

# Chapter 1

## Short History of the Society's First Seventy Five Years

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# Short History of the Society's First Seventy Five Years

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A lot can happen in 75 years, whether it be to a person's life or the life of a Society. In fact much of the history of the Acoustical Society of America was built upon the professional lives of its members. Since there was no one source of information for writing this historical account of the Society, information from ASA correspondence files, from personal recollections, and from the Journal of the Acoustical Society of America (JASA) and other articles have been gathered together to write this informal history. To make it easier to read about the entire 75 years—or just segments of those years—this history has been organized into six chronological time segments:

- **1928-May 1929**

The Formation of the Acoustical Society

- **June 1929-1940**

The Organizational Years/Great Depression

- **1941-1948**

World War II and Immediate Post-War Years

- **1949-1954**

20th and 25th Anniversary Celebrations

- **1955-1990**

Expanding Publications - Inside and Outside the Society

- **1991-2004**

Building Diversity

Of course these are somewhat artificial categories which have been used to help organize the history of the Society into manageable sections. There is indeed overlap, and many topics do not neatly fit under these six headings. In addition, the histories of the technical fields, ASA standards, and education in acoustics have been, for the most part, omitted since they are well covered in the various sections in this 75th Anniversary book.

## ***1. The Formation of the Acoustical Society, 1928-May 1929***

The idea for forming a society which was specifically devoted to acoustics had its beginnings on July 30th, 1928 when Floyd R. Watson (1873-1974), Vern O. Knudsen (1893-1974) and Wallace Waterfall (1890-1974) met at a Santa Monica beach club near Los Angeles, California. They originally envisioned an organization for engineers working in architectural acoustics. In the fall of 1928, they sent letters to men who were working in acoustics proposing the formation of an "American Society of Acoustical Engineers."

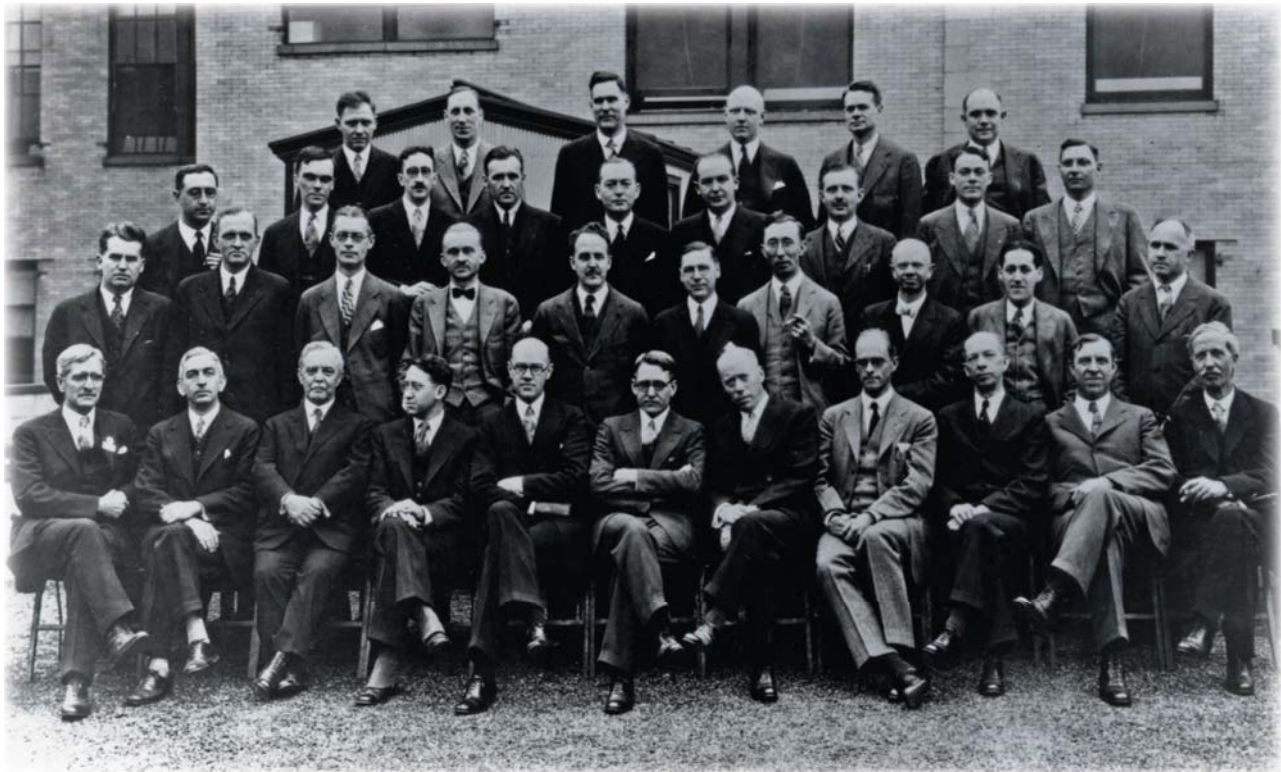
Looking back there were a number of reasons why the idea for a new society on acoustics emerged at that particular time. First, other societies were not fulfilling the needs of acousticians. In 1929 Harvey Fletcher had just published his book *Speech and Hearing* which set the foundation for the field of airborne acoustics to accompany all the new devices which were being invented. He noted that presenting his papers at the meetings of the American Physical Society had been less than stimulating because there were so few people there interested in the work he was doing. A second reason is given by Dayton Miller in his 1935 book *Anecdotal History of the Science of Sound to the Beginning of the 20th Century*. He observed that there were many events occurring in the world of sound leading up to the concept of forming a society dedicated to acoustics, including rapid advancements in the field at this period. He stated that "More progress has been made in the realm of sound in the first third of the 20th century than in all the preceding centuries." He attributed much of this to the use of underwater sound during World War I, along with sound being transmitted by radio and telephone, amplified for hearing aids, and recorded and reproduced with gramophones and later for the movies. The section on Structural Acoustics and Vibration in Miller's book noted that Warren Mason was working on filtering of waves and that Floyd Firestone introduced an analogy between electrical circuits and mechanical systems. Other events included the showing of the first movie with full audio in 1927. (The motion picture industry participated in the early years of the Society since the acoustics of rooms was of particular importance.) Also, earlier in the 20th century, many new electroacoustic sound sources and receiving equipment had been invented which previously were not available to the earlier experimenters. The section on Engineering Acoustics in Miller's book describes a classic paper written in 1925 by Rice and Kellogg of General Electric on "a new type of hornless loud speaker" which used electromagnetics. Acousticians, along with the general public, were making good use of these new sources and receivers. This was acknowledged by noting that Thomas Edison, who created the groundwork for constructing much of this equipment, was named the Acoustical Society's first honorary fellow in 1929.

There was important work in acoustics before the 20th century began to which today's acousticians still refer. Philip Morse (1903-1985), president of the Society from 1950-51, remarked in 1955 that "it behoves all of us physicists to read Rayleigh's *Science of Sound* regularly."

And to place the pre-1900 efforts in acoustics in historical perspective, Dayton Miller recalled that when he received his D.Sc. from Princeton in 1890, the four greats in the science of acoustics—Helmholtz (1821-1894), Koenig (1832-1901), Rayleigh (1842-1919) and Tyndall (1820-1893)—were all still alive. Professor Miller’s life bridged this time between these 19th century original thinkers who wrote treatises on acoustics, and the new breed of scientists and engineers who were applying acoustics to practical applications for consumers and for defense during the first third of the 20th century. Also spanning the gap was Wallace Clement Sabine (1868-1919) who published a number of papers on the new science of acoustics of auditoriums around the turn of the century. He died in 1919 while serving as vice president of the American Physical Society.

