# 1998 Citations for Public Service

Two 1998 Citations for Public Service were presented during the 104th Annual Meeting of the AMS in Baltimore. Proper recognition for mathematicians who contribute valuable service to the profession is a matter of great importance to the Society. The continued growth and health of the discipline depends in large part on those individuals who contribute their time to public service activities in support of mathematics. To provide encouragement and recognition for such service, the AMS Council, responding to a recommendation from the Committee on Science Policy, established the Citation for Public Service. One to three $500 awards are presented to individuals who have made notable contributions to the mathematics profession through public service.

The 1998 Citations for Public Service were presented to LIANG-SHIN HAHN and ARNOLD E. ROSS. The citations are made by the Council on recommendation of a selection committee whose members at the time of these selections were: Ronald Graham, Harvey Keynes, Peter Lax, Everett Pitcher, and I. M. Singer.

The text that follows contains, for each recipient, the committee's citation, a brief biographical sketch, and the recipient's response.

## Citation: Liang-shin Hahn

Professor Liang-shin Hahn is selected for a citation for public service for carrying forward and developing the New Mexico High School Mathematics Contest and for exposition and popularization of mathematics attractive to and suitable for potential candidates for the contest and others with similar intellectual interests.

## Biographical Sketch: Liang-shin Hahn

Liang-shin Hahn was born in Tainan, Taiwan. He received his B.S. from National Taiwan University and his Ph.D. from Stanford University. After a brief period of teaching at Johns Hopkins University, he moved to the University of New Mexico, where he has been ever since. He has held visiting positions at the University of Washington (Seattle), National Taiwan University (Taipei), the University of Tokyo, the International Christian University (Tokyo), and Sophia University (Tokyo).

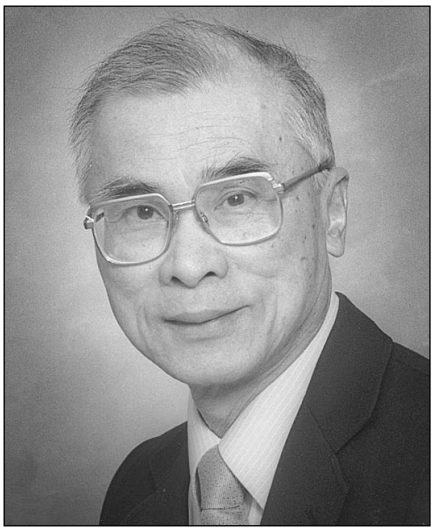
His contest problems are collected in one volume, *Teaching Mathematics through Contest Problems*. It has been submitted to the Mathematical Association of America for publication. He also is the author of the book *Complex Numbers and Geometry*, published by the Mathematical Association of America in 1994, and the co-author of *Classical Complex Analysis* (with Professor Bernard Epstein), published by Jones and Bartlett Publishers in 1995.

He enjoys playing Ping-Pong, cultivating roses, listening to classical music, and solving as well as creating mathematical puzzles.

## Response: Liang-shin Hahn

I never ever dreamed that I would get an award by simply doing what I considered a fun thing.

As an unabashed admirer of the late Professor George Pólya, I am fond of telling students half jokingly, "The trick in teaching mathematics is that I do the easy part and you do the hard part." My motto in teaching is: "Don't try to teach the most general theorems. Teach the basic ideas, then use questions to guide the students to explore and



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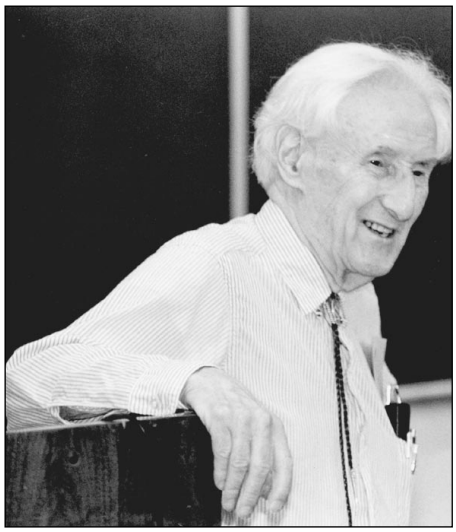
Liang-shin Hahn



Arnold E. Ross

discover for themselves." As a corollary, I am allergic to fat textbooks.

This teaching philosophy is reflected in the New Mexico Mathematics Contest, which I compose. The New Mexico Mathematics Contest consists of two rounds. For example, consider the following: Through a point in a triangle, draw lines parallel to the three sides. That divides the triangle into three small triangles and three parallelograms. In the first round, I would give the areas of the three small triangles and ask the contestants to find the area of the original triangle. Then in the second round, I would give the areas of the three parallelograms and ask the contestants to find the area of the original triangle. In this way I try to encourage contestants to explore the problems in the first round for possible variations and extensions. In the process I hope they will learn not only mathematics but also some approach to mathematics.

Thank you very much for the great honor.

