

# Music Lives Here

The National Music Centre's New Studio Bell  
is much more than a museum

By: Alan Hardiman







The National Music Centre's new Studio Bell in Calgary was formally opened on Canada Day, July 1, 2016, the first facility of its kind in North America and the first to be dedicated to music in Canada in all its forms. Completed at an estimated cost of \$191 million, the 2,500-capacity cultural center includes a performance hall, recording studios, live music venue, museum, and broadcast studio.

Designed by Brad Cloepfil, principal of Allied Works Architecture in Portland, Oregon, the visually striking complex rises in nine interlocking towers clad inside and out in 220,000 glazed terra cotta tiles from ceramics producers Koninklijke Tichelaar Makkum, the oldest company in the Netherlands. The project encompasses 160,000 sq. ft. of new construction, including the 276-seat Presentation 1 performance hall and 22,000 sq. ft. of exhibition space. The neighboring historic 1905 King Edward Hotel, the city's blues hub in the 1970s and 1980s, was dismantled brick by brick, reassembled and integrated into the facility. In 2015, the telecommunications and media company Bell Canada negotiated naming rights under a 12-year contract worth \$10 million.

"Uniting audience and performer, student and teacher, the building creates instances of immersion, when the visitor is transported from daily life, and moments of transition between spaces, providing an opportunity for quiet contemplation," Cloepfil said in a statement. "In our designs, we seek to create transformational spaces. For the National Music Centre, Studio Bell's nine towers are modeled by gravity and acoustics, and together create a silent and powerful instrument that emanates music and light."

One might be tempted to dismiss such lofty sentiment as mere hyperbole; several observers, however, have related similar impressions, the photographer Mark Nunn recalling his visit to Studio Bell as "being inside some exotic musical instrument."

The facility is portioned into two parts on the east and west sides of 4th St. SE, their uppermost stories linked by a bridge. In the larger east block, a central lobby opens upward like an atrium through the building's five levels. Two helical staircases flank the lobby and fill the interstitial space between the towers.

The building's programmatic and structural center, the 3,200 sq. ft. Presentation 1 performance hall occupies much of the second and third floors of the east block. Its design is unique in that the back of the stage overlooks the lobby "to fill the entire building with music," according to the architect; however, the stage can be closed off by an operable partition, a movable upstage acoustic wall tracked out from storage pockets on either side of the stage.

"I love that space because of the intimacy of it," Cloepfil said in an interview. "Even though it's a five-story building and there are all these different vessels and all these different experiences, you feel like you're in one place. In any





Matching helical staircases flank the east block lobby, which opens upward like an atrium through the building's five levels. When the performance hall's movable upstage acoustic wall is retracted, the back of the Presentation 1 stage overlooks the lobby to fill the entire building with music.

one place you can feel the presence of all these different activities and at the very heart and soul is the performance space. It's really a part of the entire institution. It really connects to everything, and it's really the center of everything."

A delay in the delivery of the operable partition due to the cessation of business late in 2015 of the supplier, IAC Acoustics, and the subsequent appointment of a new supplier, Moderco Inc. of Boucherville, Québec, has postponed final commissioning of the hall pending completion of its installation, which is expected toward the end of 2017.

Twenty-two open galleries, referred to as stages to reflect the center's music festival-themed visitor experience, showcase highlights from the National Music Centre's collection of more than 2,000 musical instru-

ments, artifacts, and artist memorabilia that span over 450 years of technology and innovation.

"We want our exhibition spaces to be resonant in a way that a music festival is resonant, to be a space where it's not just a linear path through a story line, but a space where you can dip in and out of gallery spaces, to be attracted to new sounds, to be attracted to different content, and choose your own adventure based on your own preferences and what you're enjoying," says Adam Fox, the director of programs.

In the lobby, which features a Christie MicroTiles display wall, a gift shop and drop-in zone flank a live music performance space called Canada Music Square, which contains interactive exhibits giving an overview of the National Music Centre's many resources and attractions. Sharing the second floor with the performance hall is a collection,





The interior and exterior walls are clad in 220,000 glazed terra cotta industrial tiles finished in semi-matte graphite and bronze.

arranged as a mosaic of Canada's music history, which tells the stories of inventors, industry pioneers, broadcasters, and musicians. The third-level galleries use interactive elements to explore the physiological and emotional dimensions of music and its power to affect both mood and environment.