Returning to the formation of the Acoustical Society, a second letter from Knudsen, Watson and Waterfall was sent on December 10th, 1928 to 16 people, mostly at universities, in which they described the need for a

new organization. The letter asked recipients to alert their colleagues of an upcoming organizational meeting which was to be held on December 27, 1928 at the Bell Telephone Laboratories located at 463 West Street in New York City where Harvey Fletcher was director of the now famous Acoustics Research Department. Forty men attended this organizational meeting, most of whom were from New York and from commercial organizations (see Figure 1). Various names were suggested for the new organization, starting with American Acoustic Society (paralleling the grammar of the American Physical Society) and the Acoustic Society of America. But eventually F. R. Watson made a motion for the “Acoustical Society of America” which was adopted with one dissenting vote. In his recounting of that meeting years later at the 25th Anniversary celebration, Harvey Fletcher said that speeches were made by several of the people who attended the organizing meeting, and “So you see our meeting started out as a talking Society and it has continued ever since through the years. Fifty years from now, this little gather-



*Figure 1. Part of the group of organizers of the Acoustical Society, Bell Telephone Laboratories, December 1928*  
*Bottom row, left to right: F.A. Saunders, R.V. Parsons, D. C. Miller, W. Waterfall, V. O. Knudsen, H. Fletcher, C. F. Stoddard, J. P. Maxfield, F. R. Watson, F. K. Richtmyer, G. R. Anderson. Second row from bottom, left to right: H. A. Erf, H. C. Harrison, J. B. Kelly, R. L. Wegel, H. A. Frederick, N. R. French, C. W. Hewlett, A. T. Jones, I. Wolff, J. B. Taylor. Third row from bottom, left to right: L. J. Sivian, E. L. Norton, W. A. MacNair, R. F. Mallina, L. Green, Jr., R. H. Schroeter, H. W. Lamson, C. N. Hickman, D. G. Blattner. Top row, left to right: W. P. Mason, J. C. Steinberg, V. L. Chrisler, E. J. Schroeter, E. C. Wentz, W. C. Jones. Other attendees not in photo: D. MacKenzie, J.H. Bolen, B. Graham and H. D. Arnold.*

ing will be referred to as the First Meeting of the Acoustical Society of America.”

The Society was formally organized during its next meeting which was held May 9th to 11th, 1929 at Bell Telephone Labs in New York City. The first day of the technical portion of the meeting was a joint session with the Society of Motion Picture Engineers. There were 183 members who registered at the first meeting. The program included two symposia, one on methods of measuring absorption coefficients and the second on speech. There was a total of 22 papers which were presented consecutively, two panel discussions, and one demonstration lecture on the science of musical sounds by Dayton Miller. By October 1929, the organization grew to 416 Charter members and 76 regular members.

The minutes of the first official meeting held on May 10th, 1929 can be found in the first issue of the *Journal* (Volume 1, No. 1, October 1929). Dayton Miller proposed that the organization include not just acoustic engineering but widened to include “. . .the study of the ear, hearing, othology, matters of speech, speaking...if we could get those various groups together and work together then I think there would be every reason in the world for the organization of the society.” Harvey Fletcher (1884-1981) and Dayton Miller (1866-1941) had stressed earlier the desirability to include a more diverse set of technical fields than just architectural acoustics in order to create a stable institution. Even then, there was some concern expressed that the proposed society would be too small to stand alone because of the narrow interest on sound. A proposal was then made that the group organize as a subcommittee of an already existing organization or that if it were formed, to contribute to another organization to have papers published in an already existing journal.

Finally the group decided on a purpose of the new society: “to increase and diffuse the knowledge of acoustics and promote its practical applications.” They then elected a set of temporary officers and discussed publications, a plan for further development of the organization, establishing a journal, standards, membership qualifications, finances, and most importantly, the scope of the organization. The first official actions by the Council at its 10 May 1929 meeting were to appoint a Publication Committee which was charged with publishing the proceedings for the first meeting and to investigate the possibility of starting a journal, appoint a Membership Committee that was given the charge to put into execution a plan to increase the membership of the Society, and approve the site of the next meeting and appointment of a local committee and Program Committee. The Acoustical Society of America had officially started its operations!

The Society was international in scope from its very beginning with 17 members residing in Australia, Belgium, Canada, Denmark, England, France, Japan, Norway, and Wales. There was one woman Charter member.

The membership was comprised of people working in architectural acoustics firms, piano and other musical instrument companies, universities and at least one aircraft company. All of the major movie studios were represented including Paramount, Warner Brothers, Columbia, RKO, United Artists and Fox.

## ***2. The Organizational Years/Great Depression, June 1929-1940***

In 1929 Wallace Waterfall was given some manuscripts and he later recalled that he “asked the Council what I was supposed to do with them and I got the answer; ‘Go publish them.’ I said we had no money and they said that was my problem. I was with Celotex then, so I hit my own company for a sizeable contribution and other companies chipped in to get us started. We set up an Editorial Committee and I held the job of Managing Editor for 4 years.” The first issue of the *Journal* was published in October 1929, the same month as the stock market crashed. It contained 8 papers in its 163 pages. On its cover was the 1929 logo which Wallace Waterfall had designed, later fondly remembering that: “A printer and I got together with a compass and we spent a lot of time, had a lot of fun, drawing that thing.”

The Executive Council met on December 12th 1929 to appoint an editorial board, elect Fellows, and to incorporate the Society, which was approved on February 4, 1930. By March 1931, the membership comprised of 632 members, 128 fellows, 10 sustaining members and one honorary member. The membership grew to 800 in the mid-1930s, but dropped back below 700 by 1939, reflecting effects of the depression.

During the depression years the Council made various decisions on business matters, on how to provide outreach to the public, on standards issues, and to appoint standing committees to handle special subjects that required deeper deliberations. They established the membership category of “Fellowship” and encouraged “foreign” membership in the Society. Decisions on JASA operations included appointment of an Editorial Board, approving advertising, setting prices for single copies and the subscription rate for libraries and establishing a \$2 page charge for authors of articles published in the *Journal*. (The first complaint about this charge was received soon thereafter!) The Council considered working with CBS TV to develop educational broadcasts about acoustics and adopted a resolution advocating more liberal appropriations for the U.S. Bureau of Standards. Committees were appointed to prepare a brochure to be distributed to mayors of U.S. cities about what could be done to reduce noise, and to cooperate with the Academy of Motion Picture Arts and Sciences which was doing research in developing standards for acoustical measurements in theatres. Emeritus membership and the Biennial Award were es-

tablished in April 1940, and at the same time donations of JASA were made to three libraries in China where many reference libraries had been destroyed. Finally, a Patent Review section was begun, and the first technical committee – on musical acoustics – was appointed.

ASA's minutes for the Society's December 31, 1930 meeting show that Professor K.T. Compton from the American Physical Society spoke to the Council about APS' financial problems and relying on wealthy benefactors for publishing *Physical Review*. The Council approved entering into a cooperative agreement with the American Physical Society and the Optical Society of America for publishing journals. In 1931 the Acoustical Society, along with three other professional societies joined together to create the American Institute of Physics (AIP) with the primary purpose of providing facilities for publishing and other common activities. In May 1932 the Executive Council voted to transfer publication of the *Journal* to AIP. ASA's relationship with AIP continues today with the Institute providing a wide variety of services to the Acoustical Society.

Financial conditions during the depression are not very evident except for the fact that expenses were kept very low. In May 1931 the treasurer reported that "the business conditions continue, although there seem to be signs of improvement beginning some time in the latter part of the present year. In endeavoring to foresee business conditions of the Council, in the Treasurer's judgment, should not lay too much weight on the prevailing deep pessimism in New York and the East generally." In November of the following year, he felt that they didn't need to ask for additional funds from industry, noting that "our best information is that no important improvement in business can be expected until several months after the inauguration of President Roosevelt." After those inserts not much was mentioned about financial difficulties even though they must have been ever present for the Society. An increasing reliance was placed on member dues and less on contributions from corporations, and some members were kept on even though they were three years in arrears in dues. Annual expenses for the Society were only in the \$3,000 to \$5,000 range, mainly because no labor expenses were allocated to the Society. The Society kept about this same amount of expenses in reserves, although the American Institute of Physics was in debt in the latter part of the 1930s. By the time of the November 15, 1940 meeting foreign subscriptions were dropping because of world conditions.

### **3. The War and Post-War Years, 1941-1948**

As with the rest of the world, World War II had its effect on the Society. Only one meeting per year was held in the spring of 1942, 1943, 1944 and 1945. During the same time, the number of pages in JASA dipped from 550 in 1940, to 220 pages in 1944. However membership in-

creased over this same period by about 6% per year. Obviously the war-time effort and security measures were taking its toll on the publication output and ability to organize meetings, but members felt it was still important to maintain their membership in the Society during these war years.