## Citation: Arnold E. Ross

Professor Arnold E. Ross is selected for a citation for public service for inspiring generations of young people through the summer mathematics programs he created and has continued to run for nearly forty years.

## Biographical Sketch: Arnold E. Ross

Arnold Ross was born in Chicago on August 24, 1906. He spent his boyhood in the USSR during the difficult years. He was able to return to Chicago in 1924. He earned his B.S., M.S., and Ph.D. at the University of Chicago. He was fortunate to study with Professor E. H. Moore before Professor Moore's retirement. His Ph.D. thesis was written under Professor L. E. Dickson. The two postdoctorate years were spent at the California Institute of Technology under E. T. Bell.

During the great depression Arnold Ross taught in a junior college put together by a group of unemployed postdocs representing English, foreign languages, sciences, and economics. His first university position was at St. Louis University. When the war ended, he moved to Notre Dame. Then in 1963 he came to the Ohio State University, where he still teaches as professor emeritus in the "Young Scholars Program".

This last program is a summer program which was started in 1957 in the post-Sputnik era at the time of heightened concern with the need for the search and development of young mathematical talent. The program survived many trials and tribulations largely through encouragement and help by many able colleagues who share educational concerns represented by the program.

More details may be found about topics passed over lightly above in the essay "Windmills or Stepping Stones" in the AMS collection entitled *A Century of Mathematical Meetings* [1].

## Response: Arnold E. Ross

**Editor's Note:** Arnold Ross prepared the following written response upon receiving the award. The text of his oral response presented during the prize ceremony also appears below.

### Written Response

I do thank our colleagues of the AMS Selection Committee for the warm moral support to all of us in the program represented by the award conferred on it.

Concern with the upbringing of the new generation of scientists, although not universal, has been represented by many generations of creative members of the world scientific community. In the U.S. this tradition was kept alive by the remarkable influence of E. H. Moore at Chicago.

I have always considered the above concerns to be a vital obligation in the life of a professional. In the Sputnik era such concerns moved dramatically into the central position in our public life. The unexpected appearance of Sputnik sent up by the Soviet Union [4] questioned our claims to technical superiority, and in the days of the cold war we felt threatened. Our popular press laid the blame upon our school teachers.

Soon after, considerable material resources were available for programs designed to upgrade the scientific and mathematical background of the secondary school teachers [1, p. 233]. This was followed by material support of summer programs for able precollege youngsters.

At Notre Dame we were among the first to introduce programs for teachers and a program for able youngsters [1, p. 234]. Our program for the youngsters, which was originally closely associ-

ated with our program for teachers, was beginning to acquire a life of its own in 1960. We were confronted with the dilemma as to what purpose should be served by a program for a collection of young individuals who have in common only eagerness, curiosity, an unbounded (and hitherto undirected) supply of vitality, and possibly an ultimate destiny in science.

We settled on the objective of providing a vivid apprenticeship to a life of exploration. This has remained our guiding motivation to the present [2, pp. 44–45].

Has our choice been relevant to the needs of our nation over the years since 1960? Is it relevant today?

The world economy, moved by the forces of the free market and shaped by science fiction technology, does not forgive weakness. The realities of weakness, however, are not presented as clearly and dramatically today as in the past, when weakness could lead to a disastrous defeat in an unequal confrontation. Appreciation of what is needed to survive and prosper in a knowledge-intensive environment grows slowly. Freedom of movement of human talent and of production prowess worldwide mitigates local economic difficulties. This is only temporary—the payment is only deferred.

Education is one of the key ingredients of a healthy economy. Median performance by our young people in mathematics, in science, and in the use of language has been moving steadily downward in quality during the last few decades. Deep anxiety over what this will mean for the well-being of our nation reached upward as far as the White House. Still there is no promise of improvement.

Our problems in education are enormous and many-faceted. The component which is involved in the bringing up of practitioners in the knowledge-intensive occupations is more focused and is, I feel, the responsibility of our professions. The penalty of neglect has been heavy and promises to be even graver in the near future. The hazards of today have different faces and different names than they had in the Sputnik era, but they are equally threatening to our well-being.

Concern with the task of discovery and development of our nation's talented in all walks of life should still be one of our major preoccupations. This feeling provides for us the motive power for the effort needed to keep our program alive and on an acceptable level of excellence.

Mathematics, science, and technology look very different today than they looked forty years ago. Our program must reflect these changes.

Each group of summer participants has a distinct personality all its own. We must respond without losing sight of our major aims.

In selecting our summer participants we try to ascertain that our applicant is ready to benefit by coming to us. Collaboration of master teachers is extraordinarily valuable in accomplishing this. We usually bring together for the summer a group of youngsters with reasonably happy mathematical experience and healthy curiosity not yet dampened.

We make a strong effort to achieve deep student involvement. A rapid transition from a role of very passive spectator to the role of active participant is very demanding for all of the participants, dramatically so for those in the group who are least experienced.

Young participants acquire the deeply moving experience in the use of language as they share results of their observations and of their exploration with others. In this process is born a community of young scholars (very young indeed) where a vivid exchange of ideas between newcomers and program veterans (some acting as counselors) enriches the quality of everyday life.

