

Stanford University Bing Concert Hall Opens

By Motoo Komoda

Stanford University needs no introduction. This school, with its campus less than an hour's drive south of San Francisco, California on the U.S west coast, numbers among the world's most prestigious institutions of higher learning across many science, engineering, medical and humanities disciplines. Situated in the heart of Silicon Valley, Stanford alumni have founded some of the world's most successful high tech firms, including Google and Yahoo! among others. In 2005, Apple's Steve Jobs gave the commencement address at Stanford's graduation ceremony. I could continue this list of accolades for many more sentences and there would still be many praiseworthy facts about Stanford to mention.

The Performing Arts at Stanford and the University's Music Department

Stanford Live is the university organization charged with nurturing and supporting the arts, artists and arts performances on the Stanford campus. This includes not only study and performances by faculty and students, but also obtaining the cooperation of off-campus arts institutions, organizations and professionals to produce performing arts events and mentor the university's budding performing artists. Formerly known as Stanford Lively Arts, Stanford Live has more than 40 years of accomplishments that include a varied and full performing arts calendar, visiting artists in residence, involvement by faculty and students, commissions, premieres and other performing arts endeavors.



Figure 1: Building Exterior

Stanford's music department spans the genres of classical music, jazz and contemporary music, as well as offering multidisciplinary studies across technology, music and acoustics. Student options for participating in music performing groups include, among others, Stanford Symphony Orchestra, Stanford Philharmonia Orchestra and "New Ensemble" dedicated to performing new music. As many as 150 concerts have been performed annually at Stanford recital halls and at its Memorial Church. The opening of the new Bing Concert Hall at long last provides Stanford University with its one true concert hall.

Designing the Bing Concert Hall for Full Orchestra Performances

The Bing Concert Hall project total cost was \$112 million. The hall building interior has 10,000 sq. m. (112,365 sq. ft) of space. In addition to the concert hall, the building houses a rehearsal room, dressing rooms and offices. The hall's namesakes, Helen and Peter Bing, donated a very generous sum to the project. Ennead Architects (formerly Polshek Partnership) created the architectural design for the project. Nagata Acoustics served as the acoustical consultant for the acoustical room design and the sound isolation and noise mitigation designs.

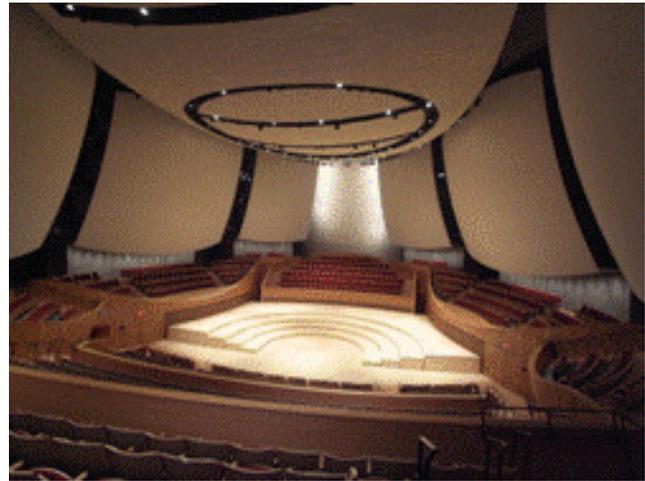


Figure 2: View of the Hall Interior

Bing Concert Hall has 842 seats. From the seat-count perspective, the hall belongs to the class of small or medium-size concert halls. This size hall typically aims to be a venue for chamber music ensembles and smaller performing groups. However, on this project, our client required that Stanford Bing Hall have a design suited to full orchestra performances.

This client requirement posed a significant acoustical design challenge that Nagata Acoustics solved by specifying a generously wide dimension for the hall's stage and a tall height dimension for the hall's ceiling. As a result, we achieved a spatial volume of 17,000 m³ (600,000 cu. ft). To understand how spacious the Bing Hall is, we can compare it to the 1,680-seat Vienna Musikverein where the spatial volume is 15,000 m³ (530,000 cu. ft). Bing Hall has half the number of seats of the Vienna Musikverein, but an even more expansive spatial volume than that illustrious hall.