Many members were involved in the applications of acoustics to the war. Frederick V. (Ted) Hunt organized and directed the Underwater Sound Laboratory at Harvard University (HUSL) during the war years 1941-1945. At the end of the war a portion of the Laboratory was moved to Penn State and is now still very active in acoustics as the Applied Research Laboratory (ARL). Leo Beranek was director of the Electro-Acoustic Laboratory at Harvard University. Other laboratories and research centers began carrying out military, industrial and academic acoustics, including the University of Texas at Austin.

The years just after the war marked the increase in research in all fields of acoustics. In 1946 the Society found the need to reorganize its membership structure to allow for "a wide and active participation, without meaningless stratification, of all persons having legitimate connection with the field which would be appropriate for the advancement of acoustics." Also at this time the grade of Associate Membership was established.

An article in JASA published shortly after the war was over noted that "A large fraction of the membership was engaged during the recent war in the development of new weapons utilizing acoustical principles, particularly the development of equipment utilizing underwater sound." It ended by predicting "The outlook for the future of the Society is bright. The war has spotlighted physics in general and acoustics in particular. Our future meetings will bring forth many interesting papers and our journal will continue to record the accelerated history of the development of acoustics." This came to be true as membership in the Society grew from around 1000 members in 1945 to 6500 in 1990. From 1945 to 1965 it grew at a rate of almost at 20% per year. The number of papers published in JASA increased at about the same rate. The nature of the Society also changed during these years. In 1966 Wallace Waterfall reported that 26% of ASA's members held doctoral degrees; in 2002 this percentage had grown to 67%. He also reported that 27% of the members were employed by academia and 45% by industry. By 2002 this had switched, with about 40% with academia and only 16% from industry.

A tremendous amount of work related to defense was done in acoustics during the war but was never published in the open literature. Articles on the research conducted in underwater acoustics, acoustical oceanography, transducers, hearing aids, acoustical measurements and speech communication were published in a huge collection under the auspices of the National Defence Research Council (NDRC). Hundreds of scientific and publica-

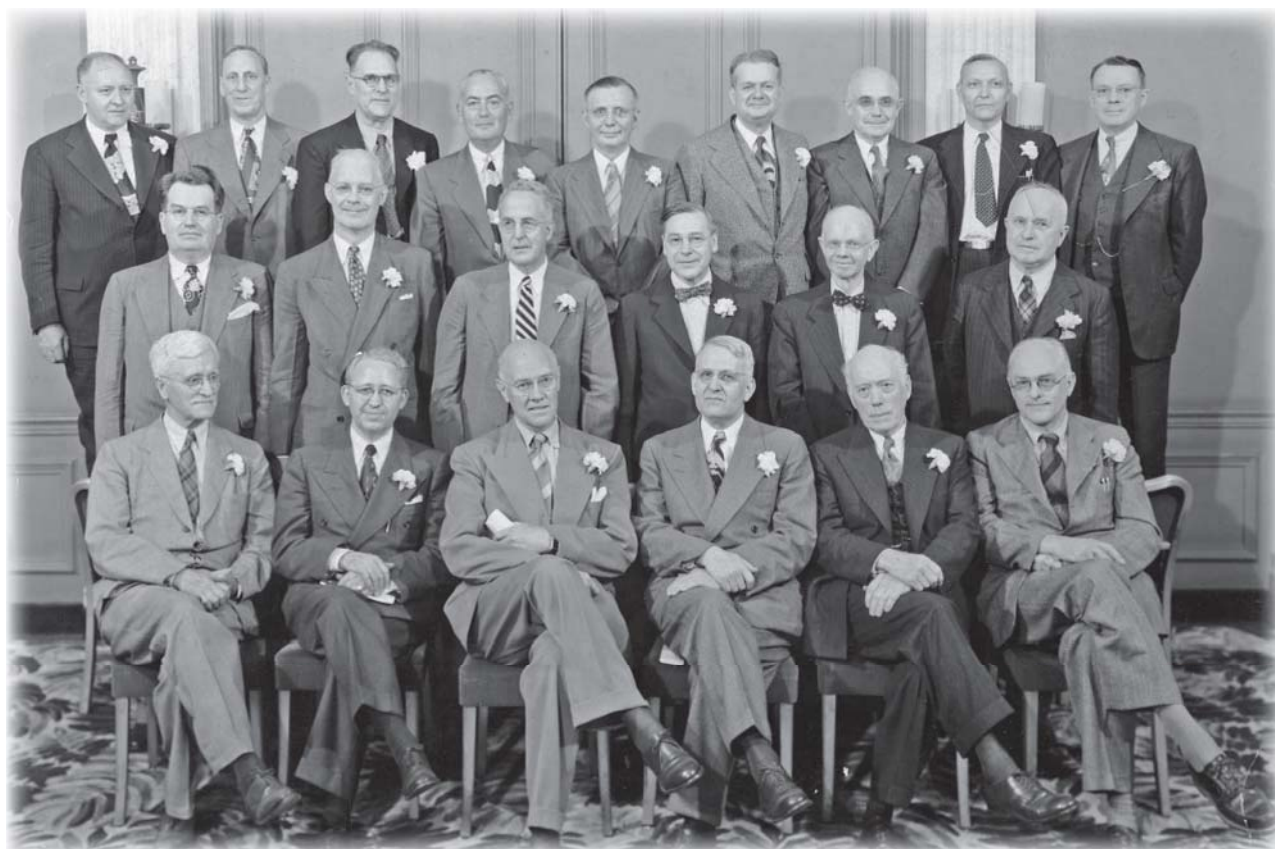
tions people were involved in this project which began in March 1945 and ended in May 1948. The project was authorized by Vannevar Bush, and administered by none other than Wallace Waterfall!

#### **4. 20th/25th Anniversary Celebration, 1949-1954**

After the depression and WWII, the Acoustical Society was celebrating its peacetime growth along with the rest of the nation. The Twentieth Anniversary meeting in 1949 held at the Hotel Statler in New York had an attendance of 417, and the membership had reached 1400 members. The theme for the meeting, "Acoustics and Man," seemed to indicate an interest in non-military applications of acoustics. A "founders' luncheon" was held and attended by 21 of the original founding members (see figure 2) who assembled for a photo mirroring the one shown in figure 1.

But one problem which resulted from this growth was expressed in Floyd Firestone's report of the 1951 Chicago meeting: "The growth of the Acoustical Society has brought with it the necessary evil, the programming of papers into simultaneous sessions, so that the member has to decide which papers he will miss, with the result that he may just stand out in the hall and visit. By contrast one can recall an announced meeting at Ann Arbor about a decade ago when only four papers had been received by the deadline date and it was necessary to stir up some progress reports in order to fill out the program." The growth of society had changed some of its character.

Although both membership and attendance at meetings were growing, the financial benefits were waiting in the wings for the 1950's boom to begin. Wallace Waterfall had been using 70 pound paper for JASA, but in 1948 decided to drop down to 55 pound paper to save money. This decision probably was promoted by Treasurer Nixon pointing out that the Society had only \$16,000



*Figure 2. Participants in Founders' Luncheon at 20th Anniversary Meeting*  
*Bottom row (left to right): F. A. Saunders, Wallace Waterfall, Vern O. Knudsen, Harvey Fletcher, C. F. Stoddard, J. P. Maxfield.*  
*Middle row (left to right): H. A. Erf, J. B. Kelly, H. A. Frederick, N. R. French, A. T. Jones, J. B. Taylor. Top row (left to right): W. P. Mason, J. C. Steinberg, V. L. Chrisler, L. Green, Jr., H. Lamson, E. C. Wentz, W. C. Jones, D. C. Blattner, C. N. Hickman.*

in the bank, but estimated that the publication of JASA would cost \$25,000 to publish in the coming year. The Society actually operated in the red for three years, and in 1950, they decided to accept advertising in JASA. The Society also initiated a meeting registration fee of \$2.00 for meetings, increased page charges from \$4.00 to \$8.00 per page, and promoted a program to obtain more sustaining members.