On the fourth floor, visitors can play different instruments through a range of interactive displays "where professional or novice music-makers can create." The fifth floor contains a lounge—"an open space that invites reflection and offers stunning views of the interior space"—as well as the Canadian Music Hall of Fame, the Canadian Country Music Hall of Fame Collection, and the Canadian Songwriters Hall of Fame. Additional reconfigurable exhibition space is available for traveling exhibits, workshops, and group performances.

"Each stage is envisioned as a place for interaction, appreciation, and performance, where Canada's music story—past, present, and future—can be further explored, encouraging visitors to engage in an ever-evolving discussion around music," the architect says. "Between each is a pause of space that allows the visitor to reflect and reconnect to the building and prepare for the next encounter."

The west block of Studio Bell has been designed along more conventional lines to house two recording control rooms, three separate live rooms, a media center, artist-in-residence spaces, classrooms, offices, and a radio station. Space has been allocated on the ground floor beside the restored King Edward Hotel to accommodate a singular piece of music history, the original Rolling Stones' mobile recording truck, which is being restored for use as part of the Centre's artist-in-residence program.





Some 6,000 gleaming stainless-steel rods are suspended on end in 40 rows from the performance hall's structural ceiling, to create an acoustically diffusive grid for mid and high frequencies. Featuring retractable seating, the hall can be converted to a flat-floor space in less than 30 minutes.

### Acoustics for an open concept design

While Studio Bell certainly represents a high-water mark in the design of cultural spaces, the architect's dream for the east block—"an interplay of glazed tile reflects and amplifies light and sound"—is nothing less than an acoustician's nightmare. Without comprehensive treatment, the noise generated by program sound and patrons in the lobby and 21 open galleries reflecting off the hard tiled walls up and down through five stories would be intrusive to the visitor experience, to say the least, not to mention the havoc it would wreak for any performance in the Presentation 1 performance hall in the absence of the upstage acoustic wall.

Yet the various galleries are intentionally meant to link "via the audio soundscape created for each gallery mingling and traveling across the building," according to the designer Jan Faulkner, director of design consultants Haley Sharpe Design, whose credits also include Stonehenge Visitor Centre and Royal Ontario Museum exhibits.

"When Allied Works Architecture won this competition, all those walls in the atrium were going to be solid, smooth concrete," says the acoustician Russ Cooper, principal acoustician with consultants Jaffe Holden. "The galleries off each floor of the atrium are open with no doors. You can imagine the cacophony of sound that was going to happen as the music from these exhibits would waft out

into the canyon or down to the floor of the lobby. If they had an event there or in the theatre that was open, there would be a real problem. We recommended from day one that the surfaces be sound absorbent, which went against what they were trying to do with the hard, smooth finish that they wanted."

Budgetary considerations, however, ruled out the use of both cast concrete and acoustic plaster, and the architect opted instead for a ceramic tile finish. Koninklijke Tichelaar Makkum developed two groups of glazes in semi-matte graphite and bronze for industrial tiles, measuring 34cm by 14.8cm, to be fitted in an aluminum frame.

"I told them that glazed tile is not very absorptive, but if we were to space them apart a little we could put some sound absorption behind them. You'd never see it, and we could create a Helmholtz absorber and change the depth and width of the opening and type of absorptive material in behind in order to broaden out the frequencies of absorption," Cooper says. The concept of the Helmholtz resonator has been understood since the 1800s. CMU blocks incorporating damped resonators have been used for over 50 years in the construction of schools and churches for noise and reverberation control; however, its acoustical utility has likely never before been realized on such a scale as this.

"They said, 'That's great. How do we know what to do?' I said, 'I haven't got a clue, but I can make an acoustic

model and we'll try to figure it out.' So we modeled this crazy thing in our acoustic modeling software by creating a sound source at the lobby of the atrium and placing listeners in each of the different galleries off the atrium. That let me see how sound propagates up through the museum. It was pretty unattenuated in the base condition, so we played with different slat placement and different openings between the tiles. You can see now that the tiles have different openings all over the place, and they all absorb sound at different frequencies so that broadband sound is attenuated up through the galleries at all levels. At the very top, there's an open gallery with a BASWaphon absorptive acoustic plaster ceiling that behaves like open sky. When sound hits that ceiling it doesn't bounce back down.

