Student Design Competition 2020

Presented by:
Technical Committee on Architectural Acoustics,
Robert Bradford Newman Student Award Fund

Sponsored by:
The Wenger Foundation

Introduction

The Technical Committee on Architectural Acoustics with support from the Robert Bradford Newman Student Award Fund (http://www.newmanfund.org/), The Wenger Foundation, is sponsoring a student design competition to be displayed and judged at the 179th meeting of the Acoustical Society of America in Chicago, IL May 11 – 15, 2020.

The Student Design Competition is intended to encourage students in the disciplines of Architecture, Engineering, Physics and other curriculums that involve building design and/or acoustics to express their knowledge of architectural acoustics and noise control in a schematic design of a facility in which acoustical considerations are of primary importance.

General Information

Entry Requirements

Entries may be submitted by individual students or teams of a maximum of three students. Undergraduate and graduate students are encouraged to participate. Participants must be registered as a student during the spring semester of 2019. Teams comprised of students from different institutions are welcome. Teams comprised of students from different disciplines are encouraged. A faculty sponsor is strongly recommended, but not required. Meeting attendance is not required to participate in the competition.
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ENTRY LIMITS

Entries must be limited by each institution to three. Entries submitted by teams with teammates from different colleges within the same university will count as entries from the same institution. Up to two additional entries per institution are allowed if its entrants from the institution team with entrants from a separate institution.

REGISTRATION

Teams must register by email on or before April 15, 2020 to the competition co-chairs at robin@thresholdacoustics.com. In the e-mail, indicate (1)

1. your name and school
2. the name of your teammates (if any), their school(s) (if different than your school), and their e-mail addresses,
3. the name of your faculty advisor, his or her school, and his or her e-mail address;
4. if the project will be completed
   a. for credit as part of a design studio,
   b. for credit as part of a non-studio class
   c. as an extra-curricular
5. indicate the student participant who will serve as primary contact for the team. The primary contact will serve as a vital link for receiving information and updates on the competition. This may include answers to frequently asked questions and changes to information presented in this bulletin.

JUDGING AND AWARDS

Entries will be evaluated on technical merit, design vision, innovation, and effectiveness of presentation.

The submitted designs will be judged by a panel of practicing design professionals and university faculty. The panel may include acoustical consultants, architects, theatrical consultants, and educators in associated fields.

Awards are made possible through a generous donation from the Wenger Foundation to the Newman Student Award Fund will include

1. One First Honors prize of $1,400
2. Four Commendation Awards of $900

PRESENTATION FORMAT AND SUBMISSION PROCEDURE

Submissions shall be presented on up to three (3) separate display boards with maximum dimensions of 22 x 28 inches (56 x 71 cm) per board. It is advisable to mount posters to foam core board or other rigid backer. Additional documentation or three-dimensional features may not be attached to the boards.
The competition language is English.

The font size, amount of narrative text, and number of graphs should be appropriate for poster viewing. A thoughtful viewing of the presentation should be possible in about 10 minutes. Presentation boards should be suitable for wall or easel display. Means of attachment to the wall or easel will be provided by the competition (submissions need not include Velcro or pins). Please denote the orientation and arrangement for the presentation boards either on the rear of the boards or on an included sheet.

Affix an opaque envelope to the back of EACH display board. Within each envelope, enclose a loose sheet with the names, addresses, phone numbers, e-mail addresses, school affiliations, and advisor(s) of all participating team members. Please indicate summer e-mail and mailing addresses for all team members. Team member identifying information (names, addresses, etc.) will not be revealed to the competition judges. Entrants may also wish to include a layout diagram for the order in which the posters should be displayed.

Please package display boards securely to prevent damage during shipping.

For entry in the competition, the physical presentation boards must be received no later than **Monday, May 4, 2020** at the following address:

Robin Glosemeyer Petrone  
Threshold Acoustics  
141 W Jackson Blvd  
Suite 2080  
Chicago, IL 60604

Students attending the meeting may hand-deliver their entries. Entries delivered by students must be available at the ASA meeting registration desk no later than **2 p.m. on Monday, May 11, 2020**. Students opting to deliver entries to the meeting are required to notify the competition co-chairs on or before **Monday, May 4, 2020**.

Additional information may be obtained by contacting Robin Glosemeyer Petrone at Threshold Acoustics:  Phone 312 386 1400  Email robin@thresholdacoustics.com
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Design Scenario

A city orchestra wishes to construct a music pavilion, with covered and lawn seating, to serve as its summer home.

Program Description

The music pavilion will have a variety of functions. The orchestra will only occupy such a facility for ¼ of the useable days during a summer season. As a result, the orchestra has formed an alliance with the local opera, ballet and theater companies who will use the facility for an additional ½ of the useable days. The anticipated number of audience members for the orchestra is 10,000 people, while the ballet, theater and opera each expect 7,000 patrons.

With ¼ of the schedule still open, and the need to bring in significantly more funds to maintain the facility, the managers of the pavilion will need to schedule popular acts such as rock and jazz to fill the remainder of the schedule. During these popular performances, audiences of up to 25,000 are expected.

The pavilion shall be sized to accommodate 5,000 seated audience members under a roof. An open lawn shall be capable of holding up to 20,000 audience members.

The orchestra, opera and ballet desire a natural acoustic facility for those audience members under the roof. It will, however, be necessary to provide amplification to support of orchestra performances with amplified instruments or singers and voice lift for broadway, and spoken word. Electro-acoustic sound reinforcement system to reach those audience members in the lawn seating and under the roof for for popular touring acts. Most touring acts will bring their own sound systems, but some may opt to use the system provided by the facility to cover the open lawn seating areas.