There was also considerable reorganization of the leadership structure during this time period as well. In 1948 the Executive Council decided that a president-elect should be chosen so that person could be better prepared to take on the responsibility of president. In the same year it was decided that the Acoustical Society should have its own standards committees rather than originating standards under the American Standards Association. A year earlier the Council had established a formal Standards Committee in 1947 with the explicit goal to keep the Executive Council better informed about standards activities. Later, in 1968, the Executive Council had established the position of vice president-elect, and assigned the vice president the duty of serving as chair of the technical council.

Regional Chapters were also established in the early 1950s in response to interest by members in forming local groups, and by 1954 four chapters had been organized. This program has expanded and contracted over the years in response to the needs and desires of local groups.

The 25th Anniversary meeting in May 1954 was very well recorded for posterity. A film of the four-hour 25th Anniversary banquet was taken, and the transcript of the film is reprinted in JASA. A "Parade of Acoustical Personalities" was the title of the presentations by all the living Presidents—gathered either in person or by recorded messages. There were several acousticians who attended from countries outside the United States including Belgium, England, Germany, India, Italy, and Japan. The Society's first Gold Medal was awarded at that meeting to Wallace Waterfall. The basic design of the medal was executed by Richard Bolt, with a drawing of a tuning fork based on an actual one made by Rudolf Koenig and borrowed from the collection of Dayton Miller.

The film of the banquet was intended for viewing at future anniversary meetings and will in fact be shown at the 75th Anniversary. A special "Time Capsule Custodial Committee" was appointed shortly after the celebration meeting to arrange for the film's care and safe-keeping. It was with this confidence of the survival of the Society and cold war worries that the members of ASA's "Time Capsule Custodial Committee" placed the 16 mm film in the Iron Mountain Atomic Storage Corporation located in upstate New York. They also kept one copy at the University of Michigan in Ann Arbor as a precaution against a widespread disaster, which the Committee noted "could conceivably not wipe out both of these locations." Even

though the intent of the Committee was for the transmission to "our hundredth Anniversary Celebration," the film was eventually removed from Iron Mountain in 1976, and a film and negative are now stored at the American Institute of Physics Center for the History of Physics in College Park, Maryland.

### ***5. Expanding Publications-Inside and Outside the Society, 1955-1990***

The official theme of the 51st meeting held at the Massachusetts Institute of Technology and Harvard University in June 1956 was "Sound and Man," and covered three areas: 1) Bioacoustics and Noise Control, including Speech and Hearing, 2) Architectural and Musical Acoustics, and 3) Physical Acoustics and Sonics. It was also the occasion of the 2nd International Congress on Acoustics, and the first held in the United States with 1230 registrants.

The Society also began increasing its publications. The total number of pages in JASA went from 1279 in 1955 to about 7000 in 1990. In 1957 JASA went from being published bimonthly to twelve times a year. Two years before, in January 1955, the first issue of the Society's publication *NOISE Control* appeared with Lewis Goodfriend as editor. In his introduction to the magazine, then-president Leo Beranek said that "The magazine is directed to the reader who needs to know about noise control—whether he is an engineer, the manager of a factory, an audiologist, or an architect." It was meant to provide helpful information on the practical application of acoustics, current "Noise in the News," noise legislation and products. It also included ads. The magazine was replaced in 1962 with *Sound Its Uses and Control*. The reason for this change was given in the first editorial, namely that "the scope of *NOISE Control* has clearly been too narrow, and the time has come to provide a broader coverage and give a grasp of the meaning of sound, its uses and control in all aspects to a much wider audience." The editorial goes on to state that one objective is "to provide practical information on the uses and control of sound unencumbered by the heavy mathematical analysis of the conventional research paper." The magazine contained patents, book reviews, calendars, new products and articles which every reader could understand. Robert Fehr (1911-1998), an Associate Editor of *Sound*, elucidated upon this point in the final issue of the magazine when it was hastily, and sadly, terminated by the Executive Council in December 1963: "It is no mean task to bring people together where some are science-oriented and others are thinking in terms of hardware – and in dollars and cents." A small note was inserted in this issue noting the demise of the magazine, and that subscription payments would be refunded.

After WWII there are many examples of societies

splitting off from the Acoustical Society. Although no official complaints are to be found associated with these events, minutes and recorded oral interviews allude to concerns expressed by the leadership of ASA about losing these technical fields and membership. In 1948 the Audio Engineering Society began as the hi-fi revolution took off. The report of ASA's Committee on the Development and Promotion of the Society noted the recent appearance of the publication of *Transactions in Audio and Ultrasonic Engineering* and the *Journal of the Audio Engineering Society* which the committee noted "suggest that there are areas, particularly in the area of applications of acoustics, which are not being adequately covered by the *Journal* or by the more recent Society publication, *NOISE Control*." In response to these new fields and publications, the Committee made several recommendations including forming new technical committees.

In 1971, following an Acoustical Society Workshop on Noise Control at Arden House in Harriman, New York, the Institute of Noise Control Engineering (INCE) was formed. Many acousticians are members of both ASA and INCE-USA, and thus the two organizations have held several joint meetings. Also the field of aeroacoustics shifted over to the American Institute of Aeronautics and Astronautics (AIAA), and many Society members helped start the Association of Research in Otolaryngology (ARO). The Society eventually accepted the splitting off of new societies, noting that the creation of new organizations in specialties in acoustics was part of a natural evolution, and the best approach is to avoid conflicts of meetings, and encouraged joint or cosponsored meetings.

Concerns about the future of the Society prompted studies which began with the aforementioned Committee on Development and Promotion of the Society which had been appointed in 1956. That Committee made a number of suggestions for revamping the Society's operations—primarily as they affected technical operations. As a result the Society's present day Technical Council/Technical Committee structure was established. During the oral history interview of Wallace Waterfall, he mentioned a significant development in the Society's structure in 1960. Waterfall recounted the growing sentiment that members wanted an expanded role in conducting the activities of the ASA. In response, the current Technical Committee structure, and later the Technical Council were formed. Wallace felt that it gave the ASA a "House of Representatives" with a large committee representation which could influence the direction of the Society—not only in administrative affairs, but the conduct of meetings and the *Journal*. Wallace commented that "I feel that a kind of grassroots representation has been very healthy. It certainly saved the Society from being broken up into actual sections...And it prevented the establishment of di-

visions." A more detailed description of the history of the Society's technical committees can be found in Chapter 3 of this book. In addition the history of each of the current technical committees can be found in the individual chapters of this book, along with the histories of publications and standards.

A special committee to study the publication policies of the Society was established in 1957. The October 1957 issue of *JASA* (Vol. 29, No. 10) carries an editorial titled "What sort of journal do we want?" and questions were posed as to how the *Journal* could be improved to better serve the acoustics community. Another poll of the membership was taken in 1966 and reported in *JASA* in 1968. Members were asked about the publication format and if the technical areas were being served well. The members felt considerable pride and satisfaction for the quality of the content of *JASA*, but favored some sort of subdivision of the *Journal*. A survey of 42 scientific and engineering societies in 1992 placed *JASA* among the top three ranked best by members. Splitting *JASA* into two sections (Physical Sciences and Life Sciences) once again became a source of deep discussion in the early 1990s. However the solution to this question was essentially answered by electronic publishing whereby readers could choose their own topic of interest without receiving a huge or split journal in the mail.

In 1972 the Society hosted the Conference on Acoustics and Societal problems at Arden House in New York. John Johnson, the Conference Chair, began the report on the conference by stating: "The pervading and ascending influence of science and technology on our society has become a cause of public concern. While impressed by such triumphs as moon landings, the public has become increasingly critical of the scientific community for its seeming apathy toward many of society's everyday problems." The technical areas focused on the effects of noise and improvements to biomedical acoustics. Also improvements to the organization were mentioned such as better relationships with other technical societies and government. Thirty-two years later most of their findings are still applicable today. The need to apply technical solutions to everyday needs of society seems to be a perpetual concern.

