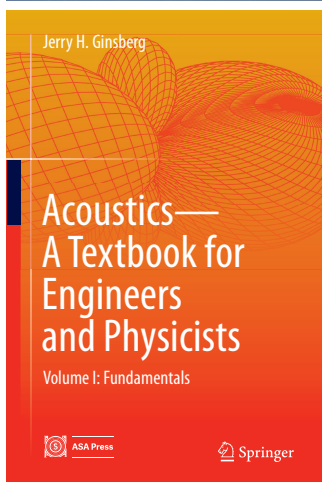
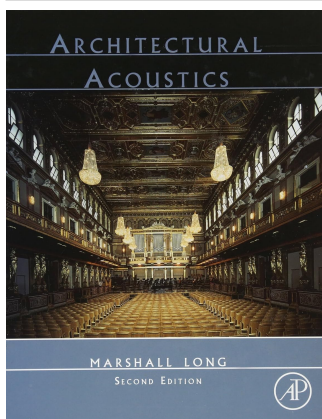
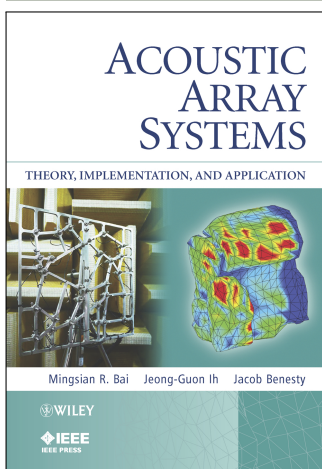
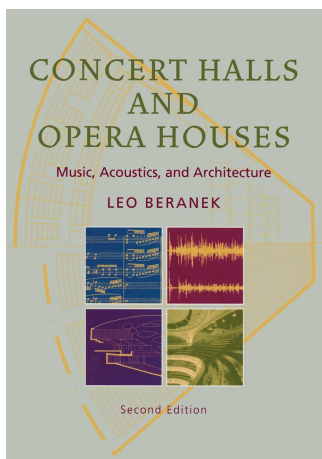


Reviews A&V n. 55



## Book Reviews

*In this issue, we have four reviews, including recent releases and classics*

In this issue, we present an exclusive selection of four book reviews. All the book reviews are available in two languages, English and Portuguese<sup>a</sup>.

It should be noted that the reviews are written in an abbreviated and concise manner, with the aim of summarizing the content of both recently released works and classics in the fields of science covering acoustics, vibrations, and audio. In addition, they provide relevant information about the authors, further enriching the context of the works analyzed.

For this issue, we have the following books:

- [Concert Halls and Opera Houses: Music, Acoustics and Architecture](#)  
**Author:** Leo Beranek | Springer, 2004 (2 ed.)
- [Acoustic Array Systems: Theory, Implementation, and Application](#)  
**Authors:** Mingsian R. Bai, Jeong-Guon Ih, and Jacob Benesty | Wiley-IEEE, 2013
- [Architectural Acoustics](#)  
**Author:** Marshall Long | Academic Press, 2014 (2 ed.)
- [Acoustics – A Textbook for Engineers and Physicists \(Vols. I & II\)](#)  
**Author:** Jerry H. Ginsberg | Springer, 2017

In these four volumes, we encounter a broad and diverse range of topics, covering everything from the fundamentals of sound to microphone arrays, signal processing, architectural acoustics, and finally, a compendium on subjects related to acoustics and vibrations. Each work excels in providing the best in terms of learning, seamlessly combining theory and practice, whether through computational models or the detailed elaboration of real-world experiments. These books thus constitute an invaluable resource for both students and professionals in the field, offering a profound and comprehensive understanding of the principles and applications of acoustics.

We hope that reading the reviews will provide you with the first insights and reflections on these works, inciting the desire to explore them fully: an excellent way to expand your knowledge and stay well-informed.

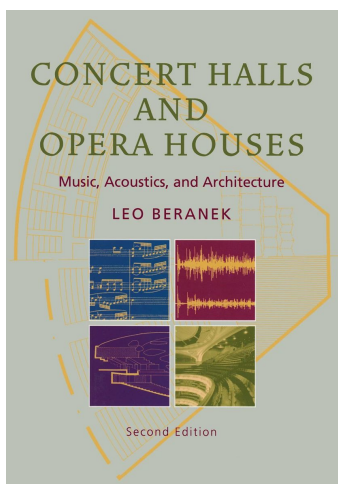
<sup>a</sup>The Portuguese version starts on page 99.

