
From the AMS Secretary

Bylaws of the American Mathematical Society

Article I

Officers

Section 1. There shall be a president, a president elect (during the even-numbered years only), an immediate past president (during the odd-numbered years only), three vice presidents, a secretary, four associate secretaries, a treasurer, and an associate treasurer.

Section 2. It shall be a duty of the president to deliver an address before the Society at the close of the term of office or within one year thereafter.

Article II

Board of Trustees

Section 1. There shall be a Board of Trustees consisting of eight trustees, five trustees elected by the Society in accordance with Article VII, together with the president, the treasurer, and the associate treasurer of the Society *ex officio*. The Board of Trustees shall designate its own presiding officer and secretary.

Section 2. The function of the Board of Trustees shall be to receive and administer the funds of the Society, to have full legal control of its investments and properties, to make contracts, and, in general, to conduct all business affairs of the Society.

Section 3. The Board of Trustees shall have the power to appoint such assistants and agents as may be necessary or convenient to facilitate the conduct of the affairs of the Society and to fix the terms and conditions of their employment. The Board may delegate to the officers of the Society duties and powers normally inhering in their respective corporative offices, subject to supervision by the Board. The Board of Trustees may appoint committees to facilitate the conduct of the financial business of the

Society and delegate to such committees such powers as may be necessary or convenient for the proper exercise of those powers. Agents appointed, or members of committees designated, by the Board of Trustees need not be members of the Board.

Nothing herein contained shall be construed to empower the Board of Trustees to divest itself of responsibility for, or legal control of, the investments, properties, and contracts of the Society.

Article III

Committees

Section 1. There shall be eight editorial committees as follows: committees for the *Bulletin*, for the *Proceedings*, for the *Colloquium Publications*, for the *Journal*, for *Mathematical Surveys and Monographs*, for *Mathematical Reviews*; a joint committee for the *Transactions* and the *Memoirs*; and a committee for *Mathematics of Computation*.

Section 2. The size of each committee shall be determined by the Council.

Article IV

Council

Section 1. The Council shall consist of fifteen members at large and the following *ex officio* members: the officers of the Society specified in Article I, except that it shall include only one associate secretary, the chairman of each of the editorial committees specified in Article III, any former secretary for a period of two years following the terms of office, and members of the Executive Committee (Article V) who remain on the Council by the operation of Article VII, Section 4.

The chairman of any committee designated as a Council member may name a deputy from the committee as substitute. The associate secretary shall be the one charged with the scientific program of the meeting at which the Council meets except that at a meeting associated with no scientific meeting of the Society the secretary may designate the associate secretary.

Section 2. The Council shall formulate and administer the scientific policies of the Society and shall act in an advisory capacity to the Board of Trustees.

Section 3. In the absence of the secretary from any meeting of the Council, a member may be designated as acting secretary for the meeting, either by written authorization of the secretary, or, failing that, by the presiding officer.

Section 4. All members of the Council shall be voting members. Each member, including deputies and the designated associate secretary, shall have one vote. The method for settling matters before the Council at any meeting shall be by majority vote of the members present. If the result of a vote is challenged, it shall be the duty of the presiding officer to determine the true vote by a roll call. In a roll call vote, each Council member shall vote only once (although possibly a member of the Council in several capacities).

Section 5. Any five members of the Council shall constitute a quorum for the transaction of business at any meeting of the Council.

Section 6. Between meetings of the Council, business may be transacted. Votes shall be counted as specified in Section 4 of this Article, “members present” being replaced by “members voting”. An affirmative vote on any proposal shall be declared if, and only if, (a) more than half of the total number of possible votes is received by the time announced for the closing of the polls, and (b) at least three-quarters of the votes received by then are affirmative. If five or more members request postponement at the time of voting, action on the matter at issue shall be postponed until the next meeting of the Council, unless either (1) at the discretion of the secretary, the question is made the subject of a second vote, in connection with which brief statements of reason, for and against, are circulated; or (2) the Council places the matter at issue before the Executive Committee for action.

Section 7. The Council may delegate to the Executive Committee certain of its duties and powers. Between meetings of the Council, the Executive Committee shall act for the Council on such matters and in such ways as the Council may specify. Nothing herein contained shall be construed as empowering the Council to divest itself of responsibility for formulating and administering the scientific policies of the Society.

Section 8. The Council shall also have power to speak in the name of the Society with respect to matters affecting the status of mathematics or mathematicians, such as proposed or enacted federal or state legislation; conditions of employment in universities, colleges, or business, research or industrial organizations; regulations, policies, or acts of governmental agencies or instrumentalities; and other items which tend to affect the dignity and effective position of mathematics.

With the exception noted in the next paragraph, a favorable vote of two-thirds of the entire membership of the Council shall be necessary to authorize any statement in the name of the Society with respect to such matters. With the exception noted in the next paragraph, such a vote may be taken only if written notice shall have been given

to the secretary by the proposer of any such resolution not later than one month prior to the Council meeting at which the matter is to be presented, and the vote shall be taken not earlier than one month after the resolution has been discussed by the Council.

If, at a meeting of the Council, there are present twelve members, then the prior notification to the secretary may be waived by unanimous consent. In such a case, a unanimous favorable vote by those present shall empower the Council to speak in the name of the Society.

The Council may also refer the matter to a referendum of the entire membership of the Society and shall make such reference if a referendum is requested, prior to final action by the Council, by two hundred or more members. The taking of a referendum shall act as a stay upon Council action until the votes have been canvassed, and thereafter no action may be taken by the Council except in accordance with a plurality of the votes cast in the referendum.

Article V

Executive Committee

Section 1. There shall be an Executive Committee of the Council, consisting of four elected members and the following *ex officio* members: the president, the secretary, the president elect (during even-numbered years), and the immediate past president (during odd-numbered years).

Section 2. The Executive Committee of the Council shall be empowered to act for the Council on matters which have been delegated to the Executive Committee by the Council. If three members of the Executive Committee request that any matter be referred to the Council, the matter shall be so referred. The Executive Committee shall be responsible to the Council and shall report its actions to the Council. It may consider the agenda for meetings of the Council and may make recommendations to the Council.

Section 3. Each member of the Executive Committee shall have one vote. An affirmative vote on any proposal before the Executive Committee shall be declared if, and only if, at least four affirmative votes are cast for the proposal. A vote on any proposal may be determined at a meeting of the Executive Committee, but it shall not be necessary to hold a meeting to determine a vote.

Article VI

Executive Director

Section 1. There shall be an Executive Director who shall be a paid employee of the Society. The Executive Director shall have charge of the offices of the Society, except for the office of the secretary, and shall be responsible for the general administration of the affairs of the Society in accordance with the policies that are set by the Board of Trustees and by the Council.

Section 2. The Executive Director shall be appointed by the Board of Trustees with the consent of the Council. The terms and conditions of employment shall be fixed by the Board of Trustees, and the performance of the Executive Director will be reviewed regularly by the Board of Trustees.

Section 3. The Executive Director shall be responsible to and shall consult regularly with a liaison committee consisting of the president as chair, the secretary, the treasurer, and the chair of the Board of Trustees.

Section 4. The Executive Director shall attend meetings of the Board of Trustees, the Council, and the Executive Committee, but shall not be a member of any of these bodies.

Article VII

Election of Officers and Terms of Office

Section 1. The term of office shall be one year in the case of the president elect and the immediate past president; two years in the case of the president, the secretary, the associate secretaries, the treasurer, and the associate treasurer; three years in the case of vice presidents and members at large of the Council, one vice president and five members at large retiring annually; and five years in the case of the trustees. In the case of members of the editorial committees and appointed members of the communications committees, the term of office shall be determined by the Council. The term of office for elected members of the Executive Committee shall be four years, one of the elected members retiring annually. All terms of office shall begin on February 1 and terminate on January 31, with the exception that the officials specified in Articles I, II, III, IV, and V (excepting the president elect and immediate past president) shall continue to serve until their successors have been duly elected or appointed and qualified.

Section 2. The president elect, the vice presidents, the trustees, and the members at large of the Council shall be elected by ballot. The secretary shall send notification to each member of the Society about the slate of candidates and the voting procedure on or before October 10, and legitimate ballots received by an established deadline at least 30 days later will be counted. Each ballot shall contain one or more names proposed by the Council for each office to be filled, with blank spaces in which the voter may substitute other names. A plurality of all votes cast shall be necessary for election. In case of failure to secure a plurality for any office, the Council shall choose by ballot among the members having the highest number of votes. The secretary, the associate secretaries, the treasurer, and the associate treasurer shall be appointed by the Council in a manner designated by the Council. Each committee named in Article III shall be appointed by the Council in a manner designated by the Council. Each such committee shall elect one of its members as chairman in a manner designated by the Council.

Section 3. The president becomes immediate past president at the end of the term of office and the president elect becomes president.

Section 4. On or before February 15, the secretary shall send to all members of the Council a ballot containing two names for each place to be filled on the Executive Committee. The nominees shall be chosen by a committee appointed by the president. Members of the Council may vote for persons not nominated. Any member of the Council who is not an *ex officio* member of the Executive

Committee (see Article V, Section 1) shall be eligible for election to the Executive Committee. In case a member is elected to the Executive Committee for a term extending beyond the regular term on the Council, that person shall automatically continue as a member of the Council during the remainder of that term on the Executive Committee.

Section 5. The president and vice presidents shall not be eligible for immediate re-election to their respective offices. A member at large or an *ex officio* member of the Council shall not be eligible for immediate election (or re-election) as a member at large of the Council.

Section 6. If the president of the Society should die or resign while a president elect is in office, the president elect shall serve as president for the remainder of the year and thereafter shall serve the regular two-year term. If the president of the Society should die or resign when no president elect is in office, the Council, with the approval of the Board of Trustees, shall designate one of the vice presidents to serve as president for the balance of the regular presidential term. If the president elect of the Society should die or resign before becoming president, the office shall remain vacant until the next regular election of a president elect, and the Society shall, at the next annual meeting, elect a president for a two-year term. If the immediate past president should die or resign before expiration of the term of office, the Council, with the approval of the Board of Trustees, shall designate a former president of the Society to serve as immediate past president during the remainder of the regular term of the immediate past president. Such vacancies as may occur at any time in the group consisting of the vice presidents, the secretary, the associate secretaries, the treasurer, and the associate treasurer shall be filled by the Council with the approval of the Board of Trustees. If a member of an editorial or communications committee should take temporary leave from duties, the Council shall then appoint a substitute. The Council shall fill from its own membership any vacancy in the elected membership of the Executive Committee.

Section 7. If any elected trustee should die while in office or resign, the vacancy thus created shall be filled for the unexpired term by the Board of Trustees.

Section 8. If any member at large of the Council should die or resign more than one year before the expiration of the term, the vacancy for the unexpired term shall be filled by the Society at the next annual meeting.

Section 9. In case any officer should die or decline to serve between the time of election and the time to assume office, the vacancy shall be filled in the same manner as if that officer had served one day of the term.

Article VIII

Members and Their Election

Section 1. Election of members shall be by vote of the Council or of its Executive Committee.

Section 2. There shall be four classes of members, namely, ordinary, contributing, corporate, and institutional.

Section 3. Application for admission to ordinary membership shall be made by the applicant on a blank provided

by the secretary. Such applications shall not be acted upon until at least thirty days after their presentation to the Council (at a meeting or by mail), except in the case of members of other societies entering under special action of the Council approved by the Board of Trustees.

Section 4. An ordinary member may become a contributing member by paying the dues for such membership. (See Article IX, Section 3.)

Section 5. A university or college, or a firm, corporation, or association interested in the support of mathematics may be elected a corporate or an institutional member.

Article IX

Dues and Privileges of Members

Section 1. Any applicant shall be admitted to ordinary membership immediately upon election by the Council (Article VIII) and the discharge within sixty days of election of the first annual dues. Dues may be discharged by payment or by remission when the provision of Section 7 of this Article is applicable. The first annual dues shall apply to the year of election, except that any applicant elected after August 15 of any year may elect to have the first annual dues apply to the following year.

Section 2. The annual dues of an ordinary member of the Society shall be established by the Council with the approval of the Trustees. The Council, with the approval of the Trustees, may establish special rates in exceptional cases and for members of an organization with which the Society has a reciprocity agreement.

Section 3. The minimum dues for a contributing member shall be three-halves of the dues of an ordinary member per year. Members may, upon their own initiative, pay larger dues.

Section 4. The minimum dues of an institutional member shall depend on the scholarly activity of that member. The formula for computing these dues shall be established from time to time by the Council, subject to approval by the Board of Trustees. Institutions may pay larger dues than the computed minimum.

Section 5. The privileges of an institutional member shall depend on its dues in a manner to be determined by the Council, subject to approval by the Board of Trustees. These privileges shall be in terms of Society publications to be received by the institution and of the number of persons it may nominate for ordinary membership in the Society.

Section 6. Dues and privileges of corporate members of the Society shall be established by the Council subject to approval by the Board of Trustees.

Section 7. The dues of an ordinary member of the Society shall be remitted for any years during which that member is the nominee of an institutional member.

Section 8. After retirement from active service on account of age or on account of long-term disability, any ordinary or contributing member who is not in arrears of dues and with membership extending over at least twenty years may, by giving proper notification to the secretary, have dues remitted. Such a member shall receive the *Notices* and may request to receive *Bulletin* as privileges of membership during each year until membership ends.

Section 9. An ordinary or contributing member shall receive the *Notices* and *Bulletin* as privileges of membership during each year for which dues have been discharged.

Section 10. The annual dues of ordinary, contributing, and corporate members shall be due by January 1 of the year to which they apply. The Society shall submit bills for dues. If the annual dues of any member remain undischarged beyond what the Board of Trustees deems to be a reasonable time, the name of that member shall be removed from the list of members after due notice. A member wishing to discontinue membership at any time shall submit a resignation in writing to the Society.

Section 11. An eligible member may become a life member by making a one-time payment of dues. The criteria for eligibility and the amount of dues shall be established by the Council, subject to approval by the Board of Trustees. A life member is subsequently relieved of the obligation of paying dues. The status and privileges are those of ordinary members.

An eligible member of the Society by reciprocity who asserts the intention of continuing to be a member by reciprocity may purchase a life membership by a one-time payment of dues. The criteria for eligibility and the amount of dues shall be established by the Council, subject to approval by the Board of Trustees.

Article X

Meetings

Section 1. The annual meeting of the Society shall be held between the fifteenth of December and the tenth of February next following. Notice of the time and place of this meeting shall be sent by the secretary or an associate secretary to each member of the Society. The times and places of the annual and other meetings of the Society shall be designated by the Council.

Section 2. There shall be a business meeting of the Society only at the annual meeting. The agenda for the business meeting shall be determined by the Council. A business meeting of the Society can take action only on items notified to the full membership of the Society in the call for the meeting. A business meeting can act on items recommended to it jointly by the Council and the Board of Trustees; a majority of members present and voting is required for passage of such an item. A business meeting of the Society can place action items on the agenda for a future business meeting. Final action on an item proposed by a previous business meeting can be taken only provided there is a quorum of 400 members, a majority of members at a business meeting with a quorum being required for passage of such an item.

Section 3. Meetings of the Executive Committee may be called by the president. The president shall call a meeting at any time upon the written request of two of its members.

Section 4. The Council shall meet at the annual meeting of the Society. Special meetings of the Council may be called by the president. The president shall call a special meeting at any time upon the written request of five of its members. No special meeting of the Council shall be held unless written notice of it shall have been sent to all

members of the Council at least ten days before the day set for the meeting.

Section 5. The Board of Trustees shall hold at least one meeting in each calendar year. Meetings of the Board of Trustees may be called by the president, the treasurer, or the secretary of the Society upon three days' notice of such meetings sent to each trustee. The secretary of the Society shall call a meeting upon the receipt of a written request of two of the trustees. Meetings may also be held by common consent of all the trustees.

Section 6. Papers intended for presentation at any meeting of the Society shall be passed upon in advance by a program committee appointed by or under the authority of the Council, and only such papers shall be presented as shall have been approved by such committee. Papers in form unsuitable for publication, if accepted for presentation, shall be referred to on the program as preliminary communications or reports.