All three of the founding fathers died in 1974. Wallace Waterfall served as Secretary of the Society from 1929 to 1969 when Betty Goodfriend, his assistant, assumed his responsibilities. Wallace Waterfall continued to serve as treasurer. Betty Goodfriend served until 1987, when Murray Strasberg, a long-time member of the Society and a past president, was appointed Secretary. In 1990 Charles Schmid became the first executive director of the Society and the position of Secretary was retired. Elaine Moran serves as division manager for the headquarters office, and began working for the Society in 1970.



## 6. Building Diversity, 1991-2004

Diversity emerged in many forms in the Society in the 1990s. The printed page started giving way to electronic publications, and members began submitting papers over the internet. The Society, through its meetings, authors and membership, became much more international in scope, and the members elected African-Americans and women to leadership positions. Along with these changes, the role of students and public relations became much more prominent in the Society.

The methods by which information was delivered and accepted from members changed drastically as a result of the internet revolution. Up until the mid-1990's ASA's communications were primarily at meetings or through the printed page. The decade which followed was truly a revolution in communicating with members. E-mail, CD ROMs, online publications, electronic submission of abstracts, manuscript management, the world wide press room, and ASA's web pages showed how many diverse ways the Society could communicate with its members and the public at-large. Before recalling the origins of these forms of Society communications, it might be of interest to note that two of the Society's past presidents had prominent roles in the founding of the internet! While most engineers and scientists in the emerging computer age were philosophizing how man and machine were going to communicate, past president J.C.R. Licklider (1915-1990) was working on a system in the early 1960s where man was communicating with man via computer – the internet. Earlier in his life he had received the Biennial Award (now the R. Bruce Lindsay Award) in 1950, and had been lauded as “one who enjoys the life of a pioneer who swings his not too precise machete through a jungle of inconsistent and contradictory data,” praising his work in psychoacoustics. He also served as president of the Society in 1958-59 when he was working with Leo Beranek at Bolt, Beranek and Newman. Shortly after that he wrote a seminal paper “On-Line Man Computer Communication” and went on to join DARPA (Defense Advanced Research Project Agency) to work on the first communication systems which sent human messages between computers. Later, at Licklider's instigation, ARPA supported university scientists in their work to make computers smaller, cheaper and more available and above all, able to communicate over some sort of electronic nervous system.

However it took the world and the Acoustical Society until the early 1990s to begin extensive communications electronically. In 1994 the Society began placing past volumes of JASA on CD ROM so that members could have quick access to past issues and at the same time gain shelf space in their homes and offices. In 1995, then President-Elect Robert Apfel (1943-2002) led the effort to provide on-line submission of abstracts which was initiated for the fall meeting in that year. In 1996 he made the mo-

tion to publish the current issue of the *Journal* on CD ROM and give members the option to receive it every two months, with students automatically receiving JASA in CD ROM format. Robert Apfel also initiated *Acoustics Research Letters Online (ARLO)* which began online-only publication in 1999. This unique journal had its own electronic manuscript managing system, and is available only online without charge to anyone with a browser. Bob Apfel carried on the visionary approach for the Society that J.C.R. Licklider did thirty years earlier for the world!

Another form of communication with members is to poll the membership about the Society – to find out if members are satisfied with the products and services they receive, or more importantly how the Society can improve. In 1992 the Society entered into a survey with 42 other prominent scientific and engineering societies. The result was that the Acoustical Society was rated in the top three in: 1) overall satisfaction, 2) technical publications, and 3) standards activities. However members felt the Society could improve in its outreach to the public informing them about acoustics and acousticians, and was not doing enough with careers in acoustics. This was followed by the Re-creation Process—rethinking the ASA—which began in 1994 and concluded with a summary report in JASA which contained many suggestions for new and modified ASA programs. Another less formal survey was later carried out with a focus group comprised of graduate students in acoustics at the University of Washington. A strong suggestion from them was the need for a student council. The ASA Student Council was appointed in 1999 and now meets semi-annually at Acoustical Society meetings. They have already established a mentoring award, and a web page which provides information explicitly for students.

Based on the 1992 poll the Society took steps to increase its dissemination of information to its members and also improve public outreach. In 1995 the Society set up its own web page with the help of ASA volunteers Paul Baxley and Carr Everbach. Paul Baxley developed an idea to post lay papers from ASA meetings on the web for the public and the press to read, naming it the World Wide Press Room. This novel approach has been adopted by other societies, and along with the aid of the press room set up by the American Institute of Physics, has led to many stories in the public press about acoustics. The World Wide Press Room was later incorporated in a separate web page for the general public <acoustics.org>.

The need for some sort of publication to supplement JASA was apparent ever since the demise of *Sound* in 1963. An often heard complaint of members is that they would like something more readable. One of Charles Schmid's first tasks as executive director was to begin the publication of *ECHOES* with Alice Suter as managing editor. It began in Spring 1991, adopting the name of a newsletter once published by the executive director's previous em-

ployer. *ECHOES* is sent four times a year to all ASA members, the press and regional chapter members who are not members of the Society. Tom Rossing took over as editor of *ECHOES* in 1997.

The 1990s also saw the membership grow in diversity. As you probably noted in the photo above showing the 40 founding members of the Society—all were men. For that matter the photo of the 25th anniversary banquet had the caption “Council members and Past presidents *and their ladies*” (italics original). Even earlier notes from the meeting in 1948 in Washington, DC discussed the “Ladies Program:” “On Friday afternoon the ladies were graciously received at the White House by Mrs. Harry S. Truman in an affair including handsome Naval aides in gold braid and a military orchestra in red uniforms.” It was fifty years later when Patricia K. Kuhl was elected as the Society’s first woman president in 1998. Since that time, two women have been elected president. And Patricia Kuhl can be seen on the cover of the Summer 1997 *ECHOES* being greeted at the White House by President Clinton when she was invited by Mrs. Clinton to give a paper on early childhood development and learning. James E. West, the first African-American president, was elected in 1997. Although the leadership has become more diverse in gender and race, it should be pointed out that today only 13% of the Society’s members are women and the number of under represented minorities is still very small. These issues have been addressed by the Committee on Women in Acoustics, which was formed in 1995, and the establishment of the Minority Scholarship in 1992.

Another aspect of diversity has been an increase in participation by international members and organizations. The percentage of members who are from outside the US or Canada went from 16% in 1990 to 26% in 2002. Likewise about half of the manuscripts submitted to *JASA* originate outside of North America. One approach the Society has taken to recognize this increased representation of non-US members has been to hold meetings in Ottawa, Canada (1968, 1981 and 1993), and to hold joint meetings with the Acoustical Society of Japan in Honolulu, Hawaii (1978, 1988, 1996). In addition, the Acoustical Society has hosted two joint meetings of the International Congress on Acoustics (ICA) in Cambridge, Massachusetts (2nd ICA 1956) and Seattle, Washington (16th ICA 1998). In the process of increasing its interaction with the International Commission on Acoustics, the Acoustical Society has become more involved with their activities, including jointly funding international travel grants and technical meetings, and scheduling conferences on acoustics. The first joint meeting with the European Acoustics Association (EAA) was held in Berlin (1999), which was also the first meeting that the ASA held in Europe. With 2,263 attending, it had the largest attendance to date of a meeting on acoustics. In 2002 the ASA met in Cancun, Mexico with the Iberoamerican Federation

of Acoustics (FIA) and the Mexican Institute of Acoustics (IMA) for the first Pan American/Iberian Meeting on Acoustics. Another method to increase international participation with the Society was by offering electronic associate membership beginning in 2002. A special aspect of this membership was a corresponding electronic associate which allows acousticians in certain countries to join the Society at a low fee. Also the Regional Chapters program was “internationalized” with the establishment of chapters in Madras, India in 1995 and in Mexico City in 2001.

The fact that acoustics is such a diverse topic has led to concerns that specialty fields within acoustics are not addressed at Society meetings to the depth members would like. This problem was referred to above in section 5 (1955-1990) when it was noted that new journals and new societies were being formed which focused on one aspect of acoustics. Acknowledging this problem the Society decided to organize and cosponsor smaller workshops and symposia which are dedicated to one subject. There have been a number of these, including the Physical Acoustics Summer School (PASS) held every two years beginning in 1992, International Symposium on Musical Acoustics (1998), Themed Entertainment Workshop (1999), the first International Workshop on Thermoacoustics (2001), and the first International Conference on Acoustic Communication by Animals (2003).

