

# Multifunctional Audio and Lighting for a University Theatre

By: Mel Lambert

## The Gracie Theatre is equipped to play many roles

Founded in 1898, Husson University has earned a well-deserved reputation for providing undergraduate and graduate students with a rounded education. But, until recently, the campus in Bangor, Maine, lacked one important facility. “There has always been a desire for an on-campus theatre,” says Julie Green, Husson University’s director of public affairs. “But, without a formal theatre department, funding has always been devoted to more pressing needs.” Fortunately, in 2007, a trustee contribution made such a state-of-the-art theatre a reality. “We began our design program with two specific goals,” Green recalls. “One, to expand our student services, and two, to share this important new asset with our neighboring community. We foresee Gracie Theatre evolving into a hub for a wide range of non-campus events, not only for the local Bangor community, but for neighboring towns, civic organizations, and corporations.”

WBRC, a local architectural and engineering firm, headed up the \$15-million Beardsley Meeting House project, which houses the new 500-seat Gracie Theatre. “WBRC has developed a number of Husson campus buildings since the ’70s,” says William Beardsley, Husson University’s past president. “But, because we knew the theatre environment would present a number of unique architectural and acoustical design challenges, David MacLaughlin, our executive director of audio engineering, recommended that we reach out to the Walters-Storyk Design Group, specialists in live-performance environments, to collaborate on the acoustic and the-

atrical design portions of the project.” The total budget for Gracie Theatre—named for Gracie McCollum, granddaughter of a long-time trustee to Husson University—was a reported \$6.5 million.

“While sight lines, lighting, and support spaces are critical elements of every successful performance space,” MacLaughlin says, “acoustics are the linchpin. Having known [Walters-Storyk Design Group principal] John Storyk for many years through the Audio Engineering Society, I was confident that WSDG could provide us with optimum sound and speech intelligibility. Right from the get-go, with our *West Side Story* premiere in October [2009], the Gracie combined the ‘wow’ factor of an extremely handsome physical environment with absolutely spot-on acoustics. You can literally hear a whisper on stage anywhere in the house. This theatre works; its sound system is capable of handling anything from a full-on musical to a corporate meeting.” A seasoned instructor at the university’s New England School of Communications, MacLaughlin initiated its audio program in 1995 with just six students; it has since grown considerably, with 160 earning bachelor’s degrees in communication science.

“We have a particular affinity for educational and performance venues,” Storyk reports. “As a lecturer on acoustics for several universities, I’m keenly aware of the ‘working classroom’ needs for facilities of this level. Our experience with real-world projects—ranging from New York’s Jazz at Lincoln Center complex to the new Le

Poisson Rouge club in Greenwich Village—is very helpful in enabling us to design theatrical environments that assure an audience of the best possible theatrical experience from both the visual and the audio perspectives.”

### Planning sessions for a multifunctional performance environment

Initial on-site meetings with John Storyk and systems integrator Judy Elliot-Brown, also from WSDG, began early in 2007. “The resultant CAD drawings and electrical scheme were extremely comprehensive,” recalls WSDG’s co-project manager, Romina Larrengina. “Concurrent with those design aspects, we focused on determining the most flexible ceiling and wall treatments; these included Helmholtz acoustic resonators, broadband scattering treatments, and acoustic-fabric-wrapped panels, which provided the joint benefits of high efficiency and economical unit costs. Theatres are never simple design projects. The Gracie went through a series of permutations to enable us to make optimum use of the 15,000 sq. ft. [allocated] from the overall 55,000-sq.-ft. Beardsley Meeting House complex.”

In addition to performance and rehearsal space, dressing rooms, wardrobe, scene shop, storage space for a Steinway piano, and a 23-musician orchestra pit—convertible to a thrust stage—plans called for other facilities to enhance the theatre’s educational and production capabilities. These include a recording studio, lighting booth, and TV master control room, all of which were needed to



The auditorium provides 360 seats in the orchestra and 140 in the balcony.



accommodate hands-on classrooms as part of Gracie Theatre's interactive communications learning center, as well as active production hubs. "And, despite the demand for all these technical prerequisites, the Gracie is a surprisingly intimate theatre," Larrengina emphasizes. The auditorium provides 360 audience seats in the orchestra, and 140 in the balcony.

The house sound system includes Meyer Sound M'elodie ultra-compact curvilinear array loudspeakers, 500-HP subwoofers, and M1D and UPJ-1P units, controlled from a Galileo Model 616 system processor. A choice of a 48-channel Yamaha PM5D and a 48-channel Avid Venue D-Show Profile console and stage rack is available for front-of-house mixing, while a companion recording studio features an Avid ICON Command-D console with a Pro Tools DAW system. The 21 M'elodie speakers are hung as seven units each for the left-, center-, and right-channel arrays, with a single 500HP subwoofer flown at the top of the left- and right-channel stacks. The M1D and UPJ-1P units cover side audience areas not accessed by the main arrays.