Article XI

Publications

Section 1. The Society shall publish an official organ called the *Bulletin of the American Mathematical Society*. It shall publish four journals, known as the *Journal of the American Mathematical Society*, the *Transactions of the American Mathematical Society*, the *Proceedings of the American Mathematical Society*, and *Mathematics of Computation*. It shall publish a series of mathematical papers known as the *Memoirs of the American Mathematical Society*. The object of the *Journal*, *Transactions*, *Proceedings*, *Memoirs*, and *Mathematics of Computation* is to make known important mathematical researches. It shall publish a periodical called *Mathematical Reviews*, containing abstracts or reviews of current mathematical literature. It shall publish a series of volumes called *Colloquium Publications* which shall embody in book form new mathematical developments. It shall publish a series of monographs called *Mathematical Surveys and Monographs* which shall furnish expositions of the principal methods and results of particular fields of mathematical research. It shall publish a news periodical known as the *Notices of the American Mathematical Society*, containing programs of meetings, items of news of particular interest to mathematicians, and such other materials as the Council may direct.

Section 2. The editorial management of the publications of the Society listed in Section 1 of this article, with

the exception of the *Notices*, shall be in the charge of the respective editorial committees as provided in Article III, Section 1. The editorial management of the *Notices* shall be in the hands of a committee chosen in a manner established by the Council.

Article XII

Indemnification

Any person who at any time serves or has served as a trustee or officer of the Society, or as a member of the Council, or, at the request of the Society, as a director or officer of another corporation, whether for profit or not for profit, shall be indemnified by the Society and be reimbursed against and for expenses actually and necessarily incurred in connection with the defense or reasonable settlement of any action, suit, legal or administrative proceeding, whether civil, criminal, administrative or investigative, threatened, pending or completed, to which that person is made a party by reason of being or having been such trustee, officer or director or Council member, except in relation to matters as to which the person shall be adjudged in such action, suit, or proceeding to be liable for negligence or misconduct in the performance of official duties. Such right of indemnification and reimbursement shall also extend to the personal representatives of any such person and shall be in addition to and not in substitution for any other rights to which such person or personal representatives may now or hereafter be entitled by virtue of the provisions of applicable law or of any other agreement or vote of the Board of Trustees, or otherwise.

Article XIII

Amendments

These bylaws may be amended or suspended on recommendation of the Council and with the approval of the membership of the Society, the approval consisting of an affirmative vote by two-thirds of the members present at a business meeting or of two-thirds of the members voting in a mail ballot in which at least ten percent of the members vote, whichever alternative shall have been designated by the Council, and provided notice of the proposed action and of its general nature shall have been given in the call for the meeting or accompanies the ballot in full.

As amended December 2003

AMS Lecturers, Officers, Prizes, and Funds

Colloquium Lecturers

James Pierpont, 1896
 Maxime Bôcher, 1896
 W. F. Osgood, 1898
 A. G. Webster, 1898
 Oskar Bolza, 1901
 E. W. Brown, 1901
 H. S. White, 1903
 F. S. Woods, 1903
 E. B. Van Vleck, 1903
 E. H. Moore, 1906
 E. J. Wilczynski, 1906
 Max Mason, 1906
 G. A. Bliss, 1909
 Edward Kasner, 1909
 L. E. Dickson, 1913
 W. F. Osgood, 1913
 G. C. Evans, 1916
 Oswald Veblen, 1916
 G. D. Birkhoff, 1920
 F. R. Moulton, 1920
 L. P. Eisenhart, 1925
 Dunham Jackson, 1925
 E. T. Bell, 1927
 Anna Pell-Wheeler, 1927
 A. B. Coble, 1928
 R. L. Moore, 1929
 Solomon Lefschetz, 1930
 Marston Morse, 1931
 J. F. Ritt, 1932
 R. E. A. C. Paley, 1934
 Norbert Wiener, 1934
 H. S. Vandiver, 1935
 E. W. Chittenden, 1936
 John von Neumann, 1937
 A. A. Albert, 1939
 M. H. Stone, 1939
 G. T. Whyburn, 1940
 Oystein Ore, 1941
 R. L. Wilder, 1942
 E. J. McShane, 1943
 Einar Hille, 1944
 Tibor Radó, 1945
 Hassler Whitney, 1946
 Oscar Zariski, 1947
 Richard Brauer, 1948
 G. A. Hedlund, 1949
 Deane Montgomery, 1951
 Alfred Tarski, 1952
 Antoni Zygmund, 1953
 Nathan Jacobson, 1955
 Salomon Bochner, 1956
 N. E. Steenrod, 1957
 J. L. Doob, 1959
 S. S. Chern, 1960
 G. W. Mackey, 1961
 Saunders Mac Lane, 1963
 C. B. Morrey, Jr., 1964

A. P. Calderón, 1965
 Samuel Eilenberg, 1967
 D. C. Spencer, 1968
 J. W. Milnor, 1968
 Raoul H. Bott, 1969
 Harish-Chandra, 1969
 R. H. Bing, 1970
 Lipman Bers, 1971
 Armand Borel, 1971
 Stephen Smale, 1972
 John T. Tate, 1972
 M. F. Atiyah, 1973
 E. A. Bishop, 1973
 F. E. Browder, 1973
 Louis Nirenberg, 1974
 John G. Thompson, 1974
 H. Jerome Keisler, 1975
 Ellis R. Kolchin, 1975
 Elias M. Stein, 1975
 I. M. Singer, 1976
 Jürgen K. Moser, 1976
 William Browder, 1977
 Herbert Federer, 1977
 Hyman Bass, 1978
 Philip A. Griffiths, 1979
 George D. Mostow, 1979
 Julia B. Robinson, 1980
 Wolfgang M. Schmidt, 1980
 Mark Kac, 1981
 Serge Lang, 1981
 Dennis Sullivan, 1982
 Morris W. Hirsch, 1982
 Charles L. Fefferman, 1983
 Bertram Kostant, 1983
 Barry Mazur, 1984
 Paul H. Rabinowitz, 1984
 Daniel Gorenstein, 1985
 Karen K. Uhlenbeck, 1985
 Shing-Tung Yau, 1986
 Peter D. Lax, 1987
 Edward Witten, 1987
 Victor W. Guillemin, 1988
 Nicholas Katz, 1989
 William P. Thurston, 1989
 Shlomo Sternberg, 1990
 Robert D. MacPherson, 1991
 Robert P. Langlands, 1992
 Luis A. Caffarelli, 1993
 Sergiu Klainerman, 1993
 Jean Bourgain, 1994
 Clifford H. Taubes, 1995
 Andrew W. Wiles, 1996
 Daniel W. Stroock, 1997
 Gian-Carlo Rota, 1998
 Helmut H. Hofer, 1999
 Curtis T. McMullen, 2000
 János Kollár, 2001
 L. Craig Evans, 2002

Peter Sarnak, 2003
 Sun-Yung Alice Chang, 2004
 Robert K. Lazarsfeld, 2005
 Hendrik W. Lenstra Jr., 2006
 Andrei Okounkov, 2007
 Wendelin Werner, 2008
 Gregory Margulis, 2009
 Richard P. Stanley, 2010
 Alexander Lubotsky, 2011

Gibbs Lecturers

M. I. Pupin, 1923
 Robert Henderson, 1924
 James Pierpont, 1925
 H. B. Williams, 1926
 E. W. Brown, 1927
 G. H. Hardy, 1928
 Irving Fisher, 1929
 E. B. Wilson, 1930
 P. W. Bridgman, 1931
 R. C. Tolman, 1932
 Albert Einstein, 1934
 Vannevar Bush, 1935
 H. N. Russell, 1936
 C. A. Kraus, 1937
 Theodore von Kármán, 1939
 Sewall Wright, 1941
 Harry Bateman, 1943
 John von Neumann, 1944
 J. C. Slater, 1945
 S. Chandrasekhar, 1946
 P. M. Morse, 1947
 Hermann Weyl, 1948
 Norbert Wiener, 1949
 G. E. Uhlenbeck, 1950
 Kurt Gödel, 1951
 Marston Morse, 1952
 Wassily Leontief, 1953
 K. O. Friedrichs, 1954
 J. E. Mayer, 1955
 M. H. Stone, 1956
 H. J. Muller, 1958
 J. M. Burgers, 1959
 Julian Schwinger, 1960
 J. J. Stoker, 1961
 C. N. Yang, 1962
 C. E. Shannon, 1963
 Lars Onsager, 1964
 D. H. Lehmer, 1965
 Martin Schwarzschild, 1966
 Mark Kac, 1967
 E. P. Wigner, 1968
 R. L. Wilder, 1969
 W. H. Munk, 1970
 E. F. F. Hopf, 1971
 F. J. Dyson, 1972
 J. K. Moser, 1973
 Paul A. Samuelson, 1974

Fritz John, 1975
 Arthur S. Wightman, 1976
 Joseph B. Keller, 1977
 Donald E. Knuth, 1978
 Martin D. Kruskal, 1979
 Kenneth G. Wilson, 1980
 Cathleen Synge Morawetz, 1981
 Elliott W. Montroll, 1982
 Samuel Karlin, 1983
 Herbert A. Simon, 1984
 Michael O. Rabin, 1985
 L. E. Scriven, 1986
 Thomas C. Spencer, 1987
 David P. Ruelle, 1988
 Elliott H. Lieb, 1989
 George B. Dantzig, 1990
 Michael F. Atiyah, 1991
 Michael E. Fisher, 1992
 Charles S. Peskin, 1993
 Robert M. May, 1994
 Andrew J. Majda, 1995
 Steven Weinberg, 1996
 Persi Diaconis, 1997
 Edward Witten, 1998
 Nancy Kopell, 1999
 Roger Penrose, 2000
 Ronald L. Graham, 2001
 Michael V. Berry, 2002
 David B. Mumford, 2003
 Eric Lander, 2004
 Ingrid Daubechies, 2005
 Michael Savageau, 2006
 Peter D. Lax, 2007
 Avi Wigderson, 2008
 Percy Deift, 2009
 Petre W. Shor, 2010
 George Papanicolaou, 2011

Presidents

J. H. Van Amringe, 1889, 1890
 J. E. McClintock, 1891-1894
 G. W. Hill, 1895, 1896
 Simon Newcomb, 1897, 1898

R. S. Woodward, 1899, 1900
 E. H. Moore, 1901, 1902
 T. S. Fiske, 1903, 1904
 W. F. Osgood, 1905, 1906
 H. S. White, 1907, 1908
 Maxime Bôcher, 1909, 1910
 H. B. Fine, 1911, 1912
 E. B. Van Vleck, 1913, 1914
 E. W. Brown, 1915, 1916
 L. E. Dickson, 1917, 1918
 Frank Morley, 1919, 1920
 G. A. Bliss, 1921, 1922
 Oswald Veblen, 1923, 1924
 G. D. Birkhoff, 1925, 1926
 Virgil Snyder, 1927, 1928
 E. R. Hedrick, 1929, 1930
 L. P. Eisenhart, 1931, 1932
 A. B. Coble, 1933, 1934
 Solomon Lefschetz, 1935, 1936
 R. L. Moore, 1937, 1938
 G. C. Evans, 1939, 1940
 Marston Morse, 1941, 1942
 M. H. Stone, 1943, 1944
 T. H. Hildebrandt, 1945, 1946
 Einar Hille, 1947, 1948
 J. L. Walsh, 1949, 1950
 John von Neumann, 1951, 1952
 G. T. Whyburn, 1953, 1954
 R. L. Wilder, 1955, 1956
 Richard Brauer, 1957, 1958
 E. J. McShane, 1959, 1960
 Deane Montgomery, 1961, 1962
 J. L. Doob, 1963, 1964
 A. A. Albert, 1965, 1966
 C. B. Morrey, Jr., 1967, 1968
 Oscar Zariski, 1969, 1970
 Nathan Jacobson, 1971, 1972
 Saunders Mac Lane, 1973, 1974
 Lipman Bers, 1975, 1976
 R. H. Bing, 1977, 1978
 Peter D. Lax, 1979, 1980
 Andrew M. Gleason, 1981, 1982
 Julia B. Robinson, 1983, 1984

Irving Kaplansky, 1985, 1986
 George Daniel Mostow, 1987, 1988
 William Browder, 1989, 1990
 Michael Artin, 1991, 1992
 Ronald L. Graham, 1993, 1994
 Cathleen Synge Morawetz, 1995, 1996
 Arthur M. Jaffe, 1997, 1998
 Felix E. Browder, 1999, 2000
 Hyman Bass, 2001, 2002
 David Eisenbud, 2003, 2004
 James G. Arthur, 2005, 2006
 James G. Glimm, 2007, 2008
 George E. Andrews, 2009, 2010
 Eric M. Friedlander, 2011, 2012

Secretaries

T. S. Fiske, 1888-1895
 F. N. Cole, 1896-1920
 R. G. D. Richardson, 1921-1940
 J. R. Kline, 1941-1950
 E. G. Begle, 1951-1956
 J. W. Green, 1957-1966
 Everett Pitcher, 1967-1988
 Robert M. Fossum, 1989-1998
 Robert J. Daverman, 1999-

Treasurers

T. S. Fiske, 1890, 1891
 Harold Jacoby, 1892-1894
 R. S. Woodward, 1895, 1896
 Harold Jacoby, 1897-1899
 W. S. Dennett, 1900-1907
 J. H. Tanner, 1908-1920
 W. B. Fite, 1921-1929
 G. W. Mullins, 1930-1936
 P. A. Smith, 1937
 B. P. Gill, 1938-1948
 A. E. Meder, Jr., 1949-1964
 W. T. Martin, 1965-1973
 Franklin P. Peterson, 1974-1998
 John M. Franks, 1999-2010
 Jane M. Hawkins, 2011-

Prizes

The George David Birkhoff Prize in Applied Mathematics

This prize was established in 1967 in honor of Professor George David Birkhoff. The initial endowment was contributed by the Birkhoff family and there have been subsequent additions by others. It is awarded for an outstanding contribution to “applied mathematics in the highest and broadest sense.” Currently, the prize amount is US\$5,000, and it is awarded every three years. The award is made jointly by the American Mathematical Society and the Society for Industrial and Applied Mathematics.

First award, 1968: To Jürgen K. Moser for his contributions to the theory of Hamiltonian dynamical systems,

especially his proof of the stability of periodic solutions of Hamiltonian systems having two degrees of freedom and his specific applications of the ideas in connection with this work.

Second award, 1973: To Fritz John for his outstanding work in partial differential equations, in numerical analysis, and, particularly, in nonlinear elasticity theory; the latter work has led to his study of quasi-isometric mappings as well as functions of bounded mean oscillation, which have had impact in other areas of analysis.

Third award, 1973: To James B. Serrin for his fundamental contributions to the theory of nonlinear partial differential equations, especially his work on existence

and regularity theory for nonlinear elliptic equations, and applications of his work to the theory of minimal surfaces in higher dimensions.

Fourth award, 1978: To Garrett Birkhoff for bringing the methods of algebra and the highest standards of mathematics to scientific applications.

Fifth award, 1978: To Mark Kac for his important contributions to statistical mechanics and to probability theory and its applications.

Sixth award, 1978: To Clifford A. Truesdell for his outstanding contributions to our understanding of the subjects of rational mechanics and nonlinear materials, for his efforts to give precise mathematical formulation to these classical subjects, for his many contributions to applied mathematics in the fields of acoustic theory, kinetic theory, and nonlinear elastic theory, and the thermodynamics of mixtures, and for his major work in the history of mechanics.

Seventh award, 1983: To Paul R. Garabedian for his important contributions to partial differential equations, to the mathematical analysis of problems of transonic flow and airfoil design by the method of complexification, and to the development and application of scientific computing to problems of fluid dynamics and plasma physics.

Eighth award, 1988: To Elliott H. Lieb for his profound analysis of problems arising in mathematical physics.

Ninth award, 1994: To Ivo Babuška for important contributions to the reliability of finite element methods, the development of a general framework for finite element error estimation, and the development of p and h - p finite element methods; and to S. R. S. Varadhan for important contributions to the martingale characterization of diffusion processes, to the theory of large deviations for functionals of occupation times of Markov processes, and to the study of random media.

Tenth award, 1998: To Paul H. Rabinowitz for his deep influence on the field of nonlinear analysis.