Creating new technical committees was another approach towards providing a platform for acousticians in special and emerging fields. After the Cold War ended, the Society saw the emergence in the mid-1990s of three new technical committees which represented very diverse technical fields: 1) Acoustical Oceanography, 2) Animal Bioacoustics, and 3) Signal Processing in Acoustics. In addition Bioresponse to Vibration added Biomedical Ultrasound to address the important developments in health-related acoustics. The history of these fields, as well as the other technical committees, are covered in the ensuing chapters of this book. In addition to adding three technical committees, the Technical Council took an increasingly active role in polling its membership at meetings to better report the needs and desires of the members to the Executive Council. Wallace Waterfall would have approved of this function; as mentioned earlier, he felt that the technical committees gave the ASA a “House of Representatives” which could influence the direction of the Society.

Although not noticeable to the average member, finances are a very important responsibility with which the Society’s leadership must concern itself. And although the Society had kept enough reserves to maintain its operations during economic downturns, it became apparent in the early 1990s that the Society needed endowment funds if it wanted to increase its outreach efforts, including supporting prizes and special fellowships. A Devel-

opment Committee was appointed in 1990, after which it was decided that the best approach for fund-raising was to form a separate not-for-profit organization which would provide funding to the Acoustical Society of America. Hence in 1996 the Acoustical Society Foundation was incorporated as a separate organization with William W. Lang as General Secretary and Paul B. Ostergaard as its first president. Also during this time period the Executive Council organized itself into three Administrative Councils to carry out its business more efficiently: 1) Internal Affairs, 2) External Affairs and 3) Financial Affairs. This was first implemented at the Austin meeting in the fall of 1994. It also initiated meetings of Officers and Managers in 1995 to carry out administrative issues between its semi-annual meetings.

### ***Parting Personal Thoughts***

Seventy five years is about the average lifetime for human beings. This accounts for the fact that none of the founding members are alive today, and hence the story of how of our Society began is now handed down to us. It is interesting to note that a number of the Acoustical Society's active members, including past presidents and the editor of *ECHOES*, happened to be born in 1929, and will be attending the 75th anniversary celebration of the Society. Since we naturally foresee the Society transcending our life spans, the message is clear. In order to retain our history for those who follow, especially for younger acousticians, we need to record the present which will turn into its history. The founders must have been keenly aware of this when they placed the 25th Anniversary film in Iron Mountain Atomic Storage. We are confident the founders would be proud to know that we are in turn recording important events which have shaped the Society during our lifetimes. Besides videotaping recollections of past presidents, there will be a video taken of the 75th anniversary celebration itself.

Additional sources for information designated by the Archives and History Committee are the three sites for storing historical items and papers in certain fields: 1) Architectural Acoustics: Riverbank Labs, IL; 2) Physical Acoustics, National Center for Physical Acoustics, MS; and 3) Musical Acoustics: The Catgut Acoustic Society Library (CASL), web pages in the Musical Acoustics Research Library (MARL), and at the Stanford University Center for Computer Research in Music and Acoustics (CCRMA). In addition, the History Center of the American Institute of Physics in College Park MD retains historical information, including oral histories from members of the Acoustical Society. A list of those whose interviews have been completed is given at the end of this section.

Anyone reading all or parts of this history should come to the conclusion that there would be no 75th celebration had not a lot of members volunteered their valuable time and creative ideas over the years to improve

the Society – and the field of acoustics in general. In turn, they too have benefitted in both their personal and their professional lives. Carrying on this tradition will most certainly allow our Society to live many human lifetimes.

In parting we note that the paragraph above is the easy way out to predict the future, namely the past is prologue. Perhaps we took a hint to avoid any stronger predictions from a JASA article entitled “Thoughts on the future of acoustics” moderated by Walter Rosenblith, with panelists James Barger, Lois Elliott, Tony Embleton and Robert Apfel. It was based on a session of the same name held at the 50th anniversary meeting. Lois Elliott was “willing to wager that when the Society celebrates its 100th anniversary, there will be people in the audience wearing and benefiting from implanted prostheses!” She would have been right even for the 75th anniversary.

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Robert T. Beyer  
Per V. Bruel  
Hallowell Davis  
Tony F. W. Embleton  
Robert S. Gales  
Louis S. Goodfriend  
David M. Green  
Robert Green  
Katherine S. Harris  
Ira J. Hirsh  
Richard H. Lyon  
Daniel W. Martin  
Harry B. Miller  
Louis C. Sutherland  
Eric E. Ungar  
Robert W. Young
- Collected by the History Center, American Institute of Physics*
- Harvey Fletcher  
Frederick V. Hunt  
Vern O. Knudsen  
R. Bruce Lindsay  
Wallace Waterfall  
A. B. Wood

## *Present and Past Officers of the Acoustical Society of America*

### **Presidents**

Harvey C. Fletcher	1929-31
Dayton C. Miller	1931-33
Vern O. Knudsen	1933-35
Paul E. Sabine	1935-37
Frederick A. Saunders	1937-39
Floyd R. Watson	1939-41
E. C. Wente	1941-43
Floyd A. Firestone	1943-45
Hugh S. Knowles	1945-47
John C. Steinberg	1947-49
Richard H. Bolt	1949-50
Philip M. Morse	1950-51
Frederick V. Hunt	1951-52
Harry F. Olson	1952-53
Hallowell Davis	1953-54
Leo L. Beranek	1954-55
Warren P. Mason	1955-56
R. Bruce Lindsay	1956-57
Richard K. Cook	1957-58
Joseph C.R. Licklider	1958-59
Hale J. Sabine	1959-60
Robert W. Young	1960-61
Laurence Batchelder	1961-62
Robert W. Leonard	1962-63
C. Paul Boner	1963-64
Cyril M. Harris	1964-65
Robert W. Morse	1965-66
Martin Greenspan	1966-67
Ira J. Hirsh	1967-68
Robert T. Beyer	1968-69
Isadore Rudnick	1969-70
Vincent Salmon	1970-71
John C. Johnson	1971-72
Karl D. Kryter	1972-73
Edgar A. G. Shaw	1973-74
Murray Strasberg	1974-75
Robert S. Gales	1975-76
Kenneth N. Stevens	1976-77
John C. Snowdon	1977-78
James L. Flanagan	1978-79
Henning E. von Gierke	1979-80
Tony F.W. Embleton	1980-81
David M. Green	1981-82
David T. Blackstock	1982-83
Frederick H. Fisher	1983-84
Daniel W. Martin	1984-85
Floyd Dunn	1985-86
Ira Dyer	1986-87
Chester M. McKinney	1987-88

W. Dixon Ward	1988-89
Harvey H. Hubbard	1989-90
Alan Powell	1990-91
Eric E. Ungar	1991-92
Herman Medwin	1992-93
Richard H. Lyon	1993-94
Jiri Tichy	1994-95
Robert E. Apfel	1995-96
Stanley L. Ehrlich	1996-97
Lawrence A. Crum	1997-98
James E. West	1998-99
Patricia K. Kuhl	1999-2000
Katherine S. Harris	2000-01
William M. Hartmann	2001-02
Richard Stern	2002-03
Ilene J. Busch-Vishniac	2003-

### **Vice President**

Vern O. Knudsen	1929-31
C. W. Hewlett	1931-32
H. A. Frederick	1932-34
R. F. Norris	1934-36
V. L. Chrisler	1936-38
Floyd A. Firestone	1938-40
C. R. Hanna	1940-42
Harry F. Olson	1942-44
John C. Steinberg	1944-46
Philip M. Morse	1946-48
Benjamin Olney	1948-49
Leo L. Beranek	1949-50
Carl F. Eyring	1950-51
R. Bruce Lindsay	1951-52
Richard D. Fay	1952-53
Robert W. Young	1953-54
Richard K. Cook	1954-55
Hale J. Sabine	1955-56
Leo P. Delsasso	1956-57
William Jack	1957-58
Arnold Peterson	1958-59
Robert W. Leonard	1959-60
Cyril M. Harris	1960-61
Robert T. Beyer	1961-62
Isadore Rudnick	1962-63
Martin Greenspan	1963-64
Vincent Salmon	1964-65
Harold L. Saxton	1965-66
Gordon E. Peterson	1966-67
Ernest Yeager	1967-68
Edgar A. G. Shaw	1968-70
John V. Bouyoucos	1970-71
Kenneth N. Stevens	1971-72
Robert S. Gales	1972-73
Ira Dyer	1973-74

