# NEWMAN STUDENT AWARD FUND

# 2021 Student Design Competition



#### ROBERT BRADFORD NEWMAN STUDENT AWARD FUND THROUGH THE ACOUSTICAL SOCIETY OF AMERICA -TECHNICAL COMMITTEE ON ARCHITECTURAL ACOUSTICS

### 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/) and The Wenger Foundation, is sponsoring a student design competition to be judged as part of the 181<sup>st</sup> meeting of the Acoustical Society of America, December 2021.

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 or fall semesters of 2021. 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.

#### ENTRY LIMITS

To Professors: If the design brief is used as part of a course, entries must be limited to three per institution. Entries submitted by teams with teammates from different colleges within the same university will count as entries from the same institution. Up to three additional entries per institution are allowed if its entrants from your institution are teaming with entrants from a separate institution.

#### REGISTRATION

Teams must register by e-mail on or before 1:00 PM (CST) on October 1, 2021 to the competition co-chair at robin@thresholdacoustics.com. In the e-mail, please include the following:

- 1. The name and contact information of each entrant on the team. For each team member, please include:
  - a. Name
  - b. School affiliation
  - c. Email addresses
- 2. The name of your faculty advisor, his or her school, and his or her e-mail address.
- 3. 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 project
- 4. 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 and will include:

- One First Honors prize of \$1,400
- Up to Four Commendation Awards of \$900

#### PRESENTATION FORMAT AND SUBMISSION PROCEDURE

As of the penning of the brief, the 181<sup>st</sup> Meeting of the Acoustical Society of America, December 2021 will be held inperson in Seattle. Submission requirements will include a digital submission for judging and a printed copy of the submission for display at the Meeting.

Entrants shall submit digital poster as pdfs with maximum dimensions equivalent to 3 poster boards of 22 x 28 inches (56 x 71 cm) per board. Additional documentation beyond that accommodated within the area of the 3 boards may not be included. Text and image size on the display surface shall be legible at a distance of 3 feet (1 meter), as if the boards were to be printed and displayed. Body text may be no smaller than 24-point font; captions may be no smaller that 18-point font. 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.

The competition language is English.

**Digital Submission:** 

- Please submit one version of your digital submission with no identifying team names or school affiliation for judging. Submit a second digital copy with all entrants' names and school affiliation included under the submissions project name. The second version will be posted on the Robert Bradford Newman Student Award Fund website for viewing. (https://www.newmanfund.org/student-design-competitions/2019-sdcannouncement/). All submissions will be posted on the website.
- Include a separate text file (.doc or similar) with the names, addresses, phone numbers, e-mail addresses, school affiliations, and advisor(s) of all participating team members. Team member identifying information (names, addresses, etc.) will not be revealed to the competition judges.
- Digital submission shall be received on or before 5:00 PM (CST) on October 1, 2020
- Please use send documents via We Transfer at https://wetransfer.com/ to Robin Glosemeyer Petrone at robin@thresholdacoustics.com

Hard Copy Submission:

- Please bring or mail a hard copy submissions to the 181<sup>st</sup> ASA Meeting in Seattle for display during the meeting. Your submission will remain on display throughout the entire meeting and will be displayed during the TCAA committee meeting on Tuesday when the winners are announcement and presented awards. If you are unable to attend the meeting, awards will be mailed to you after the meeting.
- Submission are to be on up to three (3) separate display boards with maximum dimensions of 22 x 28 inches (56 x 71 cm) per board. Mount posters to foam core board or another rigid backer.