Eleventh award, 2003: To John Mather for being a mathematician of exceptional depth, power, and originality; and to Charles S. Peskin for devoting much of his career to understanding the dynamics of the human heart and bringing an extraordinarily broad range of expertise to bear on this problem.

Twelfth award, 2006: To Cathleen Synge Morawetz for her deep and influential work in partial differential equations, most notably in the study of shock waves, transonic flow, scattering theory, and conformally invariant estimates for the wave equation.

Thirteenth award, 2009: To Joel Smoller for his leadership, originality, depth, and breadth of work in dynamical systems, differential equations, mathematical biology, shock wave theory, and general relativity.

Next award: January 2012

The Bôcher Memorial Prize

This prize, the first to be offered by the AMS, was founded in memory of Professor Maxime Bôcher, who served as president of the AMS 1909–1910. The original endowment was contributed by members of the Society. It is awarded for a notable paper in analysis published during the

preceding six years. To be eligible, the author should be a member of the American Mathematical Society or the paper should have been published in a recognized North American journal. Currently, the US\$5,000 prize is awarded every three years.

First (preliminary) award, 1923: To G. D. Birkhoff for his memoir *Dynamical systems with two degrees of freedom*. Transactions of the American Mathematical Society **18** (1917), pp. 199–300.

Second award, 1924: To E. T. Bell for his memoir *Arithmetical paraphrases. I, II*, Transactions of the American Mathematical Society **22** (1921), pp. 1–30, 198–219; and to Solomon Lefschetz for his memoir *On certain numerical invariants with applications to Abelian varieties*, Transactions of the American Mathematical Society **22** (1921), pp. 407–482.

Third award, 1928: To J. W. Alexander for his memoir *Combinatorial analysis situs*, Transactions of the American Mathematical Society **28** (1926), pp. 301–329.

Fourth award, 1933: To Marston Morse for his memoir *The foundations of a theory of the calculus of variations in the large in m -space*, Transactions of the American Mathematical Society **31** (1929), pp. 379–404; and to Norbert Wiener for his memoir, *Tauberian theorems*, Annals of Mathematics, Series 2, **33** (1932), pp. 1–100.

Fifth award, 1938: To John von Neumann for his memoir *Almost periodic functions and groups. I, II*, Transactions of the American Mathematical Society **36** (1934), pp. 445–492; and **37** (1935), pp. 21–50.

Sixth award, 1943: To Jesse Douglas for his memoirs *Green's function and the problem of Plateau*, American Journal of Mathematics **61** (1939), pp. 545–589; *The most general form of the problem of Plateau*, American Journal of Mathematics **61** (1939), pp. 590–608; and *Solution of the inverse problem of the calculus of variations*, Proceedings of the National Academy of Sciences **25** (1939), pp. 631–637.

Seventh award, 1948: To A. C. Schaeffer and D. C. Spencer for their memoir *Coefficients of schlicht functions. I, II, III, IV*, Duke Mathematical Journal **10** (1943), pp. 611–635; **12** (1945), pp. 107–125; and the Proceedings of the National Academy of Sciences **32** (1946), pp. 111–116; **35** (1949), pp. 143–150.

Eighth award, 1953: To Norman Levinson for his contributions to the theory of linear, nonlinear, ordinary, and partial differential equations contained in his papers of recent years.

Ninth award, 1959: To Louis Nirenberg for his work in partial differential equations.

Tenth award, 1964: To Paul J. Cohen for his paper *On a conjecture of Littlewood and idempotent measures*, American Journal of Mathematics **82** (1960), pp. 191–212.

Eleventh award, 1969: To I. M. Singer in recognition of his work on the index problem, especially his share in two joint papers with Michael F. Atiyah, *The index of elliptic operators. I, III*, Annals of Mathematics, Series 2, **87** (1968), pp. 484–530, 546–604.

Twelfth award, 1974: To Donald S. Ornstein in recognition of his paper *Bernoulli shifts with the same*

entropy are isomorphic, *Advances in Mathematics* 4 (1970), pp. 337–352.

Thirteenth award, 1979: To Alberto P. Calderón in recognition of his fundamental work on the theory of singular integrals and partial differential equations, and in particular for his paper *Cauchy integrals on Lipschitz curves and related operators*, *Proceedings of the National Academy of Sciences, USA*, 74 (1977), pp. 1324–1327.

Fourteenth award, 1984: To Luis A. Caffarelli for his deep and fundamental work in nonlinear partial differential equations, in particular his work on free boundary problems, vortex theory, and regularity theory.

Fifteenth award, 1984: To Richard B. Melrose for his solution of several outstanding problems in diffraction theory and scattering theory and for developing the analytical tools needed for their resolution.

Sixteenth award, 1989: To Richard M. Schoen for his work on the application of partial differential equations to differential geometry, in particular his completion of the solution to the Yamabe Problem in *Conformal deformation of a Riemannian metric to constant scalar curvature*, *Journal of Differential Geometry* 20 (1984), pp. 479–495.

Seventeenth award, 1994: To Leon Simon for his profound contributions toward understanding the structure of singular sets for solutions of variational problems.

Eighteenth award, 1999: To Demetrios Christodoulou for his contributions to the mathematical theory of general relativity, to Sergiu Klainerman for his contributions to nonlinear hyperbolic equations, and to Thomas Wolff for his work in harmonic analysis.

Nineteenth award, 2002: To Daniel Tataru for his fundamental paper *On global existence and scattering for the wave maps equations*, *Amer. Jour. Math.* 123 (2001), no. 1, pp. 37–77; and to Terence Tao for his recent fundamental breakthrough on the problem of critical regularity in Sobolev spaces of the wave maps equations, *Global regularity of wave maps I. Small critical Sobolev norm in high dimensions*, *Int. Math. Res. Notices* (2001), no. 6, pp. 299–328, and *Global regularity of wave maps II. Small energy in two dimensions*, to appear in *Comm. Math. Phys.* (2001 or early 2002); and to Fanghua Lin for his fundamental contributions to our understanding of the Ginzburg-Landau (GL) equations with a small parameter.

Twentieth award, 2005: To Frank Merle for his fundamental work in the analysis of nonlinear dispersive equations.

Twenty-first award, 2008: To Alberto Bressan for his fundamental works on hyperbolic conservation laws; and to Charles Fefferman for his many fundamental contributions to different areas of analysis; and to Carlos Kenig for his important contributions to harmonic analysis, partial differential equations, and nonlinear dispersive PDE.

Twenty-second award, 2011: To Gunther Uhlmann for his fundamental work on inverse problems; and to Assaf Naor for introducing new invariants of metric spaces and for applying his new understanding of the distortion between various metric structures to theoretical computer science.

Next award: January 2014.

The Frank Nelson Cole Prize in Algebra

This prize (and the Frank Nelson Cole Prize in Number Theory) was founded in honor of Professor Frank Nelson Cole on the occasion of his retirement as secretary of the American Mathematical Society after twenty-five years of service and as editor-in-chief of the *Bulletin* for twenty-one years. The original fund was donated by Professor Cole from moneys presented to him on his retirement and was augmented by contributions from members of the Society. The fund was later doubled by his son, Charles A. Cole. The prize is for a notable paper in algebra published during the preceding six years. To be eligible, the author should be a member of the American Mathematical Society or the paper should have been published in a recognized North American journal. Currently, the US\$5,000 prize is awarded every three years.

First award, 1928: To L. E. Dickson for his book *Algebren und ihre Zahlentheorie*, Orell Füssli, Zürich and Leipzig, 1927.

Second award, 1939: To A. Adrian Albert for his papers on the construction of Riemann matrices published in the *Annals of Mathematics, Series 2*, 35 (1934) and 36 (1935).

Third award, 1944: To Oscar Zariski for four papers on algebraic varieties published in the *American Journal of Mathematics* 61 (1939) and 62 (1940), and in the *Annals of Mathematics, Series 2*, 40 (1939) and 41 (1940).

Fourth award, 1949: To Richard Brauer for his paper *On Artin's L-series with general group characters*, *Annals of Mathematics, Series 2*, 48 (1947), pp. 502–514.

Fifth award, 1954: To Harish-Chandra for his papers on representations of semisimple Lie algebras and groups, and particularly for his paper *On some applications of the universal enveloping algebra of a semisimple Lie algebra*, *Transactions of the American Mathematical Society* 70 (1951), pp. 28–96.

Sixth award, 1960: To Serge Lang for his paper *Unramified class field theory over function fields in several variables*, *Annals of Mathematics, Series 2*, 64 (1956), pp. 285–325; and to Maxwell A. Rosenlicht for his papers *Generalized Jacobian varieties*, *Annals of Mathematics, Series 2*, 59 (1954), pp. 505–530, and *A universal mapping property of generalized Jacobians*, *Annals of Mathematics, Series 2*, 66 (1957), pp. 80–88.

Seventh award, 1965: To Walter Feit and John G. Thompson for their joint paper *Solvability of groups of odd order*, *Pacific Journal of Mathematics* 13 (1963), pp. 775–1029.

Eighth award, 1970: To John R. Stallings for his paper *On torsion-free groups with infinitely many ends*, *Annals of Mathematics, Series 2*, 88 (1968), pp. 312–334; and to Richard G. Swan for his paper *Groups of cohomological dimension one*, *Journal of Algebra* 12 (1969), pp. 585–610.

Ninth award, 1975: To Hyman Bass for his paper *Unitary algebraic K-theory*, *Springer Lecture Notes in Mathematics* 343, 1973; and to Daniel G. Quillen for his paper *Higher algebraic K-theories*, *Springer Lecture Notes in Mathematics* 341, 1973.

Tenth award, 1980: To Michael Aschbacher for his paper *A characterization of Chevalley groups over fields of odd order*, *Annals of Mathematics, Series 2*, 106 (1977),

pp. 353–398; and to Melvin Hochster for his paper *Topics in the homological theory of commutative rings*, CBMS Regional Conference Series in Mathematics, Number 24, American Mathematical Society, 1975.

Eleventh award, 1985: To George Lusztig for his fundamental work on the representation theory of finite groups of Lie type. In particular for his contributions to the classification of the irreducible representations in characteristic zero of the groups of rational points of reductive groups over finite fields, appearing in *Characters of Reductive Groups over Finite Fields*, Annals of Mathematics Studies 107, Princeton University Press, 1984.

Twelfth award, 1990: To Shigefumi Mori for his outstanding work on the classification of algebraic varieties and, in particular, for his paper *Flip theorem and the existence of minimal models for 3-folds*, Journal of the American Mathematical Society **1** (1988), pp. 117–253.

Thirteenth award, 1995: To Michel Raynaud and David Harbater for their solution of Abhyankar’s conjecture. This work appeared in the papers *Revêtements de la droite affine en caractéristique $p > 0$* , Invent. Math. **116** (1994), pp. 425–462 (Raynaud); and *Abhyankar’s conjecture on Galois groups over curves*, Invent. Math. **117** (1994), pp. 1–25 (Harbater).

Fourteenth award, 2000: To Andrei Suslin for his work on motivic cohomology, and to Aise Johan de Jong for his important work on the resolution of singularities by generically finite maps.

Fifteenth award, 2003: To Hiraku Nakajima for his work in representation theory and geometry.

Sixteenth award, 2006: To János Kollár for his outstanding achievements in the theory of rationally connected varieties and for his illuminating work on a conjecture of Nash.

Seventeenth award, 2009: To Christopher Hacon and James McKernan for their groundbreaking joint work on higher-dimensional birational algebraic geometry.

Next award: January 2012.

The Frank Nelson Cole Prize in Number Theory

This prize (and the Frank Nelson Cole Prize in Algebra) was founded in honor of Professor Frank Nelson Cole on the occasion of his retirement as secretary of the American Mathematical Society after twenty-five years of service and as editor-in-chief of the *Bulletin* for twenty-one years. The original fund was donated by Professor Cole from moneys presented to him on his retirement and was augmented by contributions from members of the Society. The fund was later doubled by his son, Charles A. Cole. The prize is for a notable paper in number theory published during the preceding six years. To be eligible, the author should be a member of the American Mathematical Society or the paper should have been published in a recognized North American journal. Currently, the US\$5,000 prize is awarded every three years.

First award, 1931: To H. S. Vandiver for his several papers on Fermat’s last theorem published in the *Transactions of the American Mathematical Society* and in the *Annals of Mathematics* during the preceding five years, with special reference to a paper entitled *On Fermat’s*

last theorem, Transactions of the American Mathematical Society **31** (1929), pp.-613–642.

Second award, 1941: To Claude Chevalley for his paper *La théorie du corps de classes*, Annals of Mathematics, Series 2, **41** (1940), pp.-394–418.

Third award, 1946: To H. B. Mann for his paper *A proof of the fundamental theorem on the density of sums of sets of positive integers*, Annals of Mathematics, Series 2, **43** (1942), pp.-523–527.

Fourth award, 1951: To Paul Erdős for his many papers in the theory of numbers, and in particular for his paper *On a new method in elementary number theory which leads to an elementary proof of the prime number theorem*, Proceedings of the National Academy of Sciences **35** (1949), pp.-374–385.

Fifth award, 1956: To John T. Tate for his paper *The higher dimensional cohomology groups of class field theory*, Annals of Mathematics, Series 2, **56** (1952), pp. 294–297.

Sixth award, 1962: To Kenkichi Iwasawa for his paper *Gamma extensions of number fields*, Bulletin of the American Mathematical Society **65** (1959), pp. 183–226; and to Bernard M. Dwork for his paper *On the rationality of the zeta function of an algebraic variety*, American Journal of Mathematics **82** (1960), pp. 631–648.

Seventh award, 1967: To James B. Ax and Simon B. Kochen for a series of three joint papers: *Diophantine problems over local fields. I, II, III*, American Journal of Mathematics **87** (1965), pp. 605–630, 631–648; and Annals of Mathematics, Series 2, **83** (1966), pp. 437–456.

Eighth award, 1972: To Wolfgang M. Schmidt for the following papers: *On simultaneous approximation of two algebraic numbers by rationals*, Acta Mathematica (Uppsala) **119** (1967), pp. 27–50; *T-numbers do exist*, Symposia Mathematica, IV, Academic Press, 1970, pp. 1–26; *Simultaneous approximation to algebraic numbers by rationals*, Acta Mathematica (Uppsala) **125** (1970), pp. 189–201; *On Mahler’s T-numbers*, Proceedings of Symposia in Pure Mathematics **20**, American Mathematical Society, 1971, pp. 275–286.

Ninth award, 1977: To Goro Shimura for his two papers *Class fields over real quadratic fields and Hecke operators*, Annals of Mathematics, Series 2, **95** (1972), pp. 130–190; and *On modular forms of half integral weight*, Annals of Mathematics, Series 2, **97** (1973), pp. 440–481.

Tenth award, 1982: To Robert P. Langlands for pioneering work on automorphic forms, Eisenstein series and product formulas, particularly for his paper *Base change for $GL(2)$* , Annals of Mathematics Studies **96**, Princeton University Press, 1980; and to Barry Mazur for outstanding work on elliptic curves and Abelian varieties, especially on rational points of finite order, and his paper *Modular curves and the Eisenstein ideal*, Publications Mathématiques de l’Institut des Hautes Études Scientifiques **47** (1977), pp. 33–186.

Eleventh award, 1987: To Dorian M. Goldfeld for his paper *Gauss’s class number problem for imaginary quadratic fields*, Bulletin of the American Mathematical Society **13** (1985), pp. 23–37; and to Benedict H. Gross and Don B.

Zagier for their paper *Heegner points and derivatives of L-series*, *Inventiones Mathematicae* **84** (1986), pp. 225–320.

Twelfth award, 1992: To Karl Rubin for his work in the area of elliptic curves and Iwasawa theory, with particular reference to his papers *Tate-Shafarevich groups and L-functions of elliptic curves with complex multiplication* and *The “main conjectures” of Iwasawa theory for imaginary quadratic fields*; and to Paul Vojta for his work on Diophantine problems, with particular reference to his paper *Siegel’s theorem in the compact case*.

Thirteenth award, 1997: To Andrew J. Wiles for his work on the Shimura-Taniyama conjecture and Fermat’s Last Theorem, published in *Modular elliptic curves and Fermat’s Last Theorem*, *Ann. of Math.* **141** (1995), pp. 443–551.