Alexandre V.  
Maiorino 

Federal University of Rio  
Grande do Norte

Rua Cel. João Medeiros, s/n,  
Lagoa Nova, Natal, RN,  
Brazil

{alexandre.maiorino}  
@ufrn.br



**Author:** Leo Beranek

**Publisher:** Springer

**Year:** 2004 (2 ed.)

**Language:** English

**ISBN:** 978-0387955247

**DOI:** 10.1007/978-0-387-21636-2

## Concert Halls and Opera Houses

*Music, Acoustics and Architecture*

*Concert Halls and Opera Houses: Music, Acoustics and Architecture* by Leo Beranek is an all-time classic on hall acoustics. Released in 1996 and updated in 2004, it is an essential reference for anyone wishing to delve deeper into the acoustics of concert halls and opera houses. Beranek shares his vast experience, passion for music, and research, offering a detailed portrait of the acoustics of 100 music performance halls. He also proposes a ranking of these halls based upon interviews with conductors, musicians, and music critics.

The book is organized into five chapters and three appendices. In the first chapter, Beranek explores the significance of acoustics for conductors and musicians from the world's leading orchestras, including personal accounts with figures such as Herbert von Karajan, Leopold Stokowski, Eugene Ormandy, Serge Koussevitzky, Isaac Stern, and E. Power Biggs. He also takes a journey through the history of music, from the Baroque to the 20th century music, and outlines the public's perspective on the acoustic quality of these spaces.

In the second chapter, Beranek introduces concepts and subjective attributes related to room acoustics, such as reverberation, definition (or clarity), intimacy, spatiality, timbre, and brightness. These attributes are correlated with various acoustic parameters in chapter four. Chapter three presents 100 music performance spaces, giving a brief history of each venue and describing the architectural elements that contribute to the room's acoustics. It includes photographs, floor plans, and longitudinal sections, detailing stage area, volume, number of seats, dimensions, and materials used. The halls described are located in Eastern Europe, Asia (China, Japan, and Taiwan), and North and South America.

In chapter four, Beranek proposes a ranking of the main concert halls based on questionnaires. He presents architectural concepts that influence acoustics, such as the materials used for surfaces and the influence of the audience and seats. The author relates the main acoustic parameters to the subjective attributes discussed in chapter two and offers design guidelines for concert halls, derived from the preferred values of the best spaces. The fifth chapter presents a ranking of the most renowned opera houses based upon the results obtained from the administered questionnaires. As in the previous chapter, the main acoustic parameters and their preferred values are discussed, as well as the design guidelines for orchestra pits, balconies, and boxes.

The book's final three appendices include terminology, definitions, and conversion factors for the parameters discussed, tables with data from measurements taken in the rooms and equations, technical data, and absorption coefficients for the main materials used. The final bibliography offers a compendium of the main articles used in the book, useful for anyone interested in the field.

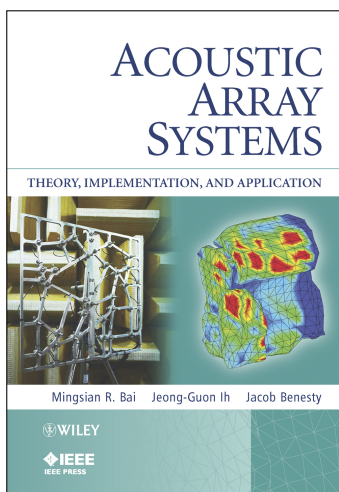
The second edition of *Concert Halls and Opera Houses* can be purchased on [Amazon](#) in the Kindle version or via [Springer Link](#) in PDF, in addition to the classic printed version.

William D'Andrea  
Fonseca 

Federal University of  
Santa Maria

Av. Roraima n° 1000,  
Cidade Universitária,  
Santa Maria, RS, Brazil

{will.fonseca}  
@eac.ufsm.br



**Authors:** Mingsian R. Bai,  
Jeong-Guon Ih, and  
Jacob Benesty

**Publisher:** Wiley-IEEE

**Year:** 2013

**Language:** English

**ISBN:** 978-0470827239

**Link:** [publisher](#)

## Acoustic Array Systems: Theory, Implementation, and Application

*From acoustics to sophisticated array signal processing*

The book by Mingsian R. Bai, Jeong-Guon Ih, and Jacob Benesty, *Acoustic Array Systems: Theory, Implementation, and Application*, represents a significant milestone as it transcends the conventional boundaries of acoustical engineering. This collaborative work from Taiwan, South Korea, and Canada offers a broad, innovative, and in-depth exploration into the expansive domain of microphone array systems within acoustics. Detailing both theoretical intricacies and practical applications, the book spans over 500 pages, divided into ten chapters and five appendices.