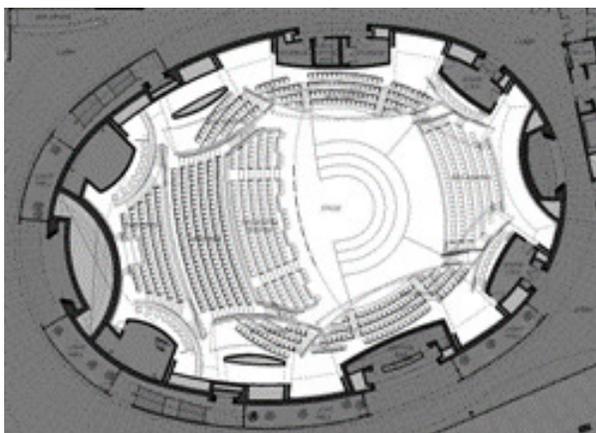


Figure 3: Plan of the Hall

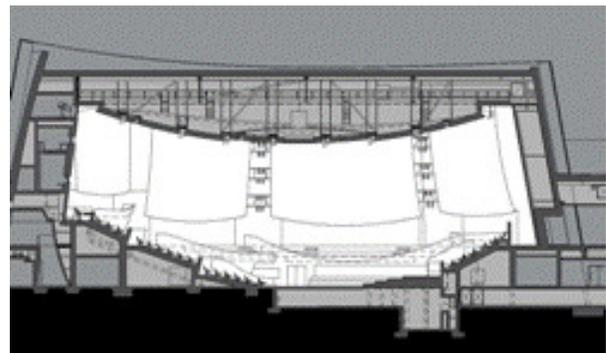


Figure 4: Section of the Hall

The Hall's Room Acoustical Design

In Bing Hall, the audience seating surrounds the stage in blocks of seats that form an arena-style configuration. The hall's interior acoustical design creates a strong feeling of intimacy between the audience and the performers. A key factor in achieving this characteristic is the height of the stage floor, which is at the same level as the first front row of audience seats. Technically speaking, compared with most other halls, Bing Hall has a stage height of "zero". The zero height of the stage floor means that the stage floor is lower than any other element of the hall interior. This stage floor positioning plays a significant role in creating both the strong feeling of intimacy and, also, the excellent musical presence the hall has.

Bing Hall has an elliptical footprint. In oval halls, undesirable focusing phenomena occur more easily than in rectangular halls. To ensure the prevention of focusing in Bing Hall we installed three-dimensional wall treatments on the walls behind the last rows of audience seating. During the design phase we built a 1/24 scale model of the hall and used it to extensively and comprehensively test our design and confirm that the hall would be echo-free. In addition to the three-dimensional wall treatments behind the audience seating, we designed the partial walls at the fronts of audience blocks and most of the ceiling to have textured, wave-like surfaces. This design element promotes sound diffusion of higher frequency sounds.

Bing Hall's sound reverberation time measures 2.4 seconds (at 500 Hz and calculated for a full hall based on measurement with the hall empty). This is a rather long reverberation time for a hall of this size and the hall has truly rich acoustics. By listening to orchestral, chamber music and solo rehearsals and concerts already performed in the hall, I also confirmed that the hall achieves excellent sound clarity.

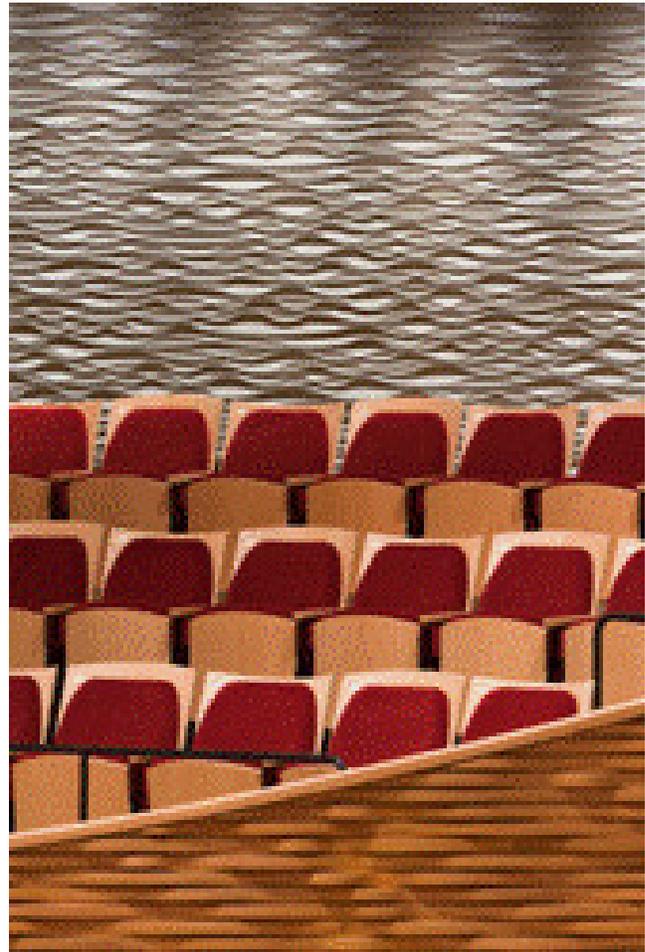


Figure 5: Sound Diffusing Wall (by courtesy of Jeff Goldberg)

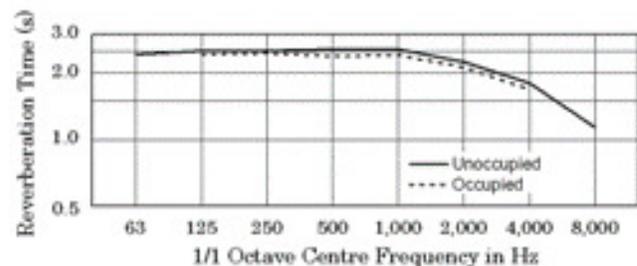


Figure 6: Frequency Response of the Reverberation Time

Inaugural Season Concert

On January 10, 2013, Stanford officially took the keys to the new Stanford Bing Hall building. The very next day, on January 11th, the St. Lawrence String Quartet and the San Francisco Symphony conducted by Maestro Michael Tilson Thomas performed the extraordinary opening night concert. In the days and weeks that followed, pianist Emanuel Ax, cellist Yo-Yo Ma and violinist Midori each took the stage to rave reviews.

Stanford University as well as Mr. and Mrs. Bing expressed their joy at the successful completion of the hall. Nagata Acoustics is delighted to have participated in this project and designed acoustics so pleasing to our clients and the hall's audiences.

For more information about Stanford Bing Hall, visit the [Stanford Live website](#).