Fourteenth award, 2002: To Henryk Iwaniec for his fundamental contributions to analytic number theory, and to Richard Taylor for several outstanding advances in algebraic number theory.

Fifteenth award, 2005: To Peter Sarnak for his fundamental contributions to number theory and in particular his book *Random Matrices, Frobenius Eigenvalues and Monodromy*, written jointly with his Princeton colleague Nicholas Katz.

Sixteenth award, 2008: To Manjul Bhargava for his revolutionary work on higher composition laws.

Seventeenth award, 2011: To Chandrashekar Khare and Jean-Pierre Wintenberger for their remarkable proof of Serre’s modularity conjecture.

Next award: January 2014.

The Levi L. Conant Prize

This prize was established in 2000 in honor of Levi L. Conant to recognize the best expository paper published in either the *Notices of the AMS* or the *Bulletin of the AMS* in the preceding five years. Levi L. Conant was a mathematician at Worcester Polytechnic Institute. His will provided for funds to be donated to the AMS upon his wife’s death. The US\$1,000 prize is awarded annually.

First award, 2001: To Carl Pomerance for his paper “A tale of two sieves”, *Notices of the AMS* **43**, no. 12 (1996), pp. 1473–1485.

Second award, 2002: To Elliott H. Lieb and Jakob Yngvason for their article “A guide to entropy and the Second Law of Thermodynamics”, *Notices of the AMS* **45**, no. 5 (1998), pp. 571–581.

Third award, 2003: To Nicholas Katz and Peter Sarnak for their expository paper “Zeroes of zeta functions and symmetry”, *Bulletin of the AMS* **36** (1999), pp. 1–26.

Fourth award, 2004: To Noam D. Elkies for his enlightening two-part article “Lattices, linear codes, and invariants”, *Notices of the AMS* **47**, no. 10 (2000), Part I, pp. 1238–1245; no. 11, Part II, pp. 1382–1391.

Fifth award, 2005: To Allen Knutson and Terence Tao for their stimulating article “Honeycombs and sums of Hermitian matrices”, *Notices of the AMS* **48**, no. 2 (2001), pp. 175–186.

Sixth award, 2006: To Ronald Solomon for his article “A brief history of the classification of the finite simple groups”, *Bulletin of the AMS* **38** (2001), no. 3, 315–352.

Seventh award, 2007: To Jeffrey Weeks for his article “The Poincaré dodecahedral space and the mystery of the missing fluctuations”, *Notices of the AMS* **51** (2004) no. 6, 610–619.

Eighth award, 2008: To J. Brian Conrey for his article “The Riemann Hypothesis”, *Notices of the AMS* **50** (2003) no. 3, 341–353; and to Shlomo Hoory, Nathan Linial, and Avi Wigderson for their article “Expander graphs and their applications”, *Bulletin of the AMS* **43** (2006), no. 4, 439–561.

Ninth award, 2009: To Jeffrey Weeks for his article “The Poincaré dodecahedral space and the mystery of the missing fluctuations”, *Notices of the AMS* **51** (2004) no. 6, 610–619.

Ninth award, 2009: To Jeffrey Weeks for his article “The Poincaré dodecahedral space and the mystery of the missing fluctuations”, *Notices of the AMS* **51** (2004) no. 6, 610–619.

Tenth award, 2010: To Bryna Kra for her article, “The Green-Tao Theorem on arithmetic progressions in the primes: An ergodic point of view”, *Bull. Amer. Math. Soc. (N.S.)* **43** (2006), no. 1, 3–23.

Eleventh award, 2011: To David Vogan for his article, “The character table for E8”, *Notices of the AMS* **54** (2007), no. 9, 1122–1134.

Next award: January 2012.

Joseph L. Doob Prize

This prize was established by the AMS in 2003 to recognize a single, relatively recent, outstanding research book that makes a seminal contribution to the research literature, reflects the highest standards of research exposition, and promises to have a deep and long-term impact in its area. The book must have been published within the six calendar years preceding the year in which it is nominated. Books may be nominated by members of the Society, by members of the selection committee, by members of AMS editorial committees, or by publishers. The US\$5,000 prize is awarded every three years.

The prize (originally called the Book Prize) was endowed in 2005 by Paul and Virginia Halmos and renamed in honor of Joseph L. Doob. Paul Halmos (Professor Emeritus at Santa Clara University) was Doob’s first Ph.D. student. Doob received his Ph.D. from Harvard in 1932 and three years later joined the faculty at the University of Illinois, where he remained until his retirement in 1978. He worked in probability theory and measure theory, served as AMS president in 1963–1964, and received the AMS Steele Prize in 1984 “for his fundamental work in establishing probability as a branch of mathematics.” Doob passed away on June 7, 2004, at the age of ninety-four.

First award, 2005: To William P. Thurston for his book *Three-Dimensional Geometry and Topology*, edited by Silvio Levy.

Second award, 2008: To Enrico Bombieri and Walter Gubler for their book *Heights in Diophantine Geometry* (Cambridge University Press, 2006).

Third award, 2011: To Peter Kronheimer and Tomasz Mrowka for their book *Monopoles and Three-Manifolds* (Cambridge University Press, 2007).

Next award: January 2014.

Leonard Eisenbud Prize for Mathematics and Physics

This prize was established in 2006 in memory of the mathematical physicist, Leonard Eisenbud (1913–2004), by his son and daughter-in-law, David and Monika Eisenbud. Leonard Eisenbud was a student of Eugene Wigner. He was particularly known for the book, *Nuclear Structure* (1958), which he co-authored with Wigner. A friend of Paul Erdős, he once threatened to write a dictionary of “English to Erdős and Erdős to English.” He was one of the founders of the Physics Department at SUNY Stony Brook, where he taught from 1957 until his retirement in 1983. In later years he became interested in the foundations of quantum mechanics and in the interaction of physics with culture and politics, teaching courses on the anti-science movement. His son, David, was President of the American Mathematical Society 2003–2004.

The prize will honor a work or group of works that brings the two fields closer together. Thus, for example, the prize might be given for a contribution to mathematics inspired by modern developments in physics or for the development of a physical theory exploiting modern mathematics in a novel way.

The US\$5,000 prize will be awarded every three years for a work published in the preceding six years.

First award, 2008: To Hiroshi Ooguri, Andrew Strominger, and Cumrun Vafa for their paper “Black hole attractors and the topological string”, *Physical Review D* (3) **70** (2004), 106007.

Second award, 2011: To Herbert Spohn for his group of works on stochastic growth processes.

Next award: January 2014.

The Delbert Ray Fulkerson Prize

The Fulkerson Prize for outstanding papers in the area of discrete mathematics is sponsored jointly by the Mathematical Programming Society (MPS) and the American Mathematical Society (AMS). Up to three awards of US\$1,500 each are presented at each (triennial) International Symposium of the MPS. Originally, the prizes were paid out of a memorial fund administered by the AMS that was established by friends of the late Delbert Ray Fulkerson to encourage mathematical excellence in the fields of research exemplified by his work. The prizes are now funded by an endowment administered by the MPS.

First award, 1979: To Richard M. Karp for *On the computational complexity of combinatorial problems*, *Networks*, **5** (1975), pp. 45–68; to Kenneth Appel and Wolfgang Haken for *Every planar map is four colorable*, Part I: *Discharging*, *Illinois Journal of Mathematics* **21** (1977), pp. 429–490; and to Paul D. Seymour for *The matroids with the max-flow min-cut property*, *Journal of Combinatorial Theory, Series B*, **23** (1977), pp. 189–222.

Second award, 1982: To D. B. Judin and A. S. Nemirovskii for *Informational complexity and effective methods of solution for convex extremal problems*, *Ekonomika i Matematicheskie Metody* **12** (1976), pp. 357–369; to L. G. Khachiyan for *A polynomial algorithm in linear programming*, *Akademiia Nauk SSSR. Doklady* **244** (1979), pp. 1093–1096; to G. P. Egorychev for *The solution of van der Waerden’s problem for permanents*, *Akademiia Nauk*

SSSR. Doklady **258** (1981), pp. 1041–1044; D. I. Falikman for *A proof of the van der Waerden conjecture on the permanent of a doubly stochastic matrix*, *Matematicheskie Zametki* **29** (1981), pp. 931–938; and to M. Grötschel, L. Lovasz, and A. Schrijver for *The ellipsoid method and its consequences in combinatorial optimization*, *Combinatorica* **1** (1981), pp. 169–197.

Third award, 1985: To Jozsef Beck, for *Roth’s estimate of the discrepancy of integer sequences is nearly sharp*, *Combinatorica* **1** (4) (1981), pp. 319–325; to H. W. Lenstra Jr. for *Integer programming with a fixed number of variables*, *Mathematics of Operations Research* **8** (4) (1983), pp. 538–548; and to Eugene M. Luks for *Isomorphism of graphs of bounded valence can be tested in polynomial time*, *Journal of Computer and System Sciences* **25** (1) (1982), pp. 42–65.

Fourth award, 1988: To Éva Tardos for *A strongly polynomial minimum cost circulation algorithm*, *Combinatorica* **5** (1985), pp. 247–256; and to Narendra Karmarkar for *A new polynomial-time algorithm for linear programming*, *Combinatorica* **4** (1984), pp. 373–395.

Fifth award, 1991: To Martin Dyer, Alan Frieze, and Ravi Kannan for *A random polynomial time algorithm for approximating the volume of convex bodies*, *Journal of the Association for Computing Machinery* **38**/1 (1991), pp. 1–17; to Alfred Lehman for *The width-length inequality and degenerate projective planes*, W. Cook and P. D. Seymour (eds.), *Polyhedral Combinatorics*, DIMACS Series in Discrete Mathematics and Theoretical Computer Science **1**, American Mathematical Society, 1990, pp. 101–105; and to Nikolai E. Mnev for *The universality theorems on the classification problem of configuration varieties and convex polytope varieties*, O. Ya. Viro (ed.), *Topology and Geometry—Rohlin Seminar*, Lecture Notes in Mathematics **1346**, Springer-Verlag, Berlin, 1988, pp. 527–544.

Sixth Award, 1994: To Lou Billera for *Homology of smooth splines: Generic triangulations and a conjecture of Strang*, *Transactions of the AMS* **310** (1988), pp. 325–340; to Gil Kalai for *Upper bounds for the diameter and height of graphs of the convex polyhedra*, *Discrete and Computational Geometry* **8** (1992), pp. 363–372; and to Neil Robertson, Paul D. Seymour, and Robin Thomas for *Hadwiger’s conjecture for K_6 ; free graphs*, *Combinatorica* **13** (1993), pp. 279–361.

Seventh award, 1997: To Jeong Han Kim for *The Ramsey number $R(3, t)$ has order of magnitude*, which appeared in *Random Structures and Algorithms* **7** (1995) no. 3, pp. 173–207.

Eighth award, 2000: To Michel X. Goemans and David P. Williamson for *Improved approximation algorithms for the maximum cut and satisfiability problems using semi-definite programming*, *Journal of the Association for Computing Machinery* **42** (1995), no. 6, pp. 1115–1145; and to Michele Conforti, Gerard Cornuejols, and M. R. Rao for *Decomposition of balanced matrices*, *Journal of Combinatorial Theory, Series B* **77** (1999), no. 2, pp. 292–406.

Ninth award, 2003: To J. F. Geelen, A. M. H. Gerards, and A. Kapoor for *The excluded minors for $GF(4)$ -representable matroids*, *Journal of Combinatorial Theory Series B*, **79** (2000), no. 2, pp. 247–299; to Bertrand Guenin for *A characterization of weakly bipartite graphs*, *Journal*

of Combinatorial Theory Series B, **83** (2001), no. 1, pp. 112-168; to Satoru Iwata, Lisa Fleischer, and Satoru Fujishige for *A combinatorial strongly polynomial algorithm for minimizing submodular functions*, Journal of the ACM, **48** (July 2001), no. 4, pp. 761-777; and to Alexander Schrijver for *A combinatorial algorithm minimizing submodular functions in strongly polynomial time*, Journal of Combinatorial Theory, Series B, **80** (2000), no. 2, pp. 346-355.

Tenth award, 2006: To Manindra Agrawal, Neeraj Kayal and Nitin Saxena, *PRIMES is in P*, Annals of Mathematics, Volume 160, issue 2, 2004, Pp. 781-793; and to Mark Jerum, Alistair Sinclair and Eric Vigoda, *A polynomial-time approximation algorithm for the permanent of a matrix with nonnegative entries*, J. ACM, Volume 51, Issue 4, 2004, pp. 671-697; and to Neil Robertson and Paul D. Seymour, *Graph Minors. XX. Wagner's conjecture*, Journal of Combinatorial Theory, Series B, **92** (2004), no. 2, pp. 325-357.

Eleventh award, 2009: To M. Chudnovsky, N. Robertson, P. Seymour, and R. Thomas, *The strong perfect graph theorem*, Annals of Mathematics **164** (2006) 51-229; and to D. A. Spielman and S.-H. Teng, *Smoothed analysis of algorithms: Why the simplex algorithm usually takes polynomial time*, Journal of ACM **51** (2004) 385-463; and to Thomas C. Hales, *A proof of the Kepler conjecture*, Annals of Mathematics **162** (2005) 1063-1183; and to Samuel P. Ferguson, *Sphere Packings, V. Pentahedral Prisms*, Discrete and Computational Geometry **33** (2006) 167-204.

Next award: August 2012.

E. H. Moore Research Article Prize

This prize was established in 2002 in honor of E. H. Moore. Among other activities, Moore founded the Chicago branch of the American Mathematical Society, served as the Society's sixth president (1901-1902), delivered the Colloquium Lectures in 1906, and founded and nurtured the *Transactions of the AMS*. The US\$5,000 prize will be awarded every three years for an outstanding research article to have appeared in one of the AMS primary research journals (namely, the *Journal of the AMS*, *Proceedings of the AMS*, *Transactions of the AMS*, *Memoirs of the AMS*, *Mathematics of Computation*, *Electronic Journal of Conformal Geometry and Dynamics*, and *Electronic Journal of Representation Theory*) during the six calendar years ending a full year before the meeting at which the prize is awarded.

First award, 2004: To Mark Haiman for *Hilbert schemes, polygraphs, and the Macdonald positivity conjecture*, Journal of the AMS **14** (2001), pp. 941-1006.

Second award, 2007: To Ivan Shestakov and Ualbai Umirbaev for their two ground-breaking papers, both published in the Journal of the American Mathematical Society: *The tame and the wild automorphisms of polynomial rings in three variables*, **17** (2004), no. 1, 197-227; and *Poisson brackets and two-generated subalgebras of rings of polynomials*, **17** (2004), no. 1, 181-196.

Third award, 2010: To Sorin Popa for his article "On the superrigidity of malleable actions with spectral gap", *J. Amer. Math. Soc.* **21** (2008), no. 4, 981-1000.

Next award: January 2013.

The Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student

This prize, which was established in 1995, is to be awarded to an undergraduate student (or students having submitted joint work) for outstanding research in mathematics. It is entirely endowed by a gift from Mrs. Frank (Brennie) Morgan. Any student who is an undergraduate in a college or university in Canada, Mexico, or the United States or its possessions is eligible to be considered for this US\$1,200 prize, which is to be awarded annually. The award is made jointly by the American Mathematical Society, the Mathematical Association of America, and the Society for Industrial and Applied Mathematics.

First award, 1995: To Kannan Soundararajan for truly exceptional research in analytic number theory. Honorable mention: Kiran Kedlaya.

Second award, 1996: To Manjul Bhargava for truly outstanding mathematical research in algebra. Honorable mention: Lenhard L. Ng.

Third award, 1997: To Jade Vinson for wide-ranging research in analysis and geometry. Honorable mention: Vikaas Sohal.

Fourth award, 1998: To Daniel Biss for his remarkable breadth, as well as depth. The most exciting aspect of his submission was his extension of a category which more closely binds the associations between combinatorial group theory and combinatorial topology. Honorable mention: Aaron E. Archer.

Fifth award, 1999: To Sean McLaughlin for his proof of the Dodecahedral Conjecture, a major problem in discrete geometry related to, but distinct from, Kepler's sphere-packing problem and a conjecture that has resisted the efforts of the strongest workers in this area for nearly sixty years. Honorable mention: Samit Dasgupta.