From the outset, a wide array of knowledge on the principles of acoustics, algebra, and signal processing is presented with clarity and precision. Having a solid understanding of the principles of acoustics and mathematics is fundamental to delving into the complexities of microphone arrays.

The book's text provides detailed descriptions of various algorithms for both far-field and near-field scenarios, covering both traditional and innovative methods. The authors utilize these scenarios to illustrate the practical application of these methods across diverse fields, including the automotive sector to acoustic virtual reality. Additionally, the book examines filtering and inverse filtering techniques, taking into account the specific nature of the acoustic environment relative to the array.

The work features numerous examples — certainly one of the book's strengths — across a wide range of applications, from acoustic echo cancellation to the localization/mapping of sound sources, as well as speech recognition enhancement. Each of these applications is analyzed in detail, showcasing the challenges encountered and the potential solutions within the array of techniques (such as *beamforming* and multi-receiver signal processing).

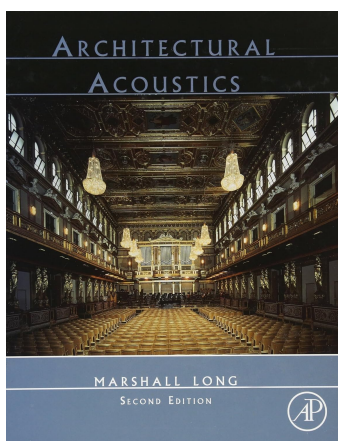
One of the aspects that sets this book apart is the in-depth theoretical approach combined with practice. The authors provide a robust theoretical basis with mathematical derivations, diagrams, and graphs — some computational examples for Matlab are also provided ([link](#)). This practical approach is invaluable for researchers and engineers aiming to apply these concepts to their real-world projects.

By the end of this journey, the reader will have a profound understanding of arrays and signal processing and will be motivated to explore newer yet unexplored aspects. The authors acknowledge that some aspects may have changed/evolved since then; nevertheless, there remains ample *time-space* for innovation. In summary, "Acoustic Array Systems" is an essential read for those seeking to comprehend and master signal processing based on sensor arrays. With its comprehensive approach and scientific rigor, this book establishes itself as a reference for academics, researchers, and students involved with *beamforming*, spatial filters, and *acoustic imaging*.

Ranny L. X. N.  
Michalski   
University of  
São Paulo

Rua do Lago, 876,  
CEP 05508-080,  
São Paulo, SP, Brazil

{rannym}  
@usp.br



**Author:** Marshall Long

**Publisher:** Academic Press

**Year:** 2014 (2 ed.)

**Language:** English

**ISBN:** 978-0123982582

**Link:** [publisher](#)

**DOI:** 10.1016/C2009-0-64452-4

## Architectural Acoustics

*Second edition*

Marshall Long's book "Architectural Acoustics" is both scholarly and thorough in its exploration of the art and science of acoustics in architectural settings. The book covers a wide range of topics, which makes it an invaluable tool for both students and acoustics professionals.

Methodically organized, the book starts with a historical introduction that shows how acoustical principles have changed throughout the course of history. The first chapters establish the basic principles of acoustics, such as wave propagation, sound absorption, and how sound behaves in different environments. Before progressing to more complicated subjects, it is important that the readers understand these fundamentals.

Other significant topics covered in the book are room acoustics, noise control, special topics, case studies, and practical applications. The book presents comprehensive content about the acoustic design of different environments, such as theaters, recording studios, and music halls. The importance of reverberation, sound diffusion, and reflection in attaining an environment's best possible acoustic quality is emphasized throughout the book.

Strategies to reduce unwanted sounds in buildings are examined, including building materials and construction methods, a topic very applicable to specialists working in building design and renovation. The book also discusses specific fields, including computational modeling in acoustics, audio engineering, and the application of electronic systems in acoustic design. Throughout the book, case studies demonstrate how theoretical concepts are applied to practical situations, which is very helpful towards understanding real-world problems and their solutions.

The author writes with clarity and precision, making difficult ideas understandable without going overboard. The extensive use of charts and illustrations in the book improves the reader's comprehension of the topics covered.

