



Acoustics: Sound Fields and Transducers

By Leo L. Beranek, Tim Mellow

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Acoustics: Sound Fields and Transducers is a thoroughly updated version of Leo Beranek's classic 1954 book that retains and expands on the original's detailed acoustical fundamentals while adding practical formulas and simulation methods.

Serving both as a text for students in engineering departments and as a reference for practicing engineers, this book focuses on electroacoustics, analyzing the behavior of transducers with the aid of electro-mechano-acoustical circuits. Assuming knowledge of electrical circuit theory, it starts by guiding readers through the basics of sound fields, the laws governing sound generation, radiation, and propagation, and general terminology. It then moves on to examine:

- Microphones (electrostatic and electromagnetic), electrodynamic loudspeakers, earphones, and horns
- Loudspeaker enclosures, baffles, and waveguides
- Miniature applications (e.g., MEMS in I-Pods and cellphones)
- Sound in enclosures of all sizes, such as school rooms, offices, auditoriums, and living rooms

Numerical examples and summary charts are given throughout the text to make the material easily applicable to practical design. It is a valuable resource for experimenters, acoustical consultants, and to those who anticipate being engineering designers of audio equipment.

- An update for the digital age of Leo Beranek's classic 1954 book *Acoustics*
- Provides detailed acoustic fundamentals, enabling better understanding of complex design parameters, measurement methods, and data
- Extensive appendices cover frequency-response shapes for loudspeakers, mathematical formulas, and conversion factors

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Editorial Review

Review

"It contains more recent and additional material, including material that is difficult to find elsewhere....this highly recommended book is a treasure of information and problem-solving technique for both the novice and expert in the areas of acoustical transducers and fields."--Journal of the Acoustical Society of America, September 2013 *"Even to those that already own a copy of the 1954 edition, I would recommend acquiring a copy of the revision. It has sufficient new material and it is a pleasure to read to justify that cost. To those starting out in the fields of room acoustics or electro-acoustics or those wishing to extend their existing knowledge, it would be invaluable...very well worth the current list price."--Acoustics Bulletin, January/February 2013, Vol. 38, No 1, page 51* *"...a modern expansion and re-working of Acoustics, the 1954 classic reference...updated throughout and focused on electroacoustics with the needs of a broad range of acoustics engineers and scientists in mind, this new book retains and expands on the detailed acoustical fundamentals included in the original while added practical formulas and simulation methods for practicing professionals."--Acoustics Today, October 2012, page 48* *Review Magazine.com, January 9, 2013* *"...this reference work could be regarded as the counterpart to the advanced, computational acoustic engineering software such as Comsol now becoming popular, providing much of the grounding for these multi discipline, coupled modelling programs...It is a welcome surprise to see Leo Beranek's Acoustics so exhaustively revised."--Audio Review Magazine.com, January 9, 2013* *"Beranek and Mellow...offer engineering students a textbook on acoustics that can also serve as a reference for experimenters and consultants. They assume knowledge of electric circuit theory."--Reference and Research Book News, December 2012*

From the Back Cover

Long-awaited update and expansion of a widely recognised classic in the field by pioneering acoustics expert, Leo L. Beranek

- Builds upon Beranek's 1954 *Acoustics* classic by incorporating recent developments, practical formulas and methods for effective simulation
- Uniquely, provides the detailed acoustic fundamentals which enable better understanding of complex design parameters, measurement methods and data
- Brings together topics currently scattered across a variety of books and sources into one valuable reference
- Includes relevant case studies, real-world examples and solutions to bring the theory to life

Acoustics: Sound Fields and Transducers is a modern expansion and re-working of *Acoustics*, the 1954 classic reference written by **Leo L. Beranek**.

Updated throughout and focused on electroacoustics with the needs of a broad range of acoustics engineers and scientists in mind, this new book retains and expands on the detailed acoustical fundamentals included in the original whilst adding practical formulas and simulation methods for practising professionals.

Benefitting from Beranek's lifetime experience as a leader in the field and co-author **Tim Mellow's** cutting-edge industry experience, *Acoustics: Sound Fields and Transducers* is a modern classic to keep close to

hand in the lab, office and design studio.

About the Author

Educated at Harvard and Cornell, Dr. Leo Beranek is an acoustical design consultant. Recent work includes several concert halls in Japan. In 1948 he co-founded Bolt, Beranek and Newman (now BBN Technologies) to provide consultation for major auditoriums. BBN also reduced jet noise, developed the ARPANET (internet forerunner), and founded Channel 5 among other achievements. Leo has won numerous awards and fellowships including AES, ASA and ASME gold medals, Presidential National Medal of Science, and ICA Lifetime Achievement in Science Award. He has published 13 books.

Tim Mellow was educated at Boundary Oak School and Lancing College before obtaining a B.Sc. in Electrical Engineering and Electronics from the University of Dundee, Scotland, in 1985. A career as a Design engineer at BICC, Marconi, Thorn EMI, Racal, VTech, and Nokia followed. Recently, he co-founded Mellow Acoustics Ltd with Philip Trevelyan to develop high fidelity loudspeakers and amplifiers. Tim takes a keen interest in music and plays the piano. He appreciates technology that brings musical performances to life, especially those which can no longer be heard live.

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Kathryn Granger:

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