Sixth award, 2000: To Jacob Lurie for his paper "On simply laced Lie algebras and their miniscule representations". Honorable mention: Wai Ling Yee.

Seventh award, 2001: To Ciprian Manolescu for making a fundamental advance in the field by giving an elegant construction of Floer homology. Honorable mention: Michael A. Levin.

Eighth award, 2002: To Joshua Greene for his work in combinatorics.

Ninth award, 2003: To Melanie Wood for research on Belyi-extending maps and P -orderings. Honorable mention: Karen Yeats.

Tenth award, 2004: To Reid W. Barton for his paper "Packing densities of patterns". Honorable mention: Po-Shen Loh.

Eleventh award, 2006: To Jacob Fox for a most astounding collection of research papers by any undergraduate mathematician.

Twelfth award, 2007: To Daniel Kane for establishing a research record that would be the envy of many professional mathematicians.

Thirteenth award, 2008: To Aaron Pixton for five impressive papers he has written, in addition to his Princeton senior thesis.

Fourteenth award, 2009: To Nathan Kaplan for four impressive papers in algebraic number theory.

Fifteenth award, 2010: To Scott Duke Kominers for his outstanding and prolific record of undergraduate research spanning a broad range of topics, including number theory, computational geometry, and mathematical economics.

Sixteenth award, 2011: To Maria Monks for her impressive work in combinatorics and number theory, which has appeared in *Advances in Applied Mathematics*, *Proceedings of the AMS*, *Electronic Journal of Combinatorics*, *Discrete Mathematics*, and *Journal of Combinatorial Theory, Series A*.

Next award: January 2012.

David P. Robbins Prize

This prize was established in 2005 in memory of David P. Robbins by members of his family. Robbins, who died in 2003, received his Ph.D. in 1970 from MIT. He was a long-time member of the Institute for Defense Analysis Center for Communications Research and a prolific mathematician whose work (much of it classified) was in discrete mathematics. The prize is for a paper with the following characteristics: it shall report on novel research in algebra, combinatorics, or discrete mathematics and shall have a significant experimental component; and it shall be on a topic which is broadly accessible and shall provide a simple statement of the problem and clear exposition of the work. The US\$5,000 prize will be awarded every three years.

First award, 2007: To Samuel P. Ferguson and Thomas C. Hales, for the paper *A proof of the Kepler conjecture*, by Thomas C. Hales, *Annals of Mathematics*, **162** (2005), 1065–1185 (Section 5 of this paper is jointly authored with Ferguson).

Second award, 2010: To Ileana Streinu of Smith College for her paper “Pseudo-triangulations, rigidity and motion planning”, *Discrete Comput. Geom.* **34** (2005), no. 4, 587–635.

Next award: January 2013.

The Ruth Lyttle Satter Prize in Mathematics

The prize was established in 1990 using funds donated by Joan S. Birman in memory of her sister, Ruth Lyttle Satter. Professor Birman requested that the prize be established to honor her sister’s commitment to research and to encouraging women in science. The US\$5,000 prize is awarded every two years to recognize an outstanding contribution to mathematics research by a woman in the previous six years.

First award, 1991: To Dusa McDuff for her outstanding work during the past five years on symplectic geometry.

Second award, 1993: To Lai-Sang Young for her leading role in the investigation of the statistical (or ergodic) properties of dynamical systems.

Third award, 1995: To Sun-Yung Alice Chang for her deep contributions to the study of partial differential equations on Riemannian manifolds and in particular for her work on extremal problems in spectral geometry and the compactness of isospectral metrics within a fixed conformal class on a compact 3-manifold.

Fourth award, 1997: To Ingrid Daubechies for her deep and beautiful analysis of wavelets and their applications.

Fifth award, 1999: To Bernadette Perrin-Riou for her number theoretical research on p -adic L -functions and Iwasawa Theory.

Sixth award, 2001: To Karen E. Smith for her outstanding work in commutative algebra, and to Sijue Wu for her work on a long-standing problem in the water wave equation.

Seventh award, 2003: To Abigail Thompson for her outstanding work in 3-dimensional topology.

Eighth award, 2005: To Svetlana Jitomirskaya for her pioneering work on nonperturbative quasiperiodic localization, in particular for results in her papers (1) *Metal-insulator transition for the almost Mathieu operator*, *Ann. of Math.* (2) **150** (1999), no. 3, pp. 1159–1175; and (2) with J. Bourgain, *Absolutely continuous spectrum for 1D quasiperiodic operators*, *Invent. Math.* **148** (2002), no. 3, pp. 453–463.

Ninth award, 2007: To Claire Voisin for her deep contributions to algebraic geometry, and in particular for her recent solutions to two long-standing open problems: the Kodaira problem (*On the homotopy types of compact Kähler and complex projective manifolds*, *Inventiones Mathematicae*, **157** (2004), no. 2, 329–343) and Green’s Conjecture (*Green’s canonical syzygy conjecture for generic curves of odd genus*, *Compositio Mathematica*, **141** (2005), no. 5, 1163–1190; and *Green’s generic syzygy conjecture for curves of even genus lying on a $K3$ surface*, *Journal of the European Mathematical Society*, **4** (2002), no. 4, 363–404).

Tenth award, 2009: To Laure Saint-Raymond for her fundamental work on the hydrodynamic limits of the Boltzmann equation in the kinetic theory of gases.

Eleventh award, 2011: To Amie Wilkinson for her remarkable contributions to the field of ergodic theory of partially hyperbolic dynamical systems.

Next award: January 2013.

The Leroy P. Steele Prize for Lifetime Achievement The Leroy P. Steele Prize for Mathematical Exposition The Leroy P. Steele Prize for Seminal Contribution to Research

These prizes were established in 1970 in honor of George David Birkhoff, William Fogg Osgood, and William Caspar Graustein and are endowed under the terms of a bequest from Leroy P. Steele. From 1970 to 1976 one or more prizes were awarded each year for outstanding published mathematical research; most favorable consideration was given to papers distinguished for their exposition and covering broad areas of mathematics. In 1977 the Council of the AMS modified the terms under which the prizes are awarded. Since then, up to three prizes have been awarded each year in the following categories: (1) for the cumulative influence of the total mathematical work of the recipient, high level of research over a period of time, particular influence on the development of a field, and influence on mathematics through Ph.D. students; (2) for a book or substantial survey or expository research paper; (3) for a paper, whether recent or not, that has proved to be of fundamental or lasting importance in its field,

or a model of important research. In 1993 the Council formalized the three categories of the prize by naming each of them: (1) The Leroy P. Steele Prize for Lifetime Achievement, (2) The Leroy P. Steele Prize for Mathematical Exposition, and (3) The Leroy P. Steele Prize for Seminal Contribution to Research. Each of these three US\$5,000 prizes is awarded annually.

Special Note: Beginning with the 1994 prize, there has been a five-year cycle of fields for the Seminal Contribution to Research Award. That cycle would have the 2008 prize awarded in discrete mathematics (discrete mathematics alternates with logic every five years), then analysis in 2009, algebra in 2010, applied mathematics in 2011, geometry/topology in 2012, and then logic in 2013, renewing the cycle.

August 1970: To Solomon Lefschetz for his paper *A page of mathematical autobiography*, Bulletin of the American Mathematical Society **74** (1968), pp. 854–879.

August 1971: To James B. Carrell for his paper, written jointly with Jean A. Dieudonné, *Invariant theory, old and new*, Advances in Mathematics **4** (1970), pp. 1–80.

August 1971: To Jean A. Dieudonné for his paper *Algebraic geometry*, Advances in Mathematics **3** (1969), pp. 223–321; and for his paper, written jointly with James B. Carrell, *Invariant theory, old and new*, Advances in Mathematics **4** (1970), pp. 1–80.

August 1971: To Phillip A. Griffiths for his paper *Periods of integrals on algebraic manifolds*, Bulletin of the American Mathematical Society **76** (1970), pp. 228–296.

August 1972: To Edward B. Curtis for his paper *Simplicial homotopy theory*, Advances in Mathematics **6** (1971), pp. 107–209.

August 1972: To William J. Ellison for his paper *Waring's problem*, American Mathematical Monthly **78** (1971), pp. 10–36.

August 1972: To Lawrence F. Payne for his paper *Isoperimetric inequalities and their applications*, SIAM Review **9** (1967), pp. 453–488.

August 1972: To Dana S. Scott for his paper *A proof of the independence of the continuum hypothesis*, Mathematical Systems Theory **1** (1967), pp. 89–111.

January 1975: To Lipman Bers for his paper *Uniformization, moduli, and Kleinian groups*, Bulletin of the London Mathematical Society **4** (1972), pp. 257–300.

January 1975: To Martin D. Davis for his paper *Hilbert's tenth problem is unsolvable*, American Mathematical Monthly **80** (1973), pp. 233–269.

January 1975: To Joseph L. Taylor for his paper *Measure algebras*, CBMS Regional Conference Series in Mathematics, Number 16, American Mathematical Society, 1972.

August 1975: To George W. Mackey for his paper *Ergodic theory and its significance for statistical mechanics and probability theory*, Advances in Mathematics **12** (1974), pp. 178–286.

August 1975: To H. Blaine Lawson for his paper *Foliations*, Bulletin of the American Mathematical Society **80** (1974), pp. 369–418.

1976, 1977, 1978: No awards were made.

January 1979: To Salomon Bochner for his cumulative influence on the fields of probability theory, Fourier analysis, several complex variables, and differential geometry.

January 1979: To Hans Lewy for three fundamental papers: *On the local character of the solutions of an atypical linear differential equation in three variables and a related theorem for regular functions of two complex variables*, Annals of Mathematics, Series 2, **64** (1956), pp. 514–522; *An example of a smooth linear partial differential equation without solution*, Annals of Mathematics, Series 2, **66** (1957), pp. 155–158; and *On hulls of holomorphy*, Communications in Pure and Applied Mathematics **13** (1960), pp. 587–591.

August 1979: To Antoni Zygmund for his cumulative influence on the theory of Fourier series, real variables, and related areas of analysis.

August 1979: To Robin Hartshorne for his expository research article *Equivalence relations on algebraic cycles and subvarieties of small codimension*, Proceedings of Symposia in Pure Mathematics, volume 29, American Mathematical Society, 1975, pp. 129–164; and his book *Algebraic Geometry*, Springer-Verlag, Berlin and New York, 1977.

August 1979: To Joseph J. Kohn for his fundamental paper *Harmonic integrals on strongly convex domains. I, II*, Annals of Mathematics, Series 2, **78** (1963), pp. 112–248; and **79** (1964), pp. 450–472.

August 1980: To André Weil for the total effect of his work on the general course of twentieth-century mathematics, especially in the many areas in which he has made fundamental contributions.

August 1980: To Harold M. Edwards for mathematical exposition in his books *Riemann's Zeta Function*, Pure and Applied Mathematics, number 58, Academic Press, New York and London, 1974; and *Fermat's Last Theorem*, Graduate Texts in Mathematics, number 50, Springer-Verlag, New York and Berlin, 1977.

August 1980: To Gerhard P. Hochschild for his significant work in homological algebra and its applications.

August 1981: To Oscar Zariski for his work in algebraic geometry, especially his fundamental contributions to the algebraic foundations of this subject.

August 1981: To Eberhard Hopf for three papers of fundamental and lasting importance: *Abzweigung einer periodischen Lösung von einer stationären Lösung eines Differential systems*, Berichte über die Verhandlungen der Sächsischen Akademie der Wissenschaften zu Leipzig. Mathematisch-Naturwissenschaftliche Klasse **95** (1943), pp. 3–22; *A mathematical example displaying features of turbulence*, Communications on Applied Mathematics **1** (1948), pp. 303–322; and *The partial differential equation $u_t + uu_x = u_{xx}$* , Communications on Pure and Applied Mathematics **3** (1950), pp. 201–230.

August 1981: To Nelson Dunford and Jacob T. Schwartz for their expository book *Linear Operators*, Part I, *General Theory*, 1958; Part II, *Spectral Theory*, 1963; Part III, *Spectral Operators*, 1971, Interscience Publishers, New York.

August 1982: To Lars V. Ahlfors for his expository work in *Complex Analysis*, McGraw-Hill Book Company, New York, 1953; and in *Lectures on Quasiconformal Mappings*,

D. Van Nostrand Co., Inc., New York, 1966; and *Conformal Invariants*, McGraw-Hill Book Company, New York, 1973.

August 1982: To Tsit-Yuen Lam for his expository work in his book *Algebraic Theory of Quadratic Forms* (1973), and four of his papers: K_0 and K_1 —an introduction to algebraic K -theory (1975), *Ten lectures on quadratic forms over fields* (1977), *Serre's conjecture* (1978), and *The theory of ordered fields* (1980).

August 1982: To John W. Milnor for a paper of fundamental and lasting importance, *On manifolds homeomorphic to the n -sphere*, *Annals of Mathematics* (2) **64** (1956), pp. 399–405.

August 1982: To Fritz John for the cumulative influence of his total mathematical work, high level of research over a period of time, particular influence on the development of a field, and influence on mathematics through Ph.D. students.

August 1983: To Paul R. Halmos for his many graduate texts in mathematics and for his articles on how to write, talk, and publish mathematics.

August 1983: To Steven C. Kleene for three important papers which formed the basis for later developments in generalized recursion theory and descriptive set theory: *Arithmetical predicates and function quantifiers*, *Transactions of the American Mathematical Society* **79** (1955), pp. 312–340; *On the forms of the predicates in the theory of constructive ordinals (second paper)*, *American Journal of Mathematics* **77** (1955), pp. 405–428; and *Hierarchies of number-theoretic predicates*, *Bulletin of the American Mathematical Society* **61** (1955), pp. 193–213.

August 1983: To Shiing-Shen Chern for the cumulative influence of his total mathematical work, high level of research over a period of time, particular influence on the development of the field of differential geometry, and influence on mathematics through Ph.D. students.

August 1984: To Elias M. Stein for his book *Singular Integrals and the Differentiability Properties of Functions*, Princeton University Press, 1970.

August 1984: To Lennart Carleson for his papers *An interpolation problem for bounded analytic functions*, *American Journal of Mathematics* **80** (1958), pp. 921–930; *Interpolation by bounded analytic functions and the Corona problem*, *Annals of Mathematics* (2) **76** (1962), pp. 547–559; and *On convergence and growth of partial sums of Fourier series*, *Acta Mathematica* **116** (1966), pp. 135–157.

August 1984: To Joseph L. Doob for his fundamental work in establishing probability as a branch of mathematics and for his continuing profound influence on its development.

August 1985: To Michael Spivak for his five-volume set *A Comprehensive Introduction to Differential Geometry* (second edition), Publish or Perish, 1979.

August 1985: To Robert Steinberg for three papers on various aspects of the theory of algebraic groups: *Representations of algebraic groups*, *Nagoya Mathematical Journal* **22** (1963), pp. 33–56; *Regular elements of semisimple algebraic groups*, *Institut des Hautes Études Scientifiques Publications Mathématiques* **25** (1965), pp. 49–80; and *Endomorphisms of linear algebraic groups*, *Memoirs of the American Mathematical Society* **80** (1968).

August 1985: To Hassler Whitney for his fundamental work on geometric problems, particularly in the general theory of manifolds, in the study of differentiable functions on closed sets, in geometric integration theory, and in the geometry of the tangents to a singular analytic space.

January 1986: To Donald E. Knuth for his expository work *The Art of Computer Programming*, 3 volumes (first edition, 1968; second edition, 1973).

January 1986: To Rudolf E. Kalman for his two fundamental papers: *A new approach to linear filtering and prediction problems*, *Journal of Basic Engineering* **82** (1960), pp. 35–45; and *Mathematical description of linear dynamical systems*, *SIAM Journal on Control and Optimization* **1** (1963), pp. 152–192; and for his contribution to a third paper (with R. S. Bucy), *New results in linear filtering and prediction theory*, *Journal of Basic Engineering* **83D** (1961), pp. 95–108.

January 1986: To Saunders Mac Lane for his many contributions to algebra and algebraic topology, and in particular for his pioneering work in homological and categorical algebra.

August 1987: To Martin Gardner for his many books and articles on mathematics and particularly for his column “Mathematical Games” in *Scientific American*.