Additional information may be obtained by contacting:

Robin Glosemeyer Petrone Threshold Acoustics P 312.386.1400 E robin@thresholdacoustics.com

#### SUGGESTED REFERENCES

- Concert Halls and Opera Houses: Music, Acoustics, and Architecture, 2nd Edition (2003) by Leo Beranek
- Architectural Acoustics (1988, reprinted in 2007) by M. David Egan
- Architectural Acoustics Illustrated (2015) by Michael Ermann
- Architectural Acoustics, 2nd Edition (2014) by Marshall Long

#### TIMELINE SUMMARY

- 24 January 2021 Design Competition Announced
- 1 October 2021– registration to be submitted by 1:00 PM Central Standard Time
- 1 November 2021 submissions to be posted by 1:00 PM Central Standard Time.
- December 2021 (final dates TBD) Posting of submissions for open exhibition at the 181<sup>st</sup> ASA meeting
- December 2021 (final dates TBD) Announcement of winners in the TCAA meeting session

#### CO-CHAIRS CONTACT INFORMATION

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

#### NEWMAN STUDENT AWARD FUND COCHAIRS:

Robin Glosemeyer Petrone	Ian Hofman	Daniel J. Butko			
Threshold Acoustics	Peabody Institute	University of Oklahoma			

# DESIGN SCENARIO

A college of moderate size with a very strong music program intends to construct on their campus a performance hall primarily for opera. Although the main purpose of the hall is to support their opera program, the hall may be used occasionally for symphony orchestra, chamber music, chorus, and dance.

The site for the center is relatively flat and it is located approximately 200 feet from a major 6-lane highway. The campus is approximately 3 statute miles from the airport that serves the geographical area, and it is approximately in line with an extension of one runway, which is frequently used for departing commercial jet aircraft. Typically, the departing aircraft will be 5,500 feet overhead when passing over the building site. Departing aircraft have been found to create noise levels at the site that are higher than the levels created by arriving aircraft.

#### PROGRAM DETAILS

Following is the architectural program statement for the opera performance facility which defines the building (for the purposes of this design competition) desired by the college

Performance Hall:

- Audience Seating:
  - 1,200 seats for speaking engagements. Number of seats may be less for operatic performance (when lifts are set to pit level)
  - Seating may be distributed between orchestra (main floor) level, upper level side and rear tiers
  - Orchestra seating arrangement may be traditional or continental.
- Stage:
  - 50 ft (15 m) wide by 40 ft (12 m) deep play area.
  - 15 ft (4.5 m)wide wings to both sides.
  - Easy access to truck dock for scenery and other material load 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 2.5 times height of proscenium.
- Orchestra Pit:
  - To accommodate orchestra of smaller orchestrations for baroque repertoire up to 70 members, depending on the orchestration of the opera being performed.
  - Provide means to accommodate the range in pit orchestra sizes.
  - Provide at least one pit lift with the highest play position at stage level.
- Variable Acoustics:
  - Since the hall is also to be used for orchestra and choral stage performances, a portable stage enclosure (orchestra shell) is required.
  - Also, consideration shall be given to providing variable sound absorption for the hall and for the orchestra pit.

Lobby:

- To serve as the entrance space to the Performance Hall and to a ticket/house manager's office.
- In addition to serving as a typical lobby, it will be used on occasion for meetings, luncheons and dinners, and receptions.

Front of House Public Restrooms

- Women's to be 50 ft (15 m) x 16 ft (5 m)
- Men's to be 50 ft (15 m) x 12 ft (3.7 m)
- Two Unisex 130 ft<sup>2</sup> (5 m<sup>2</sup>)

Lighting and Stage Manager Control Room

• 300 ft<sup>2</sup> (27 m<sup>2</sup>)

In-house Audio Mix Position

• 9 ft (3 m) wide, two seating rows deep

Follow Spot Both

250 ft<sup>2</sup> (22 m<sup>2</sup>)

Projection/Title Booth

• 225 ft<sup>2</sup> (20 m<sup>2</sup>)

Scene Shop

- Approximately 3,200 ft<sup>2</sup> (300 m<sup>2</sup>) with easy access to stage and to truck loading dock.
- One door for scenery entrance and exit with dimensions of approximately 18 ft (5.5 m) wide and 25 ft high.
- Room height 35 ft to be (10.7 m.)
- It is anticipated that the Scene Shop will be in use during rehearsals in the Performance Hall and occasionally during performances.

