymore." His job requires a grasp of polar patterns, which are the ways in which microphones pick up sound waves from different directions. The goal is to capture the

video performances involved uncharted terrain. "Symphony Hall in a normal concert would be filled with 2,500 people, absorbing the sound and changing the acoustic to some extent," Squire says. "When empty, Symphony Hall is still gorgeous but a bit washy sometimes." With a 30-foot stage extension, the musicians are widely dispersed and Squire's standard array of 40 to 50 microphones has grown to nearly 70. "Usually, we can rely more on

nated audio engineer at the Chicago Symphony, aims for a balance while recording chamber ensembles in circular arrangements (chosen for sightline benefits) and using spot microphones on individual players.

Some recording engineers say they must mix audio that will meet the subconscious expectations of viewers. When a cellist or clarinetist is seen playing a solo on camera, for example, viewers will expect that performer to be slightly louder, says the Atlanta Symphony Orchestra's longtime

Physical distancing measures, which create gaps between musicians to limit the spread of aerosols, can upend the sense of balance, pitch, and tonal cohesion.

recording engineer Tommy Joe Anderson. If not, he points out, "people will start straining, wondering, 'Why am I having trouble hearing that?'" To compensate, he may boost the soloist by a decibel or decibel-and-a-half, "in order to match the eye and the ear."

Seattle's Lipay reports a similar phenomenon. "When you see somebody very close, you would expect to hear a little more of their solo than normal," he notes. He aims for a light touch, however: "It should be an acoustical, natural-sounding orchestra and not over-engineered."

In the Unpredictable Outdoors

The ability to capture sonic nuances naturally decreases in non-traditional settings like a beer garden, where the Charlotte Symphony Orchestra has live-streamed chamber performances, or Exploria Sta-



Charlie Post, the Chicago Symphony Orchestra's audio engineer



Health precautions taken at recent recording session by the Chicago Symphony Orchestra required new solutions from sound engineers, since musicians were masked and socially distanced.

speaker system in the hall. But maybe, given social distancing and where she was on stage, that might have made sense."

In Boston's Symphony Hall, Squire routinely mixes amplified pop and Broadway-style performers for concerts by the Boston Pops. He has also captured the nuances of the Boston Symphony Orchestra's recorded Shostakovich cycle, for which he won four Grammy Awards as sound engineer. But this season's recorded

forward sound field mixed with the natural shine of the hall's acoustic.

Every room adds different acoustic variables. In Seattle's Benaroya Hall, the air ventilation system over the stage allows for eleven changes of air per hour, which is welcome from a safety standpoint but a nagging contributor to a recording's "noise floor." Cooling fans on video equipment and subway rumbles are culprits in other halls. Charlie Post, the Grammy-nomi-



New York Philharmonic Audio Director Lawrence Rock



Detroit Symphony Orchestra

A recent al fresco performance by Detroit Symphony Orchestra musicians. Outdoor performances have always required amplification, but health protocols necessitate further adaptations by sound engineers.

dium, home to Orlando City Soccer Club and the setting for the Orlando Philharmonic’s season opener this September.

When the New York Philharmonic introduced its pop-up Bandwagon concerts, plans were also moving ahead to begin renovations on David Geffen Hall,

set of speakers, a portable Yamaha mixer, several wireless microphones, and a milk crate that served as a seat. “The biggest challenge,” he recalls, “was getting it set up and taken down fast enough so that we could keep moving and do three concerts in a day.”



Marc Geelhoed, director of digital initiatives at the Detroit Symphony Orchestra

the orchestra’s home at Lincoln Center. “We gathered equipment that we were moving out of the hall anyway” for the Bandwagon events, says Rock, the Philharmonic’s audio director. He packed a

Tech rehearsals took place in an empty lot near Lincoln Center. Musicians were arrayed to adhere to the mandated twelve feet of separation for wind players and six feet for strings. While Bandwagon audi-

ences were largely polite and appreciative, there were occasional sirens, loud motorcycles, and a few New York characters. Rock recalls how one spectator, straining to get the right camera angle while taking a photo, lay down almost beneath the musicians. “One of our people asked if he could move back a little bit,” he says with a sigh. “Well, he got all bent out of the shape and then started in on us.”