August 1987: To Herbert Federer and Wendell Fleming for their pioneering paper *Normal and integral currents*, *Annals of Mathematics* **72** (1960), pp. 458–520.

August 1987: To Samuel Eilenberg for his fundamental contributions to topology and algebra, in particular for his classic papers on singular homology and his work on axiomatic homology theory, which had a profound influence on the development of algebraic topology.

August 1988: To Sigurdur Helgason for his books *Differential Geometry and Symmetric Spaces*, Academic Press, 1962; *Differential Geometry, Lie Groups, and Symmetric Spaces*, Academic Press, 1978; and *Groups and Geometric Analysis*, Academic Press, 1984.

August 1988: To Gian-Carlo Rota for his paper *On the foundations of combinatorial theory, I. Theory of Möbius functions*, *Zeitschrift für Wahrscheinlichkeitstheorie und Verwandte Gebiete*, volume 2 (1964), pp. 340–368.

August 1988: To Deane Montgomery for his lasting impact on mathematics, particularly mathematics in America. He is one of the founders of the modern theory of transformation groups and is particularly known for his contributions to the solution of Hilbert’s fifth problem.

August 1989: To Daniel Gorenstein for his book *Finite Simple Groups, An Introduction to Their Classification*, Plenum Press, 1982; and his two survey articles, *The classification of finite simple groups* and *Classifying the finite simple groups*, *Bulletin of the American Mathematical Society* **1** (1979), pp. 43–199; and **14** (1986), pp. 1–98, respectively.

August 1989: To Alberto P. Calderón for his paper *Uniqueness in the Cauchy problem for partial differential equations*, *American Journal of Mathematics* **80** (1958), pp. 16–36.

August 1989: To Irving Kaplansky for his lasting impact on mathematics, particularly mathematics in America. By

his energetic example, his enthusiastic exposition, and his overall generosity, he has made striking changes in mathematics and has inspired generations of younger mathematicians.

August 1990: To R. D. Richtmyer for his book *Difference Methods for Initial-Value Problems*, Interscience, first edition, 1957; and second edition, with K. Morton, 1967.

August 1990: To Bertram Kostant for his paper *On the existence and irreducibility of certain series of representations*, *Lie Groups and Their Representations* (1975), pp. 231–329.

August 1990: To Raoul Bott for having been instrumental in changing the face of geometry and topology with his incisive contributions to characteristic classes, K -theory, index theory, and many other tools of modern mathematics.

August 1991: To Jean-François Trèves for *Pseudodifferential and Fourier Integral Operators*, Volumes 1 and 2, Plenum Press, 1980.

August 1991: To Eugenio Calabi for his fundamental work on global differential geometry, especially complex differential geometry.

August 1991: To Armand Borel for his extensive contributions in geometry and topology, the theory of Lie groups, their lattices and representations and the theory of automorphic forms, the theory of algebraic groups and their representations, and extensive organizational and educational efforts to develop and disseminate modern mathematics.

January 1993: To Jacques Dixmier for his books *von Neumann Algebras (Algèbres de von Neumann)*, Gauthier-Villars, Paris, 1957; *C*-Algebras (Les C*-Algèbres et leurs Représentations)*, Gauthier-Villars, Paris, 1964; and *Enveloping Algebras (Algèbres Enveloppantes)*, Gauthier-Villars, Paris, 1974.

January 1993: To James Glimm for his paper *Solution in the large for nonlinear hyperbolic systems of conservation laws*, *Communications on Pure and Applied Mathematics*, XVIII (1965), pp. 697–715.

January 1993: To Peter D. Lax for his numerous and fundamental contributions to the theory and applications of linear and nonlinear partial differential equations and functional analysis, for his leadership in the development of computational and applied mathematics, and for his extraordinary impact as a teacher.

August 1993 – Mathematical Exposition: To Walter Rudin for his books *Principles of Mathematical Analysis*, McGraw-Hill, 1953, 1964, and 1976; and *Real and Complex Analysis*, McGraw-Hill, 1966, 1974, and 1976.

August 1993 – Seminal Contribution to Research: To George Daniel Mostow for his paper *Strong rigidity of locally symmetric spaces*, *Annals of Mathematics Studies*, number 78, Princeton University Press, 1973.

August 1993 – Lifetime Achievement: To Eugene B. Dynkin for his foundational contributions to Lie algebras and probability theory over a long period and his production of outstanding research students in both Russia and the United States, countries to whose mathematical life he has contributed so richly.

August 1994 – Mathematical Exposition: To Ingrid Daubechies for her book *Ten Lectures on Wavelets*, CBMS, volume 61, SIAM, 1992.

August 1994 – Seminal Contribution to Research: To Louis de Branges for his proof of the Bieberbach Conjecture.

August 1994 – Lifetime Achievement: To Louis Nirenberg for his numerous basic contributions to linear and nonlinear partial differential equations and their application to complex analysis and differential geometry.

August 1995 – Mathematical Exposition: To Jean-Pierre Serre for his 1970 book *Cours d'Arithmétique*, with its English translation, published in 1973 by Springer Verlag, *A Course in Arithmetic*.

August 1995 – Seminal Contribution to Research: To Edward Nelson for the following two papers in mathematical physics, characterized by leaders of the field as extremely innovative: *A quartic interaction in two dimensions* in *Mathematical Theory of Elementary Particles*, MIT Press, 1966, pp. 69–73; and *Construction of quantum fields from Markoff fields* in *Journal of Functional Analysis* 12 (1973), pp. 97–112. In these papers he showed for the first time how to use the powerful tools of probability theory to attack the hard analytic questions of constructive quantum field theory, controlling renormalizations with estimates in the first paper, and in the second turning Euclidean quantum field theory into a subset of the theory of stochastic processes.

August 1995 – Lifetime Achievement: To John T. Tate for scientific accomplishments spanning four and a half decades. He has been deeply influential in many of the important developments in algebra, algebraic geometry, and number theory during this time.

August 1996 – Mathematical Exposition: To Bruce C. Berndt for the four volumes, *Ramanujan's Notebooks*, Parts I, II, III, and IV (Springer, 1985, 1989, 1991, and 1994).

August 1996 – Mathematical Exposition: To William Fulton for his book *Intersection Theory*, Springer-Verlag, *Ergebnisse* series, 1984.

August 1996 – Seminal Contribution to Research: To Daniel Stroock and S. R. S. Varadhan for their four papers: *Diffusion processes with continuous coefficients I and II*, *Comm. Pure Appl. Math.* 22 (1969), pp. 345–400, pp. 479–530; *On the support of diffusion processes with applications to the strong maximum principle*, *Sixth Berkeley Sympos. Math. Statist. Probab.*, vol. III, 1970, pp. 333–360; *Diffusion processes with boundary conditions*, *Comm. Pure Appl. Math.* 34 (1971), pp. 147–225; *Multidimensional diffusion processes*, Springer-Verlag, 1979.

August 1996 – Lifetime Achievement: To Goro Shimura for his important and extensive work on arithmetical geometry and automorphic forms; concepts introduced by him were often seminal and fertile ground for new developments, as witnessed by the many notations in number theory that carry his name and that have long been familiar to workers in the field.

January 1997 – Mathematical Exposition: To Anthony W. Knap for his book *Representation Theory of Semisimple Groups (An overview based on examples)*, Princeton University Press, 1986, a beautifully written book which starts from scratch but takes the reader far into a highly developed subject.

January 1997 – Seminal Contribution to Research: To Mikhael Gromov for his paper *Pseudo-holomorphic curves in symplectic manifolds*, *Inventiones Math.* **82** (1985), pp. 307–347, which revolutionized the subject of symplectic geometry and topology and is central to much current research activity, including quantum cohomology and mirror symmetry.

January 1997 – Lifetime Achievement: To Ralph S. Phillips for being one of the outstanding analysts of our time. His early work was in functional analysis: his beautiful theorem on the relation between the spectrum of a semigroup and its infinitesimal generator is striking as well as very useful in the study of PDEs. His extension theory for dissipative linear operators predated the interpolation approach to operator theory and robust control. He made major contributions to acoustical scattering theory in his joint work with Peter Lax, proving remarkable results on local energy decay and the connections between poles of the scattering matrix and the analytic properties of the resolvent. He later extended this work to a spectral theory for the automorphic Laplace operator, relying on the Radon transform on horospheres to avoid Eisenstein series. In the last fifteen years, Ralph Phillips has done brilliant work, in collaboration with others, on spectral theory for the Laplacian on symmetric spaces, on the existence and stability of cusp forms for general noncompact quotients of the hyperbolic plane, on the explicit construction of sparse optimal expander graphs, and on the structure of families of isospectral sets in two dimensions (the collection of drums that sound the same).

January 1998 – Lifetime Achievement: To Nathan Jacobson for his many contributions to research, teaching, exposition, and the mathematical profession. Few mathematicians have been as productive over such a long career or have had as much influence on the profession as has Professor Jacobson.

January 1998 – Seminal Contribution to Research: To Herbert Wilf and Doron Zeilberger for their joint paper *Rational functions certify combinatorial identities*, *Journal of the American Mathematical Society* **3** (1990), pp. 147–158.

January 1998 – Mathematical Exposition: To Joseph Silverman for his books *The Arithmetic of Elliptic Curves*, Graduate Texts in Mathematics, volume 106, Springer-Verlag, New York and Berlin, 1986; and *Advanced Topics in the Arithmetic of Elliptic Curves*, Graduate Texts in Mathematics, volume 151, Springer-Verlag, New York, 1994.

January 1999 – Lifetime Achievement: To Richard V. Kadison. For almost half a century, Professor Kadison has been one of the world leaders in the subject of operator algebras, and the tremendous flourishing of this subject in the last thirty years is largely due to his efforts.

January 1999 – Seminal Contribution to Research: To Michael G. Crandall for two seminal papers: *Viscosity solutions of Hamilton-Jacobi equations* (joint with P.-L. Lions), *Trans. Amer. Math. Soc.* **277** (1983), pp. 1–42; and *Generation of semi-groups of nonlinear transformations on general Banach spaces* (joint with T. M. Liggett), *Amer. J. Math.* **93** (1971), pp. 265–298.

January 1999 – Seminal Contribution to Research: To John F. Nash for his remarkable paper *The embedding problem for Riemannian manifolds*, *Ann. of Math.* (2) **63** (1956), pp. 20–63.

January 1999 – Mathematical Exposition: To Serge Lang for his many books. Among Lang's most famous texts are *Algebra*, Addison-Wesley, Reading, MA, 1965; second edition, 1984; third edition, 1993; and *Algebraic Number Theory*, Addison-Wesley, Reading, MA, 1970; second edition, Graduate Texts in Mathematics, volume 110, Springer-Verlag, New York, 1994.

January 2000 – Lifetime Achievement: To Isadore M. Singer. Singer's series of five papers with Michael F. Atiyah on the Index Theorem for elliptic operators (which appeared in 1968–71) and his three papers with Atiyah and V. K. Patodi on the Index Theorem for manifolds with boundary (which appeared in 1975–76) are among the great classics of global analysis.

January 2000 – Seminal Contribution to Research: To Barry Mazur for his paper *Modular curves and the Eisenstein ideal* in *Publications Mathématiques de l'Institut des Hautes Études Scientifiques*, **47** (1978), pp. 33–186.

January 2000 – Mathematical Exposition: To John H. Conway in recognition of his many expository contributions in automata, the theory of games, lattices, coding theory, group theory, and quadratic forms.

January 2001 – Lifetime Achievement: To Harry Kesten for his many and deep contributions to probability theory and its applications.

January 2001 – Seminal Contribution to Research: To Leslie F. Greengard and Vladimir Rokhlin for the paper *A fast algorithm for particle simulations*, *J. Comput. Phys.* **73**, no. 2 (1987), pp. 325–348.

January 2001 – Mathematical Exposition: To Richard P. Stanley in recognition of the completion of his two-volume work *Enumerative Combinatorics*.

January 2002 – Lifetime Achievement: To Michael Artin for helping to weave the fabric of modern algebraic geometry and to Elias Stein for making fundamental contributions to different branches of analysis.

January 2002 – Seminal Contribution to Research: To Mark Goresky and Robert MacPherson for the papers *Intersection homology theory*, *Topology* **19** (1980), no. 2, pp. 135–162 (IH1); and *Intersection homology. II*, *Invent. Math.* **72** (1983), no. 1, pp. 77–129 (IH2).

January 2002 – Mathematical Exposition: To Yitzhak Katznelson for his book on harmonic analysis.

January 2003 – Lifetime Achievement: To Ron Graham for being one of the principal architects of the rapid development worldwide of discrete mathematics in recent years and to Victor Guillemin for playing a critical role in the development of a number of important areas in analysis and geometry.

January 2003 – Seminal Contribution to Research: To Ronald Jensen for his paper *The fine structure of the constructible hierarchy*, *Annals of Mathematical Logic* **4** (1972), 229–308 pp.; and to Michael Morley for his paper *Categoricity in power*, *Transactions of the AMS* **114** (1965), pp. 514–538.

January 2003 – Mathematical Exposition: To John B. Garnett for his book *Bounded Analytic Functions*, Pure and Applied Mathematics, volume 96, Academic Press, Inc. [Harcourt Brace Jovanovich, Publishers], New York and London, 1981.

January 2004 – Lifetime Achievement: To Cathleen Synge Morawetz for greatly influencing mathematics in the broad sense throughout her long and distinguished career.

January 2004 – Seminal Contribution to Research: To Lawrence C. Evans and Nicolai V. Krylov for the “Evans-Krylov theorem”, as first established in the papers: Lawrence C. Evans, *Classical solutions of fully nonlinear convex, second order elliptic equations*, Communications in Pure and Applied Mathematics **35** (1982), no. 3, pp. 333–363; and N. V. Krylov, *Boundedly inhomogeneous elliptic and parabolic equations*, Izvestiya Akad. Nauk SSSR, Ser. Mat. **46** (1982), no. 3, pp. 487–523; translated in Mathematics of the USSR, Izvestiya **20** (1983), no. 3, pp. 459–492.

January 2004 – Mathematical Exposition: To John W. Milnor in recognition of a lifetime of expository contributions ranging across a wide spectrum of disciplines, including topology, symmetric bilinear forms, characteristic classes, Morse theory, game theory, algebraic K-theory, iterated rational maps, ...and the list goes on.

January 2005 – Lifetime Achievement: To Israel M. Gelfand for profoundly influencing many fields of research through his own work and through his interactions with other mathematicians and students.

January 2005 – Seminal Contribution to Research: To Robert P. Langlands for his paper *Problems in the theory of automorphic forms*, Springer Lecture Notes in Math., volume 170, 1970, pp. 18–86. This is the paper that introduced what are now known as the Langlands conjectures.

January 2005 – Mathematical Exposition: To Branko Grünbaum for his book *Convex Polytopes*.

January 2006 – Lifetime Achievement: To Frederick W. Gehring for being a leading figure in the theory of quasiconformal mappings for over fifty years; and to Dennis P. Sullivan for his fundamental contributions to many branches of mathematics.

January 2006 – Seminal Contribution to Research: To Clifford S. Gardner, John M. Greene, Martin D. Kruskal, and Robert M. Miura for their paper *KortewegdeVries equation and generalizations. VI. Methods for exact solution*, Comm. Pure Appl. Math. **27** (1974), 97–133.

January 2006 – Mathematical Exposition: To Lars V. Hörmander for his book, *The Analysis of Linear Partial Differential Operators*.

January 2007 – Lifetime Achievement: To Henry P. McKean for his rich and magnificent mathematical career and for his work in analysis, which has a strong orientation towards probability theory.

January 2007 – Seminal Contribution to Research: To Karen Uhlenbeck for her foundational contributions in analytic aspects of mathematical gauge theory. These results appeared in the two papers: *Removable singularities in Yang-Mills fields*, Communications in Mathematical Physics, **83** (1982), 11–29 and *Connections with L:P bounds on curvature*, Communications in Mathematical Physics, **83** (1982), 31–42.

January 2007 – Mathematical Exposition: To David Mumford for his beautiful expository accounts of a host of aspects of algebraic geometry, including *The Red Book of Varieties and Schemes* (Springer, 1988).

January 2008 – Lifetime Achievement: To George Lusztig for entirely reshaping representation theory, and, in the process, changing much of mathematics.