Rehearsal and Warm-up Room:

• A rehearsal room to be used for staged rehearsal and sitzprobes. Determine the appropriate length, width and height requirement to fit staged rehearsals and sitzprobes of the maximum capacity for the pit.

Dressing Rooms:

- Two chorus 14-person dressing rooms, approximately 840 ft<sup>2</sup> (77 m<sup>2</sup>) each. Including two toilets and 1 shower in each room. Chorus dressing rooms may also be used as warm-up rooms.
- Five solo dressing rooms, approximately 260 ft<sup>2</sup> (56 m<sup>2</sup>) each. Dressing rooms will also be used as music practice/ warm-up spaces and should accommodate an upright piano.
- Conductors dressing room. 300 ft<sup>2</sup> (27 m<sup>2</sup>) Include a restroom with shower. Will be used as music practice/ warmup spaces and should accommodate an grand piano.

Green Room:

- One multipurpose Green Room, approximately 500 ft<sup>2</sup> (46.5 m<sup>2</sup>).
- This room may be used occasionally for meetings for chorus and staff.

Off-stage Quick Toilet

• 60 ft<sup>2</sup> (5.5 m<sup>2</sup>)

Costume Shop

• 800 ft<sup>2</sup> (70 m<sup>2</sup>)

Wig and Make Up

300 ft<sup>2</sup> (27 m<sup>2</sup>)

Prop Pantry

100 ft<sup>2</sup> (10 m<sup>2</sup>)

Lighting and Audio Storage and Repair Rooms

• 300 ft<sup>2</sup> (27 m<sup>2</sup>) each.

Dimmer and Audio Rack Rooms

• 250 ft<sup>2</sup> (22 m<sup>2</sup>) each.

Mechanical Equipment Room (MER)

- The MER will primarily house air handlers.
- Chilled water and steam are available from a nearby college building.
- It is estimated that there will be two MER will be a minimum of 1,500 ft<sup>2</sup> (140 m<sup>2</sup>).

#### SITE NOISE CONSIDERATIONS

Measured aircraft flyover and highway traffic noise levels (on the future site of the building, prior to construction) in octave frequency bands are tabulated below:

		<u>Sound Pressure Levels - dB re 20µ Pa</u>							
	Octave Band Center Frequency (Hertz)								
	<u>63</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1000</u>	<u>2000</u>	<u>4000</u>		
Departing Commercial Jet Aircraft <sup>1</sup>	68/77	73/87	71/87	71/86	65/82	58/75	55/62		
Roadway Vehicular Traffic <sup>2</sup>	63/68	66/70	59/61	60/61	60/63	54/57	44/44		

Each set of levels represents the maximum levels observed in each octave frequency band for the loudest and the quietest flyovers during a one hour period when aircraft departures were frequent.

<sup>2.</sup> 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.

#### TECHNICAL REQUIREMENTS

Design competition entries should emphasize the general building acoustics design (room acoustics, sound isolation and noise & vibration control) and its interaction with the overall architectural design, with such design included for the facility, support spaces, etc.

The drawings should present comprehensive solutions to the acoustical design in schematic design format. It is not necessary to prepare architectural exterior building elevations.

In addition to plans and sections, the poster boards may display acoustical calculations, acoustical criteria, and details of construction relating to acoustics, sound isolation 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.

Front and back of house support spaces, such as restrooms, costume storage, and equipment rooms, are to be included in the layout of the building. Submission do not need to address the interior room requirements of each spaces. If they have the potential to produce noise, the sound isolation of said rooms should be considered.

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) should address 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. The facility will require a sound reinforcement system for distribution of sound to the main seating and tiers seating levels for announcements and speaking engagements. While It is not necessary to design this system as part of the overall design it is necessary to to identify mounting locations at the stage and that open lawn coverage loudspeaker locations are to be provided and indicated.