Courtesy Seattle Symphony

Dmitriy Lipay, director of audio and recording at the Seattle Symphony

Despite these variables, Rock says that technical hurdles can occur just as frequently in the familiar confines of Lincoln Center. Interference on wireless microphone signals, for instance, can arise due to the vicinity of nearby theaters. Other engineers report that a significant amount

Every concert hall has its own acoustic variables. Air ventilation systems are welcome from a safety standpoint but nagging contributors to noise. Cooling fans on video equipment and subway rumbles can also be culprits.

of troubleshooting involves the synchronization of audio and video sources. Latencies, or delays, are introduced by camera positioning, cables, video processing tools, and encoding software, all of which may require the audio to be delayed in order to match the video feed.

Benjamin Maas, head engineer of Fifth Circle Audio, a Los Angeles-area production company that has worked with the Ojai Music Festival and La Jolla Summerfest among others, says he anticipates the range of devices on which people listen to the concerts. “Even if you’re listening on a good stereo system you’re still going to have a certain amount of distractions in your home,” he explained in a recent webinar presented by the Audio Engineering Society. While a 40-decibel range in a con-

Wilson Parish



The Houston Symphony and guest conductor Kensho Watanabe performed works by Mozart and Missy Mazzoli via livestream on August 22, 2020.

cert hall can be exciting, “on most delivery systems, you’re going to end up with a very unhappy audience because their louds will be louder than they can deal with and their softs are going to be too soft to hear.” By adding effects such as digital reverb and dynamic compression, engineers can smooth out the peaks and valleys.

Lipay, of the Seattle Symphony, says

that he always tests his mixes in everyday environments. “In my last check before I send the recording to production I listen in the car while I’m driving,” he says. “I’m used to listening on small speakers, on computer speakers, and large speakers. It’s a normal process, and in this situation I have to make sure that everybody will be comfortable with my mix.”

This attention to detail has no doubt shaped the Seattle Symphony’s pandemic-era spending priorities. “Do we spend all our money on the video component,

Dmitriy Lipay, the Seattle Symphony’s audio engineer, says, “I’m alone in my studio with the door closed.” But musicians, they are the real heroes.”

or do we focus on the audio?” asks Seattle President and CEO Krishna Thiagarajan. “We actually chose to go with the audio and make video something

that over time we can continue to grow.” Plans to purchase gear for cinematic tracking shots, which would lend a Hollywood sheen to the visual experience, have been put on hold for now, Thiagarajan says. Instead, the orchestra has invested in a streaming platform that delivers higher audio bitrates to deliver better sound, more quickly.

Thiagarajan is not alone as he looks to the future of video streaming. The Atlanta Symphony Orchestra recently ordered six Schoeps Colettes, high-end microphones for spot recording. “If and when we go back to normal, we’re going to try and put some mics in the orchestra more often than we used to,” says Atlanta’s Anderson. “We’ve been recording the Atlanta Symphony’s concerts for 32 years and we’ve never really put mics on stage because it’s visually not something we wanted to do. But they’ve sort of given us carte blanche to order some equipment we might need for this virtual presentation.”

Lipay, referring to his role as a behind-the-scenes figure, says that he is primarily focused on an authentic audio experience. “I’m alone here in my studio with the door closed,” he says. “But musicians, they are the real heroes.” **S**

BRIAN WISE writes about music for media outlets including *BBC Music Magazine*, *MusicalAmerica.com*, and *Strings*. He is also the producer of the Chicago Symphony Orchestra’s national radio broadcasts.



Shannon O'Hara

Houston Symphony Recording Engineer Brad Sayles