January 2008 – Seminal Contribution to Research: To Endre Szemerédi for his paper *On sets of integers containing no k elements in arithmetic progression*, Acta Arithmetica XXVII (1975), 199–245.

January 2008 – Mathematical Exposition: To Neil Trudinger for his book *Elliptic Partial Differential Equations of Second Order*, written with the late David Gilbarg.

January 2009 – Lifetime Achievement: To Luis Caffarelli, one of the world’s greatest mathematicians studying nonlinear partial differential equations (PDE).

January 2009 – Seminal Contribution to Research: To Richard Hamilton for his paper *Three-manifolds with positive Ricci curvature*, J. Differential Geom. **17** (1982), 255–306.

January 2009 – Mathematical Exposition: To I. G. MacDonald for his book *Symmetric Functions and Hall Polynomials* (second edition, Clarendon Press, Oxford University Press, 1995).

January 2010 – Lifetime Achievement: To William Fulton for playing a pivotal role in shaping the direction of algebraic geometry, forging and strengthening ties between algebraic geometry and adjacent fields, and teaching and mentoring several generations of younger mathematicians.

January 2010 – Seminal Contribution to Research: To Robert L. Griess Jr. for his construction of the “Monster” sporadic finite simple group, which he first announced in “A construction of F1 as automorphisms of a 196,883-dimensional algebra” (*Proc. Nat. Acad. Sci. U.S.A.* **78** (1981), no. 2, part 1, 686–691) with details published in “The friendly giant” (*Invent. Math.* **69** (1982), no. 1, 1–102).

January 2010 – Mathematical Exposition: To David Eisenbud for his book, *Commutative Algebra: With a View Toward Algebraic Geometry* (Graduate Texts in Mathematics, 150, Springer-Verlag, New York, 1995. xvi+785 pp.).

January 2011 – Lifetime Achievement: To John W. Milnor for standing out from the list of great mathematicians in terms of his overall achievements and his influence on mathematics in general, both through his work and through his excellent books.

January 2011 – Seminal Contribution to Research: To Ingrid Daubechies for her paper, “Orthonormal bases of compactly supported wavelets” (*Communications on Pure and Applied Mathematics* **41** (1988), no. 7, 909–996).

January 2011 – Mathematical Exposition: To Henryk Iwaniec for his long record of excellent exposition, both in books and in classroom notes.

Next awards: January 2012.

The Oswald Veblen Prize in Geometry

This prize was established in 1961 in memory of Professor Oswald Veblen through a fund contributed by former students and colleagues. The fund was later doubled by the widow of Professor Veblen. It is awarded in recogni-

tion of a notable research memoir in geometry or topology published in the preceding six years. To be considered, either the nominee should be a member of the Society or the memoir should have been published in a recognized North American journal. Currently, the US\$5,000 prize is awarded every three years.

First award, 1964: To C. D. Papakyriakopoulos for his papers *On solid tori*, *Annals of Mathematics, Series 2*, **66** (1957), pp. 1–26; and *On Dehn’s lemma and the asphericity of knots*, *Proceedings of the National Academy of Sciences* **43** (1957), pp. 169–172.

Second award, 1964: To Raoul Bott for his papers *The space of loops on a Lie group*, *Michigan Mathematical Journal* **5** (1958), pp. 35–61; and *The stable homotopy of the classical groups*, *Annals of Mathematics, Series 2*, **70** (1959), pp. 313–337.

Third award, 1966: To Steven Smale for his contributions to various aspects of differential topology.

Fourth award, 1966: To Morton Brown and Barry Mazur for their work on the generalized Schoenflies theorem.

Fifth award, 1971: To Robion C. Kirby for his paper *Stable homeomorphisms and the annulus conjecture*, *Annals of Mathematics, Series 2*, **89** (1969), pp. 575–582.

Sixth award, 1971: To Dennis P. Sullivan for his work on the Hauptvermutung summarized in the paper *On the Hauptvermutung for manifolds*, *Bulletin of the American Mathematical Society* **73** (1967), pp. 598–600.

Seventh award, 1976: To William P. Thurston for his work on foliations.

Eighth award, 1976: To James Simons for his work on minimal varieties and characteristic forms.

Ninth award, 1981: To Mikhael Gromov for his work relating topological and geometric properties of Riemannian manifolds.

Tenth award, 1981: To Shing-Tung Yau for his work in nonlinear partial differential equations, his contributions to the topology of differentiable manifolds, and for his work on the complex Monge-Ampère equation on compact complex manifolds.

Eleventh award, 1986: To Michael H. Freedman for his work in differential geometry and, in particular, the solution of the four-dimensional Poincaré conjecture.

Twelfth award, 1991: To Andrew J. Casson for his work on the topology of low-dimensional manifolds and to Clifford H. Taubes for his foundational work in Yang-Mills theory.

Thirteenth award, 1996: To Richard Hamilton for his continuing study of the Ricci flow and related parabolic equations for a Riemannian metric, and to Gang Tian for his contributions to geometric analysis.

Fourteenth award, 2001: To Jeff Cheeger for his work in differential geometry, to Yakov Eliashberg for his work in symplectic and contact topology, and to Michael J. Hopkins for his work in homotopy theory.

Fifteenth award, 2004: To David Gabai in recognition of his work in geometric topology, in particular, the topology of 3-dimensional manifolds.

Sixteenth award, 2007: To Peter Kronheimer and Tomasz Mrowka for their joint contributions to both three- and four-dimensional topology through the development of deep ana-

lytical techniques and applications; and to Peter Ozsváth and Zoltán Szabó for their contributions to 3- and 4-dimensional topology through their Heegaard Floer homology theory.

Seventeenth award, 2010: To Tobias H. Colding and William P. Minicozzi II for their profound work on minimal surfaces; and to Paul Seidel for his fundamental contributions to symplectic geometry.

Next award: January 2013.

The Albert Leon Whiteman Memorial Prize

This prize was established in 1998 using funds donated by Mrs. Sally Whiteman in memory of her husband, Albert Leon Whiteman, to recognize notable exposition and exceptional scholarship in the history of mathematics. Starting in 2009, the US\$5,000 prize will be awarded every three years.

First award, 2001: To Thomas Hawkins to recognize an outstanding historian of mathematics whose current research and numerous publications display the highest standards of mathematical and historical sophistication.

Second award, 2005: To Harold M. Edwards to pay tribute to his many publications over several decades that have fostered a greater understanding and appreciation of the history of mathematics, especially the theory of algebraic numbers.

Third award, 2009: To Jeremy John Gray for his many historical works, which have not only shed great light on the history of modern mathematics but also have given an example of the ways in which historical scholarship can contribute to the understanding of mathematics and its philosophy.

Next award: January 2012.

The Norbert Wiener Prize in Applied Mathematics

This prize was established in 1967 in honor of Professor Norbert Wiener and was endowed by a fund from the Department of Mathematics of the Massachusetts Institute of Technology. The prize is awarded for an outstanding contribution to “applied mathematics in the highest and broadest sense”. The award is made jointly by the American Mathematical Society and the Society for Industrial and Applied Mathematics. The recipient must be a member of one of these societies and a resident of the United States, Canada, or Mexico. Beginning in 2004, the US\$5,000 prize will be awarded every three years.

First award, 1970: To Richard E. Bellman for his pioneering work in the area of dynamic programming and for his related work on control, stability, and differential-delay equations.

Second award, 1975: To Peter D. Lax for his broad contributions to applied mathematics, in particular, for his work on numerical and theoretical aspects of partial differential equations and on scattering theory.

Third award, 1980: To Tosio Kato for his distinguished work in the perturbation theory of quantum mechanics.

Fourth award, 1980: To Gerald B. Whitham for his broad contributions to the understanding of fluid dynamical phenomena and his innovative contributions to the methodology through which that understanding can be constructed.

Fifth award, 1985: To Clifford S. Gardner for his contributions to applied mathematics in the areas of supersonic aerodynamics, plasma physics and hydromagnetics, and especially for his contributions to the truly remarkable development of inverse scattering theory for the solution of nonlinear partial differential equations.

Sixth award, 1990: To Michael Aizenman for his outstanding contribution of original and nonperturbative mathematical methods in statistical mechanics, by means of which he was able to solve several long open important problems concerning critical phenomena, phase transitions, and quantum field theory; and to Jerrold E. Marsden for his outstanding contributions to the study of differential equations in mechanics: he proved the existence of chaos in specific classical differential equations; his work on the momentum map, from abstract foundations to detailed applications, has had great impact.

Seventh award, 1995: To Hermann Flaschka for deep and original contributions to our understanding of completely integrable systems, and to Ciprian Foias for basic contributions to operator theory, analysis, and dynamics and their applications.

Eighth award, 2000: To Alexandre J. Chorin in recognition of his seminal work in computational fluid dynamics, statistical mechanics, and turbulence; and to Arthur T. Winfree in recognition of his profound impact on the field of biological rhythms, otherwise known as coupled nonlinear oscillators.

Ninth award, 2004: To James A. Sethian for his seminal work on the computer representation of the motion of curves, surfaces, interfaces, and wave fronts, and for his brilliant applications of mathematical and computational ideas to problems in science and engineering.

Tenth award, 2007: To Craig Tracy and Harold Widom for their deep and original work on Random Matrix Theory, a subject which has remarkable applications across the scientific spectrum, from the scattering of neutrons off large nuclei to the behavior of the zeros of the Riemann zeta-function.

Eleventh award, 2010: To David L. Donoho for introducing novel fundamental and powerful mathematical tools in signal processing and image analysis.

Next award: January 2013.

Awards

AMS Centennial Fellowships

A Research Fellowship Fund was established by the AMS in 1973 to provide one-year fellowships for research in mathematics. In 1988 the Fellowship was renamed to honor the AMS Centennial. The number of fellowships granted each year depends on the contributions received; the Society supplements contributions as needed. The primary selection criterion for the Centennial Fellowship is the excellence of the candidate's research. A recipient of the fellowship shall have held his or her doctoral degree for at least three years and not more than twelve years at the inception of the award. Applications will be accepted from those currently holding a tenured, tenure-track, postdoctoral, or comparable (at the discretion of the selection committee) position at an institution in North America. The amount

of the fellowship varies each year. See the last entry on the list below to find the amount and number of fellowships awarded most recently. To make a contribution to the Centennial Fellowship Fund, see <http://www.ams.org/development/centennialfund.html>. To apply for a Centennial Fellowship, see <http://www.ams.org/employment/centflyer.html>.

First award, 1974–1975: Fred G. Abramson, James Li-Ming Wang.

Second award, 1975–1976: Terence J. Gaffney, Paul Nèvai, George M. Reed.

Third award, 1976–1977: Fredric D. Ancel, Joseph A. Sgro.

Fourth award, 1977–1978: Steven Kalikow, Charles Patton, Duong-Hong Phong, David Vogan.

Fifth award, 1978–1979: Alan Dankner, David Harbater, Howard Hiller, Steven P. Kerckhoff, Robert C. McOwen.

Sixth award, 1979–1980: Scott W. Brown, Jeffrey E. Hoffstein, Jeffry N. Kahn, James E. McClure, Rick L. Smith, Mark Steinberger.

Seventh award, 1980–1981: Robert K. Lazarsfeld, Thomas H. Parker, Robert Sachs.

Eighth award, 1981–1982: Lawrence Man-Hou Ein, Mark Williams.

Ninth award, 1982–1983: Nicholas J. Kuhn.

Tenth award, 1983–1984: Russell David Lyons.

Eleventh award, 1984–1985: Richard Timothy Durrett.

Twelfth award, 1985–1986: R. Michael Beals.

Thirteenth award, 1986–1987: Dinakar Ramakrishnan.

Fourteenth award, 1987–1988: Richard Hain, Bill Jacob.

Fifteenth award, 1988–1989: Steven R. Bell, Don M. Blasius, David Gabai.

Sixteenth award, 1989–1990: Isaac Y. Efrat, John M. Lee, Ralf J. Spatzier.

Seventeenth award, 1990–1991: Michael Anderson, Carolyn Gordon, Steven Mitchell.

Eighteenth award, 1991–1992: Daniel Bump, Kari Vilonen.

Nineteenth award, 1992–1993: Krzysztof Burdzy, William Menasco, David Morrison.

Twentieth award, 1993–1994: Jacques Hurtubise, Andre Seedorov, David Webb.

Twenty-first award, 1994–1995: Patricia E. Bauman, David E. Marker.

Twenty-second award, 1995–1996: Rafael de la Llave, William Gordon McCallum, Kent Edward Orr.

Twenty-third award, 1996–1997: Yi Hu, Robert McCann, Alexander Voronov, Jiaping Wang.

Twenty-fourth award, 1997–1998: Ovidiu Costin, Fred Diamond, Gang Liu, Zhongwei Shen, Stephanie Frank Singer.

Twenty-fifth award, 1998–1999: Mark Andrea A. de Cataldo, Stavros Garoufalidis, Sándor Kovács, Yanguang Li.

Twenty-sixth award, 1999–2000: Charles W. Rezk, Bin Wang, Changyou Wang, Tonghai Yang.

Twenty-seventh award, 2000–2001: Siqi Fu, Christopher Herald, Wei-Dong Ruan, Vasily Strela.

Twenty-eighth award, 2001–2002: Ivan Dimitrov, Ravi Vakil, Jiahong Wu, Meijun Zhu.

Twenty-ninth award, 2002–2003: Albert C. Fannjiang, Wee Teck Gan, Ravi Kumar Ramakrishna.

Thirtieth award, 2003–2004: Henry H. Kim, John E. Meier.

Thirty-first award, 2004–2005: Jinho Baik, Nitu Kitchloo.

Thirty-second award, 2005–2006: Yuan-Pin Lee, Mihaela Popa.

Thirty-third award, 2006–2007: Christopher Hacon, Bryna Kra.

Thirty-fourth award, 2007–2008: Martin Kassabov.

Thirty-fifth award, 2008–2009: Christopher Hoffman.

Thirty-sixth award, 2009–2010: Antonio Montalban.

Thirty-seventh award, 2010–2011: Joel Bellaïche.

Thirty-eighth award, 2011–2012: Andrew S. Toms.

Next award (for 2012–2013 academic year): June 2012.

JPBM Communications Award

This award was established by the Joint Policy Board for Mathematics (JPBM) in 1988 to reward and encourage communicators who, on a sustained basis, bring mathematical ideas and information to nonmathematical audiences. Both mathematicians and nonmathematicians are eligible. Currently, the US\$1,000 award is made annually. JPBM is a collaborative effort of the American Mathematical Society, the Mathematical Association of America, the Society for Industrial and Applied Mathematics, and the American Statistical Association.

First award, 1988: To James Gleick for sustained and outstanding contributions in communicating mathematics to the general public.

Second award, 1990: To Hugh Whitmore for contributions to communicating mathematics to the public in his play *Breaking the Code*, which chronicles the brilliant but troubled life of British mathematician Alan Turing.

Third award, 1991: To Ivars Peterson for exceptional skill in communicating mathematics to the general public over the last decade.

Fourth award, 1993: To Joel Schneider for *Square One TV*.

Fifth award, 1994: To Martin Gardner, for authoring numerous books and articles about mathematics, including his long-running *Scientific American* column “Mathematical Games”, and his books *Fads and Fallacies in the Name of Science* and *Mathematical Carnival*.

Sixth award, 1996: To Gina Kolata for consistently giving outstanding coverage to many of the most exciting breakthroughs in mathematics and computer science over the past twenty years.

Seventh award, 1997: To Philip J. Davis for being a prolific communicator of mathematics to the general public.

Eighth award, 1998: To Constance Reid for writing about mathematics with grace, knowledge, skill, and clarity.

Ninth award, 1999: To Ian Stewart for communicating the excitement of science and mathematics to millions of people around the world for more than twenty years. Also a “Special Communications Award” to John Lynch and Simon Singh for their exceptional contributions to public understanding of mathematics through their documen-

tary on Andrew Wiles and the Fermat Conjecture, entitled *Fermat’s Last Theorem* (shown on NOVA as “The Proof”).

Tenth award, 2000: To Sylvia Nasar for *A Beautiful Mind*, her biography of John Forbes Nash Jr.