Back of house support space will be required; some will be acoustically sensitive. The orchestra will need a rehearsal room. The ballet, opera and theater will require a room for rehearsal as well. Resident companies and facility staff will need offices. Dressing rooms for the soloist and chorus members are also required.

The site that has been purchased has a natural slope and provides several different location and orientation options. Location and orientation should be considered. The site is surrounded by a river at the north, a state highway on the south and state roads on the east and west. There is a major, 6-lane interstate located 200 feet to the east of the site. Sound levels measured from the interstate have been provided and must be taken into consideration. Please see the attached site plan.

Parking for patron and performers will be required.
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Program Details
The following section is the architectural program statement for the pavilion which defines the building (for the purposes of this design competition) as desired by the orchestra.

Pavilion:
- Audience Seating: Approximately 5000 seats. Orchestra (main floor) seating arrangement may be traditional or continental.
- Stage: Approximately 6,000 ft\(^2\) (560 m\(^2\)) with depth of approximately 60 ft (18 m). Easy access to the loading dock for scenery and other materials being transported in and out.
- Stage Proscenium: Minimum dimensions of 50 ft (15 m) wide and 30 ft (9 m) high.
- Stage House: Height from stage floor to gridiron approximately 3 times height of proscenium.
- Orchestra Pit: To accommodate orchestra of approximately 70 members. At least one pit lift with at least three positions…pit level, and stage level.

Rehearsal Rooms:
- Orchestra Rehearsal: To accommodate up to 100 orchestra members.
- Movement Rehearsal: A multipurpose room to accommodate rehearsal as well as a warm up for the ballet, theater, chorus and opera.

Dressing Rooms:
- Two chorus dressing rooms, approximately 600 ft\(^2\) (56 m\(^2\)) each.
- Eight solo dressing rooms, approximately 70 ft\(^2\) (6.5 m\(^2\)) each. Dressing rooms may also be used as music practice rooms.

Green Room:
- One multipurpose Green Room, approximately 500 ft\(^2\) (46.5 m\(^2\)). This room may be used occasionally for meetings and perhaps as a music rehearsal room.

Office Space:
- Three offices for the facility’s technical staff approximately 120 sq.ft.
- Two offices for the resident company’s staff approximately 100 sq.ft.

Mechanical Equipment Room (MER)
- The MER will primarily house air handlers and a scroll type chiller to serve the back stage support and rehearsal spaces. It is estimated that area required by the MER will be a minimum of 800 ft\(^2\) (75 m\(^2\)).
SITE NOISE CONSIDERATIONS
Measured highway traffic noise levels at the edge of the site closest to the highway in octave frequency bands are tabulated below:

<table>
<thead>
<tr>
<th>OCTAVE FREQ. BAND, CENTER FREQ. - Hz</th>
<th>63</th>
<th>125</th>
<th>250</th>
<th>500</th>
<th>1000</th>
<th>2000</th>
<th>4000</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROADWAY VEHICULAR TRAFFIC*</td>
<td>65-75</td>
<td>34-76</td>
<td>62-74</td>
<td>63-72</td>
<td>65-70</td>
<td>64-71</td>
<td>60-65</td>
</tr>
</tbody>
</table>

* Each set of levels represents the range of levels observed in each octave frequency band for a 20-minute period during heavy, late afternoon traffic. Levels indicated are believed to represent realistic “worst case” environmental sound levels at the site. Measurements were made at the edge of the site that is closest to the highway.

TECHNICAL REQUIREMENTS
Design competition entries should emphasize the general building acoustics design (room acoustics and noise control) and its interaction with the overall architectural design, with such design included for the facility, support spaces, etc. It is not necessary to prepare architectural exterior building elevations. The drawings should present comprehensive solutions to the acoustical design in schematic design format. In addition to plans and sections, the poster boards may display acoustical calculations, acoustical criteria, and details of construction relating to acoustics and noise control as necessary to describe and support the design. If computer programs are used in the design, graphics and data from the programs may be displayed.

While the design of the building mechanical and electrical systems is very important to the acoustical success of a project, it is not necessary for this particular design problem to indicate in detail the mechanical and electrical system noise control procedures that are required. However, the presenter(s) may wish to indicate noise criteria, and general noise and vibration control procedures relating to air handling, electrical power transformers, theatrical lighting dimmers, etc. It is also not necessary, for this particular design problem, to indicate special stage equipment such as stage rigging, side and rear slip stages, traps, etc. As indicated below, the facility will require an electro-acoustic sound reinforcement system for distribution of sound to the main seating and the open lawn seating areas. It is not necessary to design this system as part of the overall design except to identify mounting locations at the stage and that open lawn coverage loudspeaker locations are to be provided and indicated.
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Suggested References


Competition Timeline Summary

December 31, 2019 – Statement release

April 15, 2020 – registration deadline

Monday, May 4, 2020 – Presentation boards must be received by the individual listed in the competition announcement.

Monday, May 4, 2020 – (For participants delivering presentation boards to the meeting) notice must be emailed to robin@thresholdacoustics.com that entry will be delivered to the ASA registration desk.

Tuesday, May 12, 2020 – Judging and open exhibition

Student Design Competition Co-Chairs Contact Information

Competition primary contact will be through the e-mail address robin@thresholdacoustics.com.

Co-chairs:
Robin Glosemeyer Petrone  Michelle Vigeant  Ian Hoffman
*Threshold Acoustics*  *Penn State University*  *Peabody Institute*