"With the slat openings, the different absorption behind the tiles, and the absorptive ceiling at the top of the atrium, we were successful in lowering the sound level as you go up through this atrium," he continues. Cooper's acoustic model predicted a gradual attenuation of sound rising up through the building, with a 125Hz source produced at a level of 91dB SPL in the lobby tapering off a remarkable 35dB to 56dB in the center of the fourth floor, and only 2dB higher than that on the top floor. There was no requirement to install the tiles on the building's exterior with spacing between or absorption behind them.

### Presentation 1 performance hall

The jewel in an already impressive crown, Presentation 1 was from the beginning envisaged as a reconfigurable flat-floor event space. "The idea is to be able to remove the upstage wall and extend a performance out overlooking the lobby, yet also to be able to host a function with the seating removed," says the theatre consultant Robert Campbell, associate principal of Fisher Dachs Associates.

A retractable platform with 148 seats in eight rows, alternating between 18 and 19 seats each, provides the main seating in Presentation 1. Campbell says, "The theatre has to look great when it's in theatre mode with the seating in place, and not like we just put a bunch of folding seats on risers that squeak and move around and feel flimsy. It wants to look like the seats are always there. Then, when the seats are retracted into the back wall, we want them to look great as well. Jezet Seating produced a fascia with the same type of wood on the front of the retracted seating platform as in the rest of the room. It doesn't look like there are seats stored in the wall; it just looks like a wall. It looks great. With the push of a button, you can go from a very nice-looking theatre space with 150 seats on a retractable system to a flat-floor space fairly quickly—less than half an hour."

Unlike certain other retractable platform systems, the seats are individually mounted and do not interact with others in the same row. "Each seat structurally attaches to the platform via a piece of steel within the platform that

the seat bolts to," Campbell says. "It's heavier and bulkier, and it's going to last a long time. When the platform is pulled out, one person goes along the row, flips the seats up, and they lock into place. They are not on a bar system, so when somebody moves to get up out of their seat, you don't feel the whole bank of seats moving around. It feels like you're on a fixed seat, which is one of the features of the Jezet system that we like."

An assortment of benches, stools, and fixed seating in the balconies at the sides and rear of the hall complements the retractable seating. Understandably, the facility owner and architect were concerned that different kinds of seats would feature a consistent look. Campbell says, "The neat thing is that Jezet manufactured all five types of seating in the room: the seats on top of the telescopic risers that fold down and retract, and two or three rows of loose seats that sit in front of the telescopic seating when they're presenting a speaker or showing a film. At the rear, behind the retractable seating on top of where those seats store, there are two rows of fixed seats like auditorium seats. There is also a row of bench seating along each side of the theatre on the upper level, and right behind each row is a set of eight stools that sit higher up, providing sightlines over the people in the benches. Jezet provided all of them, so all the wood, features, color, fabric, and workmanship came from one manufacturer. It's a coup—it's not necessarily something that just any seating manufacturer can do—to be able to pull that off. The millwork for the bench seating and for the loose seats is completely separate from the kind of fabrication that's done for auditorium seating, which is also different from the types of seats that you put on telescopic seating risers. They managed to get all of them to work together. We were able to get Jezet to do all of it, which was pretty great."

A lighting and sound control booth, with an operable window, is mounted high on the rear wall above the balcony, with two rows of fixed seating. The front and underside surfaces of the booth and sidewalls of the theatre are finished with slatted wood strips of slightly varying depth, to provide some diffusion at mid and high frequencies. Cooper says, "The architect wanted the walls to be parallel, and I said, 'That's not good. In the flat-floor condition, you're going to get a lot of echoes between those walls if they're just solid wood.' We sent them several options with diffusion materials and patterns, and they liked the wood slats."

The target STC 55 sound transmission coefficient of the operable partition affords about 55dB of isolation between the theatre and the building areas behind the stage. Featuring manually retractable bottom seals, the 15 interlocking wall sections run on rollers on an overhead track from storage pockets on both sides of the 40' x 18' stage. "You can't do rock-and-roll in there and expect complete isolation to the lobby," Cooper says, adding that it is antic-





A wall of glazed ceramic tiles, incorporating acoustically tuned slat absorbers, soars upward to a fifth-floor open gallery with an absorptive plaster ceiling that behaves acoustically like open sky; in that event, sound is not reflected back down to the lower levels.

ipated that most performances will be at more modest levels. “The wall is manually operated; you can’t get a good seal if it’s motorized.”