According to David Kotch, technology consultant for WSDG and systems integrator/project manager for Masque Sound, the company that supplied and installed the sound system, "David MacLaughlin is a major Meyer Sound

fan, which was a happy coincidence, since Masque Sound and WSDG are equally strong Meyer proponents, particularly for live-performance venues. The M'elodie system is an ideal choice for the 500-seat theatre, because it provides coverage for the entire auditorium without the need for separate speakers to cover the under-balcony area." Sapsis Rigging, of Philadelphia, supplied six rigging points with half-ton motors for the loudspeaker arrays—enabling students to lower and re-install the systems during classes. Syracuse Scenery and Stage Light installed the stage trusses.

To enable the new theatre to serve as a multi-use venue for live theatrical and musical performances, as well as video projection, TV, online, and broadcast applications, Masque Sound developed a comprehensive Crestron control system. "We installed an MPS300 main systems interface," Kotch says, "capable of coordinating projector, audio/video, and a variety of wireless microphones with a TPS-6X wireless touch panel."

A three-way split from the on-stage microphones can be connected to the front of house, recording studio, and the university's mobile truck for live broadcast to local radio, TV, online, and audio recording. Line-level signal distribution is handled via three BSS Audio BLU-160 units, with analog and digital I/O cards, and a Symetrix 581E

16-way distribution amp. For communications, a Clear-Com MS-704 four-channel headset/speaker station connects to a pair of RM-704 and RM-702 remote stations with HS6 headset/telephones and RS-601 belt packs.

"There's a tremendous amount of advanced technology at play in this theatre that lets the university mount highly sophisticated productions," Kotch says. "It also presents students with invaluable state-of-the-art hands-on learning tools; it's a terrific educational environment." The entire equipment package cost a reported \$500,000.

### Multifunctional acoustic design

Storyk says that sound needed to be controlled within the theatrical space. "When we first saw the initial building design, the hall's shape was quite reasonable. We needed to focus—both architecturally and acoustically—on final designs for the side walls, as well as audience-chamber ceiling profiles. Certainly, the final ceiling solution—with its angled wooden reflectors—has become one of the room's signatures, and also allowed us to control low-frequency response in the hall. Additionally, we needed to revisit some back-of-house planning functions to fine-tune the layout by maximizing space utilization and functionality.

"The most challenging part of this

assignment was the hall's multifunctional aspect. It is always a challenge to get a theatre hall, stage house, orchestra pit, etc., to function as a concert hall. Add to that a movie-theatre function, and the assignment gets even more interesting. Essentially, we tried to create a great theatre hall with fly space, theatre rigging, excellent sight lines, etc., and then did our best to make it work as an orchestra/music venue. We developed over 50' of fly space over the stage to accelerate backdrop and set changes." The design also involved 40 removable seats to accommodate handicapped audience members.

"We selected RT60 reverberation times for maximum performance of the venue when used in its theatre mode, where speech and dialogue intelligibility were of prime importance," Storyk states. "The 1kHz design value was set between 1.1 and 1.2S, with a slight rise to the lower frequencies. These values work particularly well for music performances, as well as speech. The ceiling membrane absorbers assured us that there would be good decay control at the low-end."

"For the side walls," the acoustician continues, "we opted for part broadband absorption and part mid/high-end reflective, using small diffuser strips to create a low-frequency Helmholtz strip absorber. This means that the side walls are quite complex, with a combination of broadband absorption, general RT60 control, and LF control devices. The Helmholtz resonators were placed at the lower and upper levels, giving us the required convergence for low-frequency absorption, and, at the same time, producing mid/high-frequency scattering. The combination enhances music reproduction, without deadening the room unnecessarily. Resonators were constructed from RPG flutter-free members with desired spacing. Wood was chosen to meet aesthetic consistency of room and building.

"Nickerson & O'Day, the general contractor recommended by WBRC, did a great job," he adds. "They were responsible for selection of the specific wood

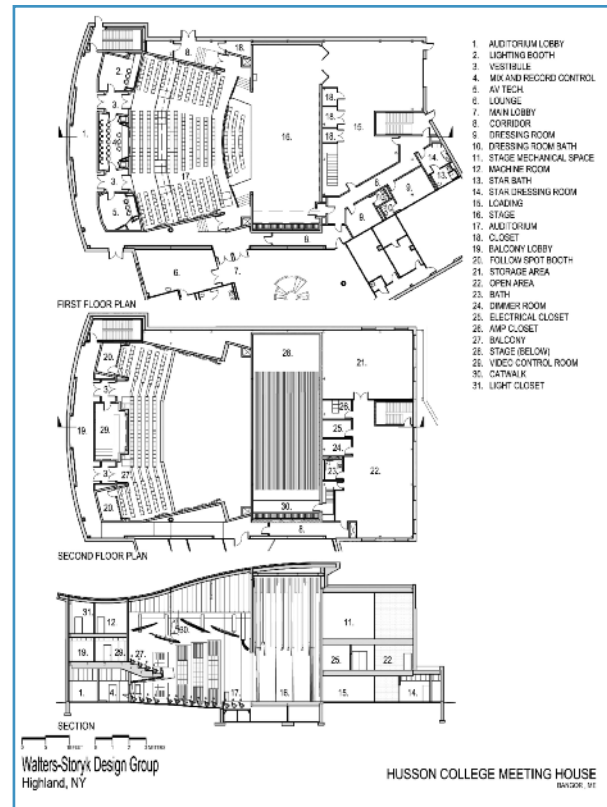
panels, and played a valuable role in helping The Gracie Theatre achieve its maximum aesthetic and acoustic qualities. The system installation was coordinated by Masque Sound, a firm with almost 75 years of experience in providing sound systems for literally thousands of Broadway productions."