Happy slogans are always helpful. To indicate involvement, we used to speak of "hands on". With the advent of computer software this is no longer appropriate. Our friends in the life sciences proposed "minds on". Since this expresses our sentiments as well, we have adopted it. After we make our charges realize that "thinking deeply of simple things" is a quality of a fine, inquisitive mind, reexamining the familiar becomes for them a fulfilling experience.

In the crucible of the first summer, individual talents assert themselves. Fortunately, basic mathematical ideas have deep appeal and wide pertinence. Thus intensive participant involvement still allows us to keep many doors open. Nonetheless, deep mathematical and scientific talent also has an opportunity to flower.

Our newcomers do what we call number theory. Number theory proper reflects much of what has been happening in mathematics. On the other hand, many important mathematical ideas, such as those in abstract algebra, for example, are traced back to number theory. Number theory proper and its rich environment are a fertile ground for exploration and are a valuable source for nontrivial but accessible problems. Also, one can increase the density of encounter with new ideas without increasing unduly the computational complexity. Every so often a beginner can get a glimpse of usefulness of geometric or analytic ideas.

Those who return to us for the second summer study combinatorics very intensively. In the last forty years combinatorics has moved into one of the central positions in mathematics. Combinatorics has many interesting and accessible ideas and provides many challenges for the exercise of ingenuity. It has many varied uses in mathematics, in science, and in technology.

Subjects studied by our advanced participants who return to us for an additional summer reflect

their interests as well as their experience. Also, as often as possible we try to provide for them an opportunity to learn some interesting mathematics which becomes important in science. This became true for knot theory soon after 1986 and for the representation theory of finite groups in the work of stereochemists about thirty years ago. Moving away from the already established interest helps to broaden the outlook of a budding young mathematician. Failure to be concerned with this facet of education has been deplored by many influential people who oversee the careers of young scientists and mathematicians.

I am happy to say that experimentation is still alive. David Kelly at Hampshire College is much gentler than we are—he reaches out to a different audience. Glenn Stevens and David Fried at Boston University augmented their program (PROMYS) by a symbiotic program for master teachers. The remarkable program of Manuel Berriozabal has reached deeply into the community of San Antonio, which is predominantly Hispanic. Max Warshauer at San Marcos, Texas, lays emphasis on working with underrepresented groups—students and teachers alike. The program, which began under the sponsorship of Admiral Rickover, works through faculty mentors. Paul Sally searches keenly for talent among minorities. His exploration begins through programs in the Chicago city schools at the sixth-grade level and above till college and involves teachers as well. Tom Banchoff assisted in our program while a student at Notre Dame. His deep interest in his students is still very much in evidence. George Berzsenyi of Rose-Hulman Institute of Technology revived for the U.S. the inspired Hungarian tradition. ARML, a society of master teachers, sponsors discussion centers throughout the nation. Julian Stanley's concern with Mathematically Precocious Youth since 1971 has enriched the lives of many youngsters [3]. His imaginative exploration has been instrumental in inspiring widespread interest in the needs of able youngsters.

I am deeply grateful to Professors Daniel Shapiro, Gerald Edgar, Dijen Ray-Chaudhuri, Bogdan Baishanski, Ranko Bojanic, and to Dr. Gloria Woods for their warm support and help in keeping our program alive through many trials and tribulations.

**Oral Response**

I wish to thank the award selection committee for this award. It serves as a warm moral support for all of us who work in the program.

My deep gratitude goes to my wife, Madeleine, for her faith in our aims and for her unstinted support and help.

In my written response I have tried to describe what we do. As I speak I would like to lay the accent on motivation.

I was told that when Woodrow Wilson served as the president of Princeton, he proposed some radical changes at the university. The board of trustees would not let him do that. A quotation which I discovered not so long ago may give us an inkling of what he had in mind. Let me share it with you. Here is Woodrow Wilson in 1889.

> America is sauntering through her resources and through the mazes of her politics with an easy nonchalance; but presently there will come a time when she will be surprised to find herself grown old—a country crowded, strained, perplexed—when she will be obliged to pull herself together, husband her resources, concentrate her strength, steady her methods, sober her views, restrict her vagaries, *trust her best not her average members*. That will be the time of change.

This is a very attractive vision—a vision well worth working for. I hope the future will be kind to me and my colleagues and that we will be able to carry on.

## References

1. Arnold Ross, *Windmills or stepping stones?*, A Century of Mathematical Meetings, Amer. Math. Soc., Providence, RI, 1966, p. 221.
2. ____, *Creativity: Nature or nurture?*, CBMS Issues in Mathematics Education, vol. 2, Amer. Math. Soc., Providence, RI, 1991.
3. *Quo Vadis America*, Intellectual Talent, The Johns Hopkins Univ. Press, Baltimore, MD, 1996, Chapter 13.
4. *Fostering scientific talent*, Science and Technology Policies, Ballinger Publishing Co., 1973, Chapter V.