The panels are each about 15' high and a little over 3' wide, with the exception of a half-width panel on each side where the assembly meets the fixed wall of the auditorium. Both sides of the wall are finished in 1/4"-thick walnut panels to match the rest of the theatre. “The acoustic is the most important part of the operable wall,” says Stephan Julien, president of Moderco. “Every project we fabricate is custom made to accommodate different acoustics and design requirements.”

Perhaps the most striking feature of Presentation 1 is the ceiling: Some 6,000 gleaming stainless-steel rods about 2" in diameter and suspended on end in 40 rows from the structural ceiling suggest ranks of organ pipes or orchestral bells receding into the distance. Due to the way the rods are partially painted black along incrementally

increasing and then decreasing sections of their lengths, any small change in one’s viewing angle hints at harmonic wave motion though the ranks, or perhaps the foothills of the Rockies that lie just beyond the edge of the city.

“They were an aesthetic architectural statement to begin with, and then we ran with it and made sure they wouldn’t ring, and made them solid so they wouldn’t absorb all the sound like hollow organ pipes,” Cooper says. “We varied their height and spacing to create a diffusive grid up there. They’re all at different heights with different lengths like a dense chandelier. Like the slats of the walls, they provide diffusion. With a Schroeder diffuser, it doesn’t take much dimension to scatter sound. Low frequencies aren’t really going to see them, but it’s hard to diffuse low frequency anyway, and we were more concerned about the mid and high frequencies. Above the rods, a series of motorized adjustable draperies run across the room horizontally left and right to vary the absorption

as required.” In addition, some 750 sq. ft. of absorptive acoustic panels are affixed out of sight to the upper walls and underside of the decking.

## Lighting

The 40 rows of rods are arranged in five groups of eight rows each. Six light pipes have been rigged, with one before, between, and behind the groups of eight. The pipes are motorized so they can be readily lowered for service. An additional fixed pipe, with data and power, is mounted high on a curved wall rising above the lobby outside the theatre behind the stage, and another on the back wall below the control booth window.

“There’s a theatrical light plot that’s permanently in the air,” says Jon Sivell, head of lighting for Fisher Dachs Associates. “In most normal situations the performer would be fully set up inside the auditorium itself flanked by the wood walls, but if they wanted to, they could spin around and pull the performance out into the lobby. In that case, the lighting mounted on the curved fixed pipe becomes their frontlight, and the wood walls would frame a proscenium for them.”

The unique situation of having the rear of the stage open to the rest of the building posed the biggest challenge for the lighting system design, Sivell notes: “There was quite a lot of careful thought back and forth about where the lighting could mount on the lobby side, given that these ‘vessels’ that Allied Works Architecture had as the central concept for the building were the main feature. We didn’t want to just stick theatrical fixtures and equipment to it in a haphazard way. We went through quite a number of iterations where maybe we were going to have openings in some of the upper level galleries that fixtures could be accessed from, and we also looked at a flown pipe. We ended up with the cleanest and simplest solution, in that it’s a fixed pipe that follows the curve of their wall.”

The theatrical lighting system is a mix of incandescent and LED fixtures, Sivell says: “We started the design of this project way back in 2010. Between then and the opening in 2016, there was a big technology shift for theatrical lighting. The lighting fixture inventory is about half-LED, half-tungsten moving lights, and a small handful of tungsten traditional Source Fours. The system is based on ETC ThruPower dimmers, which can support either the old analog tungsten halogen lighting, or be switched and support the LEDs and the moving lights. A lot of the fixture choices were driven by the need not to have any fan noise for purely acoustic performance, so the moving lights are extremely quiet, but are maybe not the flashy fixtures that one might choose in what you would think of as a music venue, because we had to be really careful about making sure they were quiet enough for acoustic performances.”

The data transport is Streaming ACN over Ethernet,

“which pretty much has become the standard for the industry at this point,” Sivell says, “but we had made that leap all the way back from the beginning of the project. While it’s certainly not anywhere near one of the first facilities to have that, it was baked into the design from the get-go. The ETC Paradigm architectural control system can operate either stand-alone or in conjunction with the ETC Ion theatrical board. That gives them some decent moving light control without busting the budget. There are four DMX universes within the capacity of the architectural control processor, which can store the looks separately from the theatrical console, but given the scalability of Streaming ACN, if they needed to drive a really big show off the console, they could upgrade the console capacity in software and run hundreds of universes, theoretically—maybe if they were driving a video wall or something, so the infrastructure is there to support all of that.”