Arthur H. Benade	1974–75
William S. Cramer	1975–76
James L. Flanagan	1976–77
Tony F. W. Embleton	1977–78
David T. Blackstock	1978–79
Edith L. R. Corliss	1979–80
Frederick H. Fisher	1980–81
Floyd Dunn	1981–82
Alan Powell	1982–83
William J. Galloway	1983–84
Chester M. McKinney	1984–85
Harvey H. Hubbard	1985–86
W. Dixon Ward	1986–87
Herman Medwin	1987–88
Eric E. Ungar	1988–89
Richard H. Lyon	1989–90
Katherine S. Harris	1990–91
Robert E. Apfel	1991–92
Jiri Tichy	1992–93
Stanley L. Ehrlich	1993–94
Lawrence R. Rabiner	1994–95
Lawrence A. Crum	1995–96
Patricia K. Kuhl	1996–97
Ilene J. Busch-Vishniac	1997–98
William M. Hartmann	1998–99
Mauro Pierucci	1999–00
Gilles A. Daigle	2000–01
Janet M. Weisenberger	2001–02
William A. Yost	2002-03
Anthony A. Atchley	2003-

#### **Editor-in-Chief**

Wallace Waterfall	1929-33
Floyd R. Watson	1933-39
Floyd A. Firestone	1939-57
R. Bruce Lindsay	1957-85
Daniel W. Martin	1985-99
Allan D. Pierce	1999-

#### **Treasurer**

Charles Fuller Stoddard	1929-30
E. E. Free	1930-34
G. T. Stanton	1934-39
C.C. Potwin	1939-41
Lonsdale Green, Jr.	1941-47
George M. Nixon	1947-50
Herbert A. Erf	1950-67
Wallace Waterfall	1967-74
Robert T. Beyer	1974-94
William W. Lang	1994-99
Paul B. Ostergaard	1999-00
David Feit	2000-

#### **Secretary**

Wallace Waterfall	1929-69
Betty H. Goodfriend	1969-87
Murray Strasberg	1987-90

#### **Executive Director**

Charles E. Schmid	1990-
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#### **Standards Director**

Henning E. von Gierke	1978-79
William J. Galloway	1979-83
William Melnick	1983-87
Kenneth M. Eldred	1987-93
Tony F.W. Embleton	1993-97
Daniel L. Johnson	1997-02
Paul D. Schomer	2002-

### ***Recipients of the Gold Medal***

1954 - Wallace Waterfall  
 1955 - Floyd A. Firestone  
 1957 - Harvey Fletcher  
 1959 - Edward C. Wentz

**1961** - Georg von Békésy - For his deft proficiency in the experimental art which has laid open the ear and resolved the mysteries of its inner workings. (Abstracted)

**1963** - R. Bruce Lindsay - For major contributions to the knowledge of physical acoustics through research and authorship; for teaching and training acousticians; and for sustained service to the Society as an officer and Editor-in-Chief of its publications. (Abstracted)

**1965** - Hallowell Davis - For his many contributions to our understanding of the workings of the hearing mechanism; for his versatile concern with bioacoustics, psychoacoustics, audiology, physiology, and otolaryngology; and for his service to the Society. (Abstracted)

**1967** - Vern Oliver Knudsen - For his research into the propagation of acoustical waves through the air and the sea; for his contributions to the understanding of the communication of speech and music and his expert application of this knowledge in the field of hearing and architectural acoustics; and for his service to the Society as founder and officer. (Abstracted)

**1969** - Frederick V. Hunt - For his extensive contributions to the science and technology of acoustics in the fields of architecture, engineering, and signal processing; for his creative leadership in underwater sound and its applica-

tion to the security of our nation; and for his service to the Society. (Abstracted)

**1971** - Warren P. Mason - For his electromechanical filters which are the keystone of carrier-frequency telephony; investigations of piezoelectric crystals, ceramics and the properties of materials. (Abstracted)

**1973** - Philip M. Morse - For his preeminent accomplishments in the field of vibration.

**1975** - Leo L. Beranek - For leadership in developing, in the United States and abroad, the desire and the capability for achieving good acoustics in communications, workplaces, concert halls, and communities.

**1977** - Raymond W. B. Stephens - For extensive contributions to the advancement of acoustics in his own and many other countries: as a physics teacher and experimentalist; as an author and editor; as a founder and leader of acoustical societies; and above all as a research supervisor who has taught and inspired a generation of acoustics students and guided them in the attainment of excellence.

**1979** - Richard H. Bolt - For outstanding contributions to acoustics through research, teaching, and professional leadership, and for distinguished administrative and advisory service to science, engineering, and government.

**1981** - Harry F. Olson - For his innovative and lasting contributions in acoustic transduction, sound reproduction, electronic music and speech synthesis, and his service to the Society.

**1982** - Isadore Rudnick - For his ingenious and masterly contributions to acoustical research and teaching, and for his distinguished leadership and service to the Society.

**1983** - Martin Greenspan - For wide ranging and superlative contributions to experimental and theoretical physical acoustics, including ultrasonically induced cavitation in liquids and sound propagation in solids, liquids, and gases.

**1984** - Robert T. Beyer - For contributions to acoustics through his teaching, research, and translations and for his dedicated service to the Acoustical Society of America.

**1985** - Laurence Batchelder - For significant contributions to underwater acoustics, to acoustical standards, and to the Acoustical Society of America as Fellow, officer, and patent reviewer.

**1986** - James L. Flanagan - For contributions to and leadership in digital speech communications.

**1987** - Cyril M. Harris - For service to the Society; for improved understanding of absorption of sound in gases; and for contributions to the science and practice of architectural acoustics.

**1988** - Arthur H. Benade (posthumously) - For pioneering work in the science and art of musical acoustics, emphasizing the interactions among performer, instrument, and listener.

**1988** - Richard K. Cook - For outstanding seminal contributions to diverse areas of acoustics and to standardization.

**1989** - Lothar W. Cremer - For identifying and solving key problems in acoustics and acoustical engineering and for the impact of his teachings and writings.

**1990** - Eugen J. Skudrzyk (posthumously) - For his extensive contributions to the advancement of acoustics, particularly structural and underwater acoustics, as a researcher, author and educator.

**1991** - Manfred R. Schroeder - For theoretical and practical contributions to human communication through innovative application of mathematics to speech, hearing, and concert hall acoustics.

**1992** - Ira J. Hirsh - For contributions to the understanding of the auditory process.

**1993** - David T. Blackstock - For contributions to the understanding of finite-amplitude sound propagation and worldwide leadership in nonlinear acoustics.

**1994** - David M. Green - For contributions to knowledge, theory, and methodology in audition.

**1995** - Kenneth M. Stevens - For leadership and outstanding contributions to the acoustics of speech production and perception.

**1996** - Ira Dyer - For contributions to ocean acoustics, structural acoustics, and aeroacoustics, and for dedicated service to the Society.

**1997** - K. Uno Ingard - For contributions to and teaching of physical acoustics and noise control.

**1998** - Floyd Dunn - For creative contributions to fundamental knowledge of ultrasonic propagation in, and

interactions with, biological media.

**1999** - Henning E. von Gierke - For contributions to bioacoustics, psychoacoustics, vibrations, and for leadership in national and international acoustical standards.

**2000** - Murray Strasberg - For contributions to hydroacoustics, acoustic cavitation and turbulence noise, and for dedicated service to the Society.

**2001** - Herman Medwin - For innovative research in ocean acoustics and leadership and service to the Society.

**2002** - Robert E. Apfel - For fundamental contributions to physical acoustics and biomedical ultrasound and for innovative leadership in electronic publishing.

**2002** - Tony F.W. Embleton - For fundamental contributions to understanding outdoor sound propagation and noise control and for leadership in the Society.

**2003** - Richard H. Lyon - For sustained leadership and extensive contributions in the application of statistical concepts to structural acoustics and noise.