### The flexible lighting system

Josephine Marquez, of JMarquez Consultants, was hired to design a flexible production-lighting system for the theatre, including work and running-light systems. The rig includes an ETC Ion 1000 control console with a 2x10-fader wing linked to a total of one hundred ninety-six 2.4kW ETC Sensor performance and twenty-four 2.4kW ETC Sensor house-light dimmers, plus 60 ETC SmartSwitch relays. The equipment racks are located stage left, and include house, work, and running-light controls, as well as non-dimmer controls and network devices. A designer control station is provided at the orchestra level, with tap stations located around the theatre to plug in network nodes for control of external devices.

The lighting rig include 20 ETC Source Four 14°, six Source Four 26°, and 12 Source Four 19° ellipsoidals, 25 ETC Source Four PARs, six Selecon Pacific Zoomspot 23-50° ellipsoidals, a pair of Elation Lighting Opti Tri PARs, two Martin MAC 250 moving heads, and four ETC Source Four PAR-Nels. Also available are four Chroma-Q Plus color changers and a Chroma PS08 splitter box, plus two Selecon Pacific followspots with MSR ballast box. Lighting gear was supplied by BMI Supply.

"WSDG provided me with a list of equipment specified by the school," Marquez recalls. "The theatre needed to work well for university presentations, as well as for incoming road shows and/or meetings and lectures. It needed to accommodate not only the teaching of undergraduate and graduate classes at the university on lighting skills and related theatre crafts, but also to be used during university-



organized productions, ranging from lectures and similar events, to full-scale musical and theatrical productions, and also be suitable for visiting productions that hire the hall. In other words, the lighting system allows students to learn with the most modern of equipment, similar to that used in larger professional venues. The system's flexibility can handle the most sophisticated musicals, as well as meetings and lectures."

"Because there is no grid to facilitate a flexible drop," explains Brave Williams, New England School of Communications' lighting instructor, "the five electrics over the stage are powered from each side of the batten via a swagged power cord/ETC Net with four ETC Gateway units. The system is a circuit-per-dimmer system with ETC Sensor dimmers. There is a single FOH catwalk, about 45° from the front of the thrust, with box-boom positions accessible from the house floor via a ladder. There is a balcony-fill position. The catwalk is ideal for our teaching requirements, which are a third theory and two-thirds hands-on; the Ion console and dimmer package

provides a lot of options for teaching lighting design.

"We are looking to expand the stage and lighting systems as we develop our theatre program. For this, we will add a lift to access the boom positions and the battens onstage for focusing. We will add cyc lights, and generally increase the lighting inventory. As part of our live-sound program, we are looking into adding typical touring lighting gear that can be easily integrated into the existing cam-locks available backstage."

"For visiting productions," Marquez advises, "the Gracie Theatre systems offer enough power to tap into their dimmer racks or to augment the permanent system in the hall. The control console is as sophisticated as any they would be traveling with, or could rent anywhere."

"We are absolutely thrilled with the new Gracie Theatre," Husson University's Green says. "It has exceeded all of our expectations in

terms of hosting professional performances, and providing audiences with a comfortable, elegant, and eminently accessible entertainment venue. We anticipate the time when this exciting new addition to our campus will fulfill its potential as a seat of learning, a community asset, and profit center capable of contributing funding to future campus projects.

"Our premiere performance of *West Side Story*, with members of the Bangor Symphony Orchestra, was a success from every perspective. Our students worked on sets, performed sound and lighting checks, and a variety of related assignments. We are in discussions with the BSO about the possibility of the Gracie playing host to some of their smaller concerts and developing other types of performances and events."

"We are very, very pleased with the new Gracie Theatre," confides executive director MacLaughlin. "The acoustics and sound system have

been letter-perfect from the very beginning. The Meyer sound system offers outstanding quality and is a perfect teaching tool. There is not a bad seat in the house."

"We are particularly proud of both the design and execution of the auditorium hall's ceiling treatments," Storyk concludes. "The sidewall design was also a gratifying accomplishment—it is handsome and extremely effective. The Gracie Theatre team has received many compliments on the room's overall intelligibility. Initial feedback from everyone at Husson has been very gratifying."

*Mel Lambert has been intimately involved with production industries on both sides of the Atlantic for more years than he cares to remember. He is now principal of Media&Marketing, a Los Angeles-based consulting service for the professional audio industry, and can be reached at mel.lambert@MEDIAandMARKETING.com; +1/818.558-3924.*

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