The fixed pipe on the back wall permits shallow-angle lighting when the stage is viewed from the perspective of a camera mounted on the same rail for webcasting or simulcasting a performance. “For video applications, we need to fill in the shadows with some shallow front light, as opposed to a live performance where higher contrast is usually better,” Sivell says. “There’s a small inventory of loose fixtures that can clamp onto that pipe and there’s also a vertical boom position built into the side boxes at the stage end, so there’s an opportunity to install sidelight at those positions. The theatrical console typically lives in the control booth, although, since it’s portable, it can be plugged in at a number of points, including on the lobby side; if you wanted to control a big event that swept from the auditorium into the lobby you could get that perspective from the lobby side as well as the control booth side.” Control points are also available in the fixed seating area under the booth where the lighting console can be plugged in and operated, with just a few seats removed.

The inventory of stage lighting fixtures includes 20 ETC Source Four Zooms in various degree sizes, 28 Philips Vari-Lite VL1100TS moving lights, 12 ETC Selador D40 Vivid seven-color LED washes, and 30 ETC Selador Desire D40 Studio LED arrays.

## Performance sound and video

A d&b audiotechnik sound reinforcement sound system is available for amplified performances in Presentation 1. A pair of loudspeaker arrays flown over downstage left and right each consists of four 10AL compact two-way elements topped with a 27A cardioid subwoofer. “We deliberately chose that to minimize the amount of low-frequency energy that shoots back into the lobby,” says Ben Bausher, senior consultant at Jaffe Holden. Westbury National Show Systems served as the performance sound, video, and communications systems contractor for the theatre.



A single d&b audiotechnik 5S lightweight two-way loudspeaker provides sidefill for the bench and stool seating at each side of the theatre on the upper level. "We hung the sidefill off the rigging grid," Bausher says. "Westbury did a great job with that mounting detail. There's an unused hole in the little rigging links that go in between each loudspeaker in the array, and they used that hole to mount the bracket for the fills." Three additional 5S loudspeakers provide under-balcony fill for the fixed seating below the control booth. The side and under-balcony fills are powered by a d&b audiotechnik 10D amplifier, and the main left-right arrays are powered by d&b audiotechnik 30D amplifiers.

says. "Once it gets digitized in the stage box, it all runs on Dante over Cat6 cable. Loudspeaker processing is in the amplifiers and all the effects processing is internal to the console. From the console, it goes through a Symetrix Radius digital signal processor for general system processing. It also feeds some of the backstage areas and the Listen Technologies RF hearing assist system." Sixteen RF receivers are available for patrons.

The intercom is a standard HME Clear-Com four-channel wired system. "The stage manager rack has the four-channel main station, and we provided six belt packs and headsets," Wallace says.

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"The space lends itself to doing small acts, more acoustic than anything, but they still wanted to have a system that could deliver high SPL program if needed," says Guy Wallace, Westbury's project manager. "They wanted a high-power system to be able to accommodate small single or two-piece folk acts, up to five- or six-piece bands, and even live programs." The equipment inventory includes six EAW VFM 109i two-way full-range stage monitors.

A modest surround sound system is available for film screenings and multichannel audio playback, consisting of six Fulcrum Acoustic RX699 coaxial loudspeakers, a pair on each side mounted low and high, and a pair at the back, all driven by Lab.gruppen amplification.

The Yamaha QL5 mixing console, with a Rio3224-D stage box, provides 32 analog inputs, 16 analog outputs, and four AES/EBU digital output pairs. The Dante-enabled stage box affords the capability of sending audio from the theatre anywhere in Studio Bell via the facility's Dante digital audio network infrastructure, including the recording control rooms in the west block. For events that don't require mixing in the auditorium, the console can be operated in the control booth with the operable window open. Alternatively, a few seats in the balcony under the booth can be removed and the audio console can be plugged in and operated from that position.

"Everything is copper up to the stage box," Bausher

A Christie HD14K-M 1080 HD 3DLP digital projector and a retractable projection screen installed in front of the operable partition track are available for film and video screenings. "In addition, they have a small Blackmagic video routing production switch and a Crestron DM DigitalMedia switcher to allow them to do lectern-driven lecture-type video," Wallace says. Delivery and installation of the screen were hampered by the construction crane and scaffolding, which prevented access to the upstage area. "With the theatre being on the second level, we had to have the screen craned in through the freight elevator shaft well in advance while the scaffold was still available to get it up in place."