**2004** - Chester M. McKinney - For pioneering research and leadership in underwater acoustics and high resolution sonar, and for dedicated service to the Society.

### ***Recipients of Honorary Fellowship***

1929 - Thomas A. Edison

1949 - Harvey Fletcher

1954 - Vern O. Knudsen

1954 - Paul E. Sabine

1954 - Frederick A. Saunders

1954 - Floyd R. Watson

1960 - Harvey C. Hayes

1971 - Walter G. Cady

1980 - Elfyn J. Richards

1983 - Maurice A. Biot

1988 - Henrik A. S. Nodtvedt

1994 - Leo L. Beranek

1997 - Robert W. Young

1998 - Carleen M. Hutchins

1999 - Leonid M. Brekhovskikh

2002 - Michael Longuet-Higgins

### ***Recipients of the R. Bruce Lindsay Award (formerly Biennial Award)***

1942 - Richard H. Bolt

1944 - Leo L. Beranek

1946 - Vincent Salmon

1948 - Isadore Rudnick

1950 - J. C. R. Licklider

1952 - Osman K. Mawardi

1954 - K. Uno Ingard

1956 - Ernest Yeager

1956 - Ira J. Hirsh

1958 - Bruce P. Bogert

1960 - Ira Dyer

**1962** - Alan Powell - In recognition of his outstanding contributions to acoustics, through research and publication on edge tones, random vibrations, boundary layer phenomena, and the noise made by jet flow and turbulence.

**1964** - Tony F. W. Embleton - For his original contributions to radiation pressure of curved wave fronts, his work on precision microphone calibration, and especially for the varied work, both theoretical and experimental in the field of noise control.

**1966** - David M. Green - In recognition of his many contributions to the body of knowledge of psychological acoustics, stressing the importance of the analytic model in understanding the basic processes of audition; with particular recognition of his major role in demonstrating the relationships between detection theory and auditory perception.

**1968** - Emmanuel P. Papadakis - For important contributions to the theoretical and experimental understanding of the propagation, attenuation, diffraction, and refraction of elastic waves in crystalline and polycrystalline solids.

**1970** - Logan E. Hargrove - For research in ultrasonics, including especially his contributions to the understanding of diffraction of light by ultrasonic waves and his demonstration of mode-locking in lasers.

**1972** - Robert D. Finch - For research in ultrasonics; specifically for contributions toward the understanding of cavitation nucleation.

**1974** - Lawrence R. Rabiner - For exceptional research contributions in speech communications, hearing and digital-signal processing.

**1976** - Robert E. Apfel - For his contributions to physical acoustics, especially for research in acoustic cavitation and the strength of liquids.

**1978** - Henry E. Bass - For theoretical and experimental research on the effects of molecular relaxation on sound propagation in multicomponent gases.



**1980** - Peter H. Rogers - For research accomplishments in theoretical linear and nonlinear acoustics as related to acoustic radiation, transduction, and shock waves.

**1982** - Ralph N. Baer - For important contributions toward a better understanding of the propagation of sound in the ocean and, in particular, the effects of Rossby waves and eddies.

**1984** - Peter N. Mikhalevsky - For significant contributions to understanding the propagation of sound in the ocean and the role of fluctuations in signal detection modeling.

**1986** - William E. Cooper - For his explorations of the mechanisms for processing the phonetic attributes of speech; for his pioneering research in the role of prosody and intonation in sentence processing and sentence planning; and for his contributions to basic research on speech and language disorders subsequent to brain damage.

**1987** - Ilene J. Busch-Vishniac - For outstanding contributions to developing an improved understanding of the dynamic response of electret transducers and noise propagation in urban environments.

**1988** - Gilles A. Daigle - For theoretical and experimental studies of the effects of micrometeorology and of the contours and acoustical properties of the ground on sound propagation outdoors.

**1989** - Mark F. Hamilton - For contributions to nonlinear acoustics, particularly parametric arrays, intense sound beams, and waveguides.

**1990** - Thomas J. Hofler - For the development of thermoacoustic heat pumps and for the design and calibration of optoacoustic transducers.

**1991** - Yves H. Berthelot - For experimental and theoretical contributions to the use of lasers in acoustics and to the measurement of propagation of sound over irregular terrain.

**1991** - Joseph M. Cuschieri - For contributions to theory and measurement of power flow in vibrating structures.

**1992** - Anthony A. Atchley - For contributions to the understanding of acoustic cavitation and thermoacoustics.

**1993** - Michael D. Collins - For exceptional contributions to numerical modeling of complex acoustical phenomena and nonlinear inversion methods.

**1994** - Robert P. Carlyon - For contributions to knowledge concerning the auditory processing of spectrally and temporally complex sound.

**1995** - Beverly A. Wright - For contributions to the understanding of auditory processing of complex signals.

**1996** - Victor W. Sparrow - For contributions to nonlinear acoustics, outdoor sound propagation, and structural acoustics.

**1997** - D. Keith Wilson - For contributions to atmospheric acoustics, and for applying acoustical tomography to the turbulent atmosphere.

**1998** - Robert L. Clark - For contributions to adaptive noise control.

**1999** - Paul E. Barbone - For developing novel theoretical and computational acoustics techniques.

**2000** - Robin O. Cleveland - For contributions to nonlinear acoustics, particularly to shock wave lithotripsy.

**2001** - Andrew J. Oxenham - For contributions to the measurement of peripheral auditory nonlinearity, and to understanding its effects in normal and hearing-impaired listeners.

**2002** - James J. Finneran - For contributions to the understanding of auditory mechanisms and transduction in teleost fish and of hearing by dolphins.

**2002** - Thomas J. Royston - For contributions to the nonlinear characterization and control of vibration and for acoustical outreach to inner city youth.

**2003** - Dani Byrd - For research in motor control and timing in speech production.

**2004** - Michael R. Bailey - For contributions to the understanding of shock wave lithotripsy and nonlinear acoustics

### ***Recipients of the Distinguished Service Citation***

1972 - Laurence Batchelder  
1973 - Robert W. Young  
1973 - Betty H. Goodfriend  
1974 - Gerald J. Franz  
1978 - Robert T. Beyer  
1978 - Henning E. von Gierke  
1981 - R. Bruce Lindsay  
1984 - William S. Cramer  
1986 - Stanley L. Ehrlich  
1986 - Samuel F. Lybarger  
1987 - Frederick E. White  
1989 - Daniel W. Martin  
1990 - Murray Strasberg  
1996 - John C. Burgess  
1994 - William J. Cavanaugh  
1997 - Alice H. Suter  
1999 - Elaine Moran  
2000 - F. Avril Brenig  
2000 - John V. Bouyoucos

### ***Recipients of the Minority Fellowship***

1993 - Brian Scott  
1997 - J. Sean Allen  
1999 - Guillermo E. Aldana  
2001 - Vernecia S. McKay  
2002 - David T. Bradley  
2003 - Gaylon C. Hollis

### ***Recipients of the Frederick V. Hunt Postdoctoral Research Fellowship in Acoustics***

1978-79 - Steven L. Garrett  
1979-80 - Mary J. Osberger  
1980-81 - Cynthia A. Prosen  
1981-82 - Daniel Rugar  
1982-83 - Wesley N. Cobb  
1983-84 - Mark F. Hamilton  
1984-85 - Christine H. Shadle  
1985-86 - Anthony A. Atchley  
1986-87 - M. Christian Brown  
1987-88 - Ian M. Lindevald  
1988-89 - Elizabeth C. Oesterle  
1989-90 - E. Carr Everbach  
1990-91 - Kenneth A. Cunefare  
1991-92 - Gregory J. Sandell  
1992-93 - Quan Qi  
1993-94 - Charles E. Bradley  
1994-95 - T. Douglas Mast  
1995-96 - Robin O. Cleveland  
1996-97 - Mark A. Hasegawa-Johnson  
1997-98 - James J. Finneran  
1998-99 - Lily Wang  
1999-00 - Penelope Menounou  
2000-01 - James C. Lacefield  
2001-02 - Chao-Yang Lee  
2002-03 - Constantin C. Coussios  
2003-04 - Tyrone M. Porter