It is also important to highlight its educational value. It is a textbook, written with technical depth and pedagogical plainness, intended for undergraduate and postgraduate courses. The book is a great teaching tool because of the step-by-step progression through concepts and practical applications. With the help of the book's framework, students can develop their knowledge gradually by working their way up from basic ideas to increasingly sophisticated applications.

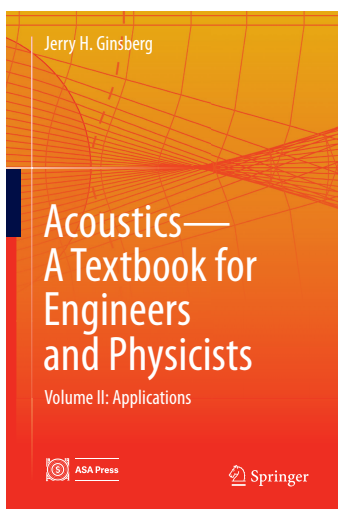
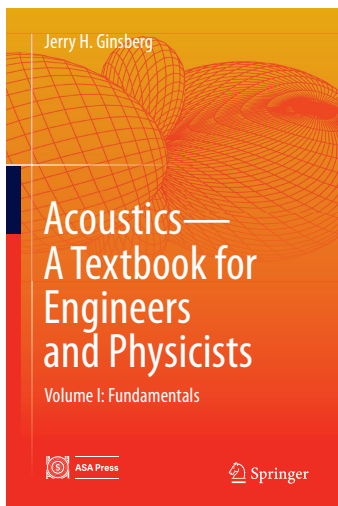
In summary, "Architectural Acoustics" is a reference on the subject and an excellent tool for anyone thinking about designing, researching, or using acoustics in architectural environments. Whether you work in education or as a professional, this book provides you with useful knowledge and resources to help you understand the nuances of architectural acoustics.

Olavo M. Silva 

Federal University of  
Santa Catarina

Rua Delfino Conti, s/n,  
Campus Universitário,  
Trindade - 88040-370,  
Florianópolis, SC, Brazil

{olavo}  
@lva.ufsc.br



**Author:** Jerry H. Ginsberg

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**DOI:** [10.1007/978-3-319-56847-8](https://doi.org/10.1007/978-3-319-56847-8)

## Acoustics – A Textbook for Engineers and Physicists (Vols. I & II)

*The fundamentals of acoustics thoroughly described in two volumes*

Gathering fundamental concepts and applications of acoustics into a single book is no easy task, especially when done with detailed explanations and examples. This is why Jerry H. Ginsberg, a retired professor from Georgia Tech, USA, needed two volumes to accomplish this. In this 2017 editorial collaboration between Springer and ASA Press, we have an excellent work that can be adopted as a textbook in courses in the field or even as a recurring reference for researchers.

Starting with the behavior of particles, moving through signal analysis techniques and the characteristics of human hearing, then reaching the propagation of plane and spherical waves in different media, the author uses numerous illustrations and examples to elucidate the basic phenomena of acoustics in the first volume, subtitled *Fundamentals*. All equations are derived step-by-step, without leaving us wondering, “where did this equation come from?” The author has the freedom to use almost 600 pages to detail the basic concepts in a way not found in other books, without resorting to language simplifications. Ginsberg maintains mathematical rigor from start to finish without making it complicated, even aiding in the understanding of theorems and principles used. Various Matlab codes are provided throughout the text, giving readers the opportunity to conduct tests by varying parameters, reinforcing their learning.

In the second volume, subtitled *Applications*, Ginsberg describes important phenomena based on the fundamentals presented, still using well-elaborated examples and illustrations, continuing with Matlab in exercises that enhance learning. The radiation of vibrating bodies is highlighted throughout the first two chapters, including numerical techniques for analyzing radiation considering arbitrary geometries. Then, the behavior of typical waveguides and cavities is detailed, including practical examples. The volume goes on to delve into essential topics that may not be easily found in classic books, such as geometric acoustics, scattering, and nonlinear acoustics. It is nearly 700 pages of knowledge and applications. Just like in the first volume, the reader does not finish any chapter with any doubts — everything is explained in detail.

The author’s care in the preparation of this work is evident, as is his mastery of all the subjects. It is without a doubt a beautiful reference for the field of acoustics and vibrations. The online and print versions of [Volume 1](#) and [Volume 2](#) can be purchased directly from the Springer Link website.