One PTZ camera is installed on the fixed pipe on the back wall to provide a modulated feed for back-of-house distribution, along with audio from a Shure VP88 stereo mic. "That video is available on the production switch. We also installed the infrastructure for cameras with camera positions all over the place so they can do some real live switching, although, with the exception of the switching, they don't own any of that hardware yet," Wallace says. "We also installed SDI and fiber ties line to the loading dock, and a cable path so they can get their own copper there. They have a huge selection of their own microphones; we provided four stereo servo reelers to motorize suspended stereo mics in the theatre."





Visitors have access to about 15% of the ever-growing collection of more than 2,000 historic musical instruments, artifacts, and Canadian music memorabilia collectively spanning over 450 years of technology and innovation.

### Ancillary facilities

Some typical theatre features, such as a crossover and vomitoria, were not included in the Presentation 1 specification. “The space is designed to be beautiful, so they can use it for whatever purpose they wish,” Campbell says. “I never liked to refer to it as a ‘black box,’ because that implies that the interior is black, that the artistry is in the scenery and in the lighting—that it’s a theatrical space. By contrast, Presentation 1 is a very architectural space. I use the word ‘studio’ to refer to it without implying that it has black walls, a black floor, and black ceiling. In fact, there was an effort on the part of the architect and the owner to make this space look great for non-theatrical events, even though in most cases it will be used for music performance. So it’s not meant to be theatrical in a way that we need to get dancers across the stage or have actor entrances. It’s literally, ‘Get it up and running for music performance, and maybe presentations such as TED Talks.’ The downside is that we have one large dressing room for performers that is not on the stage level. It’s one level up, and if I could have made the footprint larger, I’d like to have placed that dressing room on the stage level so that band members and other performers could easily get offstage and not have to cross through public circulation areas to get up to the dressing room.”

Two rooms measuring 38' x 8.5' underneath the upper side seating areas are available for staging equipment, and also for storing lecterns, drum kits, instruments, and so forth. The room at house left is directly accessible from the freight elevator, a necessary trade-off given the theatre’s elevated location in the building with no ground level access.

“The loading comes from the loading dock below and up this elevator,” Campbell says. “Then they have to get equipment into the space on a circuitous route that can make it difficult for larger things, such as pianos, which are very difficult. Pianos have to be loaded on their side to get up here. That is one of the consequences of the space being up in the air overlooking the building lobby—but that’s a terrific feature.”

A number of the theatre systems are programmable. “This is one of those spaces where there’s virtually no staff,” Campbell says, “Typically in museum or exhibition halls, there isn’t a theatre person, and if there is, it’s usually the audio guy because that’s a sensitive thing. So everything is push-button: the telescopic seating is motorized, the variable acoustics are motorized, and the light pipes are all motorized; if you want to add or remove lights, they are all winch battens that one person can bring in to the floor, make adjustments, and take them back out. The



moving lights up there are also programmable,” he says, noting that the control systems for the variable acoustics and the light pipes were supplied by Joel Theatrical Rigging.

For safety reasons, the operator of the retractable seating system must be on the floor during operation of the retractable platform. “You have to be on the floor to plug in to the front of the seating system,” Campbell says. “It’s set up that way so that the person running the system can lis-

ated in part to provide exposure for the Carthy organ, was held every four years from 1990 until 2002. The festival in turn inspired the creation of the Chinook Keyboard Centre, which began developing a collection of keyboard instruments in 1996.

Two years later, as the scope of the collection expanded to include electronic instruments and sound equipment, the Chinook Keyboard Centre was renamed the Cantos Music Museum, under the curatorship of Andrew Mosker,



One of 22 galleries, the Made in Canada stage features stories about inventors, industry pioneers, broadcasters, and musicians who have defined music in Canada. Studio Bell is also the new home of the Canadian Music Hall of Fame, Canadian Country Music Hall of Fame Collection, and Canadian Songwriters Hall of Fame.

ten for any issues during operation. It’s a very heavy system. It does not take long to deploy, but it is sensitive, and the floor has to be clean.”

## West block

Across the Skybridge, three live rooms in the west block of Studio Bell house portions of a collection of keyboard instruments that has grown over three decades from a small local community initiative. In 1987, the 6,040-pipe Carthy Organ, built by Casavant Frères, Canada’s oldest continuously operating musical instrument company, was installed in Calgary’s Jack Singer Concert Hall. The Calgary International Organ Festival and Competition, cre-

a local musicologist and keyboard player who, not coincidentally, had earned his undergraduate degree in history. Its modest programming was limited to gallery tours and concerts. During the next few years, Mosker traveled extensively visiting historic music sites and museums, researching how music heritage is curated in different parts of the world. In 2005, the Cantos Music Foundation, as it had become known, created an exhibition for Alberta’s centennial, commemorating 100 years of music in Alberta. On the heels of this success, the foundation looked to expand its scope to the whole of Canada, and, in 2009, embarked on efforts to develop a new cultural institution devoted to the country’s musical heritage,



changing its name along the way to the National Music Centre with Mosker serving as president and CEO.

Visitors to Studio Bell have access to about 15% of the ever-growing collection, in contrast to other institutions that render only two or three percent of their collections accessible to the public. The oldest artifact in the collection is a polygonal virginal made in 1560, one of only two known to have been produced by Francesco Bonafinis. While this instrument is still playable, it is demonstrated only by qualified staff members under special circumstances. However, in the spirit of providing access to its “living collection” and the idea that historic instruments should be seen, heard, and sometimes touched, many other instruments in the collection have been designated for use in the creation of new music through the artist-in-residence program, which is expected to add to the legacy of some of these historic items.

“We believe that in order for these artifacts to be appreciated, they have to be used,” says the National Music Centre’s collections assistant Jason Tawkin. A singular case in point is the iconic synthesizer TONTO, the first and still the largest multitimbral polyphonic analog synthesizer in the world and the only one of its kind ever made—The Original New Timbral Orchestra. Housed in a semi-circle of curving wooden cabinets 20’ in diameter and 6’ tall, TONTO has been used on hit records by Stevie Wonder, Quincy Jones, Weather Report, the Doobie Brothers, Stephen Stills, and many others.

“I wanted to find a home for TONTO that would survive me,” says its creator, the producer and inventor Malcolm Cecil. “This instrument can be of great value to future generations. I wanted to make sure that TONTO was preserved for history, and not just as something to look at. It was built 45 years ago and it was 45 years ahead of its time.”

“He wanted to it be used and for it to evolve, and that’s what’s going to happen,” says the National Music Centre’s electronics technician John Leimseider, former keyboardist with Iron Butterfly and Spencer Davis. “This synth is in many ways the holy grail of synthesizers for our collection. It was one of the top five things we were looking for. We are so lucky to have it here, and we can’t wait to start using it.” TONTO is currently being restored in the electric workshop on the east block’s fourth floor, where visitors can view the work in progress.

The west block’s floors were built at different heights from those in the east block, the first five floors having 10’ ceilings to match the elevation of the adjacent King Edward Hotel. The sixth and seventh floors’ 14’ ceilings match the top two floors in the east block. The footprint of the west block is contained within a 25’-wide lot immediately to the west of the hotel.

The live rooms are spread apart, with Live Rooms A and B on the fifth floor and Live Room C on the seventh floor

sandwiching the two control rooms on the sixth floor. The live rooms and control rooms are connected by video links. One control room features a Trident A-range console, the other the original Olympic Studios console. The 32’-long Rolling Stones’ mobile recording truck on the ground floor shares a video link with the live rooms and control rooms above, and also has analog tie lines into the King Edward Hotel for recording performances directly off the floor.

“This is probably the first major mobile studio ever made,” Leimseider says. “Exile on Main Street and Sticky Fingers were both recorded on this truck primarily. *Live!* by Bob Marley, *Led Zeppelin III* and *IV*, a lot of Deep Purple was recorded with this truck—just an amazing collection of music was done on it.” Queen, Dire Straits, David Bowie, Fleetwood Mac, and Frank Zappa are also among the many artists who have recorded some of their most enduring works on the Rolling Stones’ mobile.

**“The space is designed to be beautiful, so they can use it for whatever purpose they wish. I never liked to refer to it as a ‘black box,’ because that implies that the interior is black, that the artistry is in the scenery and in the lighting—that it’s a theatrical space. By contrast, Presentation 1 is a very architectural space.”** — Campbell

“It has an amazing Helios console, the second Helios ever made,” Leimseider says. “To me it’s the most important one ever made because of what it did, not because of the technology of it but because of the music that came out of it. And it’s a way of letting the public gain access to new music in a different way than people are trying to do it now. We can use it to record music in a different way that will sound just incredible because it’s an amazing sounding recording system. And people are dying to use it because of the mojo of it. It recorded so many great things and it was such a positive time in music that people want to recreate that experience, and we want to provide that.”

The truck body is still painted with the logo of the AIMS project. AIMS—Ambition, Ideas, Motivation, Success—was an initiative of the Stones’ former bassist Bill Wyman to give free recording facilities to 50 bands out of some 1,200 applicants in England. In his autobiography *Stone Alone*, Wyman says, “My purpose was to encourage young live bands in an age when producers were taking over.” The AIMS project wrapped up in 1988 with a final concert at

the Royal Albert Hall

"Everything is modern but we're using some vintage and historic equipment," says Jesse Moffatt, the NMC's director of collections. "And then we have digital infrastructure through the network that you can pull up with Pro Tools and do modern type recording in those spaces."

"This is a modern studio facility that embraces the rich legacy of recording history," says the studios' designer Martin Pilchner, of Pilchner Schoustal International Inc. "An artist can perform in several spaces and choose to work with a Trident A range, the original Olympic console or the Helios console, in the Rolling Stones Mobile. Add to that a literal museum full of instruments at your disposal to make music. The analog system, important to maintain an authentic signal path, benefits from the quality and character of the extensive amount of vintage equipment. The digital system is used for audio and visual cues as well as enabling audio-video and data connection to the rest of the facilities in the building. Recording studio system integration was carried out by Revolution Custom Shop of Toronto, who we worked with developing the customized SOTA monitoring system."

**"This is a modern studio facility that embraces the rich legacy of recording history. An artist can perform in several spaces and choose to work with a Trident A range, the original Olympic console, or the Helios console in the Rolling Stones Mobile. Add to that a literal museum full of instruments at your disposal to make music."** — Pilchner

Pilchner's design embraces many traditional studio elements that are consistent with the vintage nature of the equipment and instruments, and with the intended purposes of the various rooms. Live Room B, for example, doubles as an electronic lab while Live Room C is known as the acoustic lab.

"The acoustic treatments include the use of specular absorbers, wood reflectors, tuned resonant cavities, Helmholtz absorbers, diaphragmatic panels and diffusers," Pilchner says, "All of these elements are carefully proportioned to yield the desired end result. The intent was to make each space warm and neutral. As we have a number of environments that are capable of live recording, we opted to give each its own acoustic signature, varying

from the electronic lab being very dead to the acoustic lab being live."

All recording and live rooms have windows to the outside. "The strong form of the building anchored the window locations, which we then worked to integrate into the studio design in a meaningful way," he adds. "The end result is studio spaces that have a good amount of natural lighting, while also creating a diaphanous effect as the daylight diffuses through the terracotta tile screen of the exterior cladding."

CKUA Radio, Canada's oldest public broadcaster on the air since 1927, broadcasts from space leased from the National Music Centre on the ground floor of the west wing. Over the years, the station has supported local independent artists, and is credited with helping to launch many music careers, including those of Bruce Cockburn and k.d. lang, both of whom have been inducted into the Canadian Music Hall of Fame over in the east wing. "We've partnered with them in the past and we just thought it was a good fit," Moffatt says. "We gave them the base building and then they designed it to their specifications." CKUA undertook the broadcast studio upgrades at its own expense.

### Fulfilling the mandate

The mandate of the National Music Centre is to be "a national catalyst for discovery, innovation, and renewal through music;" to "preserve and celebrate Canada's music story and inspire a new generation of music lovers through programming that includes on-site and outreach education programs, performances, artist incubation, and exhibitions." Its new Studio Bell is envisaged as an international hub of music and technology, and Moffatt reports that a number of well-known artists and producers have already expressed an interest in recording there.

"The end result is visually really breathtaking," Sivell says. "I have not seen any other institution put together a collection like this in a way that's so accessible to the public and that mixes live performance with museum exhibitions in a really interesting way."

Cloepfil muses, "I think cultural buildings, whether they're visual arts buildings or music buildings, their job is to sort of propel us and carry us away from the everyday, and to show us what's possible. I think the best cultural architecture re-references you from your day-to-day life, whether it's the old historical monumental museums or concert halls, and this one—very contemporary architecture—takes you away to a place that allows you to experience music in a way that you don't in your everyday life on your headphones or on the radio. It's a more active, physical, visceral relationship with the music." 🎧



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