Eleventh award, 2001: To Keith J. Devlin for his many contributions to public understanding of mathematics through great numbers of radio and television appearances; public talks; books; and articles in magazines, newsletters, newspapers, journals, and online.

Twelfth award, 2002: To Helaman and Claire Ferguson for dazzling the mathematical community and a far wider public with exquisite sculptures embodying mathematical ideas, along with artful and accessible essays and lectures elucidating the mathematical concepts.

Thirteenth award, 2003: To Robert Osserman for being an erudite spokesman for mathematics, communicating its charm and excitement to thousands of people from all walks of life.

2004: No award given.

Fourteenth award, 2005: To Barry Cipra for writing about mathematics of every kind—from the most abstract to the most applied—for nearly twenty years. His lucid explanations of complicated ideas at the frontiers of research have appeared in dozens of articles in newspapers, magazines, and books.

Fifteenth award, 2006: To Roger Penrose for the discovery of Penrose tilings, which have captured the public’s imagination, and for an extraordinary series of books that brought the subject of consciousness to the public in mathematical terms.

Sixteenth award, 2007: To Steven H. Strogatz for making a consistent effort to reach out to a wider audience. He has made significant contact with the wider scientific community. The style of his book, *Sync: The Emerging Science of Spontaneous Order* (2003), and its sales indicate that it is intended for and has reached an even wider audience. The volume of this work is impressive, but the quality and breadth are spectacular as well.

Seventeenth award, 2008: To Carl Bialik for increasing the public’s understanding of mathematical concepts.

Eighteenth award, 2009: To George Csicsery for communicating the beauty and fascination of mathematics and the passion of those who pursue it.

Nineteenth award, 2010: To Marcus du Sautoy for complementing his love of mathematical discovery with a passion for communicating mathematics to a broad public.

Twentieth award, 2011: To Nicolas Falacci and Cheryl Heuton for their positive portrayal of the power and fun of mathematics through their hit TV series, *Numb3rs*.

Next award: January 2012.

AMS Epsilon Awards for Young Scholars Programs

In 1999 the American Mathematical Society started the Epsilon Fund to help support existing summer programs for mathematically talented high school students. The name for the fund was chosen in remembrance of the late Paul Erdős, who was fond of calling children “epsilons”. At its meeting in November 2000, the AMS Board of Trustees approved the Society’s engagement in a sustained effort to raise an endowment for the Epsilon Fund. In addition, a Board-designated fund of US\$500,000 was created as a

start for the endowment. As a start for the program, the AMS used money from its Program Development Fund to award Epsilon grants for activities during summers 2000, 2001, 2002, and 2003. The Epsilon Fund now stands at a level where it can annually provide grants to support ten separate programs that touch approximately 600 talented and highly motivated mathematics students every year. To make a contribution to the Epsilon Fund, see http://www.ams.org/about-us/support-ams/giving_op/epsilon. To apply for an Epsilon grant, see <http://www.ams.org/programs/edu-support/epsilon/emp-epsilon>.

First awards, 2000: To All Girls/All Math (University of Nebraska, Lincoln), Hampshire College Summer Studies in Mathematics, Mathcamp, PROMYS (Boston University), Ross Young Scholars Program (Ohio State University), SWT Honors Summer Math Camp (Southwest Texas State University), and the University of Michigan Math Scholars.

Second awards, 2001: To All Girls/All Math (University of Nebraska), Mathcamp (Port Huron, Michigan), Michigan Math & Science Scholars (University of Michigan, Ann Arbor), Mathematics Scholars Academy (Oklahoma State University), Hampshire College Summer Studies in Mathematics (Hampshire College), PROMYS (Boston University), Young Scholars Program (University of Chicago), and Ross Mathematics Program (The Ohio State University).

Third awards, 2002: To All Girls/All Math (University of Nebraska), Hampshire College Summer Studies in Mathematics (Amherst, Massachusetts), Mathcamp (Mathematics Foundation of America), Michigan Math and Science Scholars (University of Michigan, Ann Arbor), PROMYS (Boston University), Ross Mathematics Program (The Ohio State University), SWT Honors Summer Math Camp (Southwest Texas State University), and University of Chicago Young Scholars Program.

Fourth awards, 2003: To All Girls/All Math (University of Nebraska), Canada/USA Mathcamp (Mathematics Foundation of America), Hampshire College Summer Studies in Mathematics (Amherst, Massachusetts), PROMYS (Boston University), Ross Mathematics Program (The Ohio State University), Stanford University Mathematics Camp (Stanford University), SWT Honors Summer Math Camp (Southwest Texas State University), and University of Chicago Young Scholars Program.

Fifth awards, 2004: To Ross Mathematics Program (The Ohio State University), Texas State University Honors Summer Math Camp, PROMYS (Boston University), Canada/USA Mathcamp (Mathematics Foundation of America), Hampshire College Summer Studies in Mathematics (Amherst, Massachusetts), All Girls/All Math (University of Nebraska), University of Chicago Young Scholars Program, and MathPath (MathPath Foundation).

Sixth awards, 2005: To All Girls/All Math Summer Camp for High School Girls (University of Nebraska, Lincoln), Canada/USA Mathcamp (Reed College, Portland, Oregon), Hampshire College Summer Studies in Mathematics (Hampshire College, Amherst, Massachusetts), MathPath, (Colorado College, Colorado Springs), Michigan Math and Science Scholars Program (University of Michigan, Ann Arbor), PROMYS (Boston University), Ross Mathematics Program (The Ohio State University), Texas State Honors

Summer Math Camp (Texas State University, San Marcos), and University of Chicago Young Scholars Program.

Seventh awards, 2006: To All Girls/All Math Summer Camp for High School Girls (University of Nebraska, Lincoln), Canada/USA Mathcamp (University of Puget Sound, Tacoma, Washington), Hampshire College Summer Studies in Mathematics (Hampshire College, Amherst, Massachusetts), MathPath, (University of California, Santa Cruz), Michigan Math and Science Scholars Program (University of Michigan, Ann Arbor), PROMYS (Boston University), Puerto Rico Opportunities for Talented Students in Mathematics (PROTaSM) (University of Puerto Rico, Mayaguez), Ross Mathematics Program (Ohio State University, Columbus), Summer Explorations and Research Collaborations for High School Girls (SEARCH) (Mount Holyoke College, South Hadley, Massachusetts), Texas State Honors Summer Math Camp (Texas State University, San Marcos), Texas Tech University Summer Mathematics Academy (Texas Tech University, Lubbock), and University of Chicago Young Scholars Program (University of Chicago).

Eighth awards, 2007: Hampshire College Summer Studies in Mathematics, Amherst, Massachusetts; Michigan Math and Science Scholars Summer Program, University of Michigan, Ann Arbor; PROMYS, Boston University; Ross Mathematics Program, Ohio State University, Columbus; Summer Explorations and Research Collaborations for High School Girls (SEARCH), Mount Holyoke College, South Hadley, Massachusetts; and Texas State University Honors Summer Math Camp, Texas State University, San Marcos.

Ninth awards, 2008: All Girls/All Math, University of Nebraska, Lincoln; Hampshire College Summer Studies in Mathematics, Amherst, Massachusetts; MathPath, University of Vermont, Burlington; Michigan Math and Science Scholars Summer Program, University of Michigan, Ann Arbor; PROMYS, Boston University; PROTaSM (Puerto Rico Opportunities for Talented Students in Mathematics), University of Puerto Rico, Mayaguez; Ross Mathematics Program, Ohio State University, Columbus; and Texas State University Honors Summer Math Camp, Texas State University, San Marcos.

Tenth awards, 2009: Achievement in Mathematics Program (AMP), Lamar University; All Girls/All Math, University of Nebraska, Lincoln; Hampshire College Summer Studies in Mathematics (HCSSiM), Hampshire College; MathPath, Colorado College, Colorado Springs; Michigan Math and Science Scholars Summer Program, University of Michigan, Ann Arbor; PROMYS (Program in Mathematics for Young Scientists), Boston University; PROTaSM (Puerto Rico Opportunities for Talented Students in Mathematics), University of Puerto Rico, Mayagüez Campus; Research Science Institute, Massachusetts Institute of Technology; Ross Mathematics Program, Ohio State University, Columbus; Texas State University Honors Summer Math Camp, Texas State University, San Marcos.

Eleventh awards, 2010: All Girls/All Math, University of Nebraska, Lincoln; Lamar Achievement in Mathematics Program (LAMP), Lamar University; MathPath, Macalester College; PROMYS (Program in Mathematics for Young Scientists), Boston University; PROTaSM (Puerto Rico Opportunities for Talented Students in Mathematics),

University of Puerto Rico, Mayagüez Campus; Research Science Institute, Massachusetts Institute of Technology; Stanford University Mathematics Camp (SUMaC), Stanford University; Stony Brook Mathematics Camp, State University of New York at Stony Brook; Texas State Honors Summer Math Camp, Texas State University; Young Scholars Program, University of Chicago.

Twelfth awards, 2011: All Girls/All Math, University of Nebraska, Lincoln; Canada/USA Mathcamp, Reed College, Portland, Oregon; Lamar Achievement in Mathematics Program (LAMP), Lamar University, Beaumont, Texas; MathPath, Colorado College, Colorado Springs; PROMYS, Boston University; PROTaSM (Puerto Rico Opportunities for Talented Students in Mathematics), University of Puerto Rico, Mayagüez Campus; Research Science Institute, Massachusetts Institute of Technology; Ross Mathematics Program, The Ohio State University; Texas State Honors Summer Math Camp, Texas State University, San Marcos; Young Scholars Program, University of Chicago. **Next awards (for summer 2012):** May 2012.

Award for an Exemplary Program or Achievement in a Mathematics Department

This award was established in 2004 to recognize a department which has distinguished itself by undertaking an unusual or particularly effective program of value to the mathematics community, internally or in relation to the rest of society. Examples might include a department that runs a notable minority outreach program, a department that has instituted an unusually effective industrial mathematics internship program, a department that has promoted mathematics so successfully that a large fraction of its university's undergraduate population majors in mathematics, or a department that has made some form of innovation in its research support to faculty and/or graduate students or which has created a special and innovative environment for some aspect of mathematics research. Departments of mathematical sciences in North America that offer at least a bachelor's degree in mathematical sciences are eligible. The prize is awarded annually. For the first three awards (2006-2008), the prize amount was US\$1,200. The prize was endowed by an anonymous donor in 2008, and, starting with the 2009 prize, the amount is US\$5,000.

Nomination process: A letter of nomination may be submitted by one or more individuals. Nomination of the writer's own institution is permitted. The letter should describe the specific program(s) for which the department is being nominated as well as the achievements which make the program(s) an outstanding success and may include any ancillary documents which support the success of the program(s). The letter should not exceed two pages, with supporting documentation not to exceed an additional three pages. Nominations should be submitted to the Office of the Secretary. Nominations received by September 15 will be considered for the award presented the following January.

First award, 2006: Harvey Mudd College.

Second award, 2007: University of California, Los Angeles (UCLA).

Third award, 2008: University of Iowa. See also <http://www.ams.org/notices/200805/tx080500599p.pdf>.

Fourth award, 2009: University of Nebraska-Lincoln. See also <http://www.ams.org/notices/200905/rtx090500622p.pdf>.

Fifth award, 2010: North Carolina State University. See also <http://www.ams.org/notices/201005/rtx100500653p.pdf>.

Sixth award, 2011: University of Arizona. See also <http://www.ams.org/notices/201105/rtx110500718p.pdf>.

Next award: Spring 2012.

Mathematical Art Exhibition Award

This award "for aesthetically pleasing works that combine mathematics and art" was established in 2008 through an endowment provided by an anonymous donor who wishes to acknowledge those whose works demonstrate the beauty and elegance of mathematics expressed in a visual art form. The exhibition takes place every January at the Joint Mathematics Meetings. First (US\$500), second (US\$300), and third place (US\$200) awards are made annually. For further information about this award, email the AMS Public Awareness Office.

First Awards, 2009: First place award to Goran Konjevod, for his origami work, "Wave (32), 2006"; second place award to Carlo Séquin, for his sculpture, "Figure-8 Knot, 2007"; and third place award to Robert Fathauer, for "Twice Iterated Knot No. 1, 2008".

Second Awards, 2010: First place award to Robert Bosch for "Embrace"; second place award to Harry Benke for "The Vase"; and third place award to Richard Werner for "Meditations on $f(x,y) = x^2/2 + xy/2 - y^4/8$ ".

Third Awards, 2011: First place award to Margaret Kepner for "Magic Square 25 Study"; second place award to Carlo H. Séquin for "Torus Knot (5,3)"; and third place award to Anne Burns for "Circles on Orthogonal Circles".

Next Award: January 2012.

The Award for Mathematics Programs that Make a Difference

This award was established in 2005 in response to a recommendation from the AMS's Committee on the Profession that the AMS compile and publish a series of profiles of programs that:

- 1) aim to bring more persons from underrepresented minority backgrounds into some portion of the pipeline beginning at the undergraduate level and leading to advanced degrees in mathematics and professional success, or retain them once in the pipeline;
- 2) have achieved documentable success in doing so; and are replicable models.

Preference will be given to programs with significant participation by underrepresented minorities. Two programs are highlighted annually.

First award, 2006: Summer Institute in Mathematics for Undergraduates (SIMU), Universidad de Puerto Rico, Humacao; and Graduate Program, Department of Mathematics, University of Iowa.

Second award, 2007: Enhancing Diversity in Graduate Education (EDGE), Bryn Mawr College and Spelman College; and Mathematical Theoretical Biology Institute (MTBI), Arizona State University.

Third award, 2008: Summer Undergraduate Mathematical Science Research Institute (SUMSRI), Miami University (Ohio) and Mathematics Summer Program in Research and Learning (Math SPIRAL), University of Maryland, College Park. See citations and descriptions of programs. See *Notices of the AMS* article.

Fourth award, 2009: Department of Mathematics at the University of Mississippi and the Department of Statistics at North Carolina State University. See citations and description of programs.

Fifth award, 2010: Department of Computational and Applied Mathematics (CAAM) at Rice University and the Summer Program in Quantitative Sciences at the Harvard School of Public Health. See citations and descriptions of programs. See *Notices of the AMS* article, May 2010, p. 650.

Sixth award, 2011: Department of Mathematics at North Carolina State University and the Center for Women in Mathematics and the Center's Post-baccalaureate Program at Smith College. See citations and descriptions of programs. See *Notices of the AMS* article, May 2011, p. 713.

Next award: Spring 2012. For information about the nomination process, please see www.ams.org/programs/diversity/emp-makeadiff or contact Dr. Ellen Maycock, AMS Executive Director for Meetings & Professional Services, at ejm@ams.org or phone (800-321-4267).

The Karl Menger Memorial Awards

Family members of the late Karl Menger were the major contributors to a fund established at Duke University. The majority of the income from this fund is to be used by the Society for annual awards at the International Science and Engineering Fair.

First award, 1990: Daniel K. Dugger, Joshua Erlich, Joshua B. Fischman, Min-Horng Chen, Matthew Baker, Michael L. Harrison, Virginia A. DiDomizio.

Second award, 1991: Monwhea Jeng, Hans Christian Gromoll, Jesse L. Tseng, Andrew Olstrom Dittmer, Matthew A. Neimark, Rageshree Ramachandran, Jeb E. Willenbring.

Third award, 1992: Mahesh Kalyana Mahanthappa, Harrison Kwei Tsai, Andrew Olstrom Dittmer, Jonobie Dale Baker, Joshua Brody, Yen-Hsiang Li, Robert Jordon Pollack.

Fourth award, 1993: Mahesh Kalyana Mahanthappa, Steve Shaw-Tang Chien, Andrew Olstrom Dittmer, Moon Duchin, Robert Michael Kirby II, Sarah Ann Lord, Anna Ruth Terry.

Fifth award, 1994: Davesch Maulik, Eric Matthew Dennis, Sarah Ann Lord, Timothy Stephen Eller, Rahul Manu Kohli, Fam-ye Lin, Benedek Valko, Mary Kathleen Clavenna, Vinay Kumak Goyal-Singhal, Jan Kristian Haugland, Wes Andres Watters, Ian George Zacharia.

Sixth award, 1995: Davesch Maulik, Benjamin Michael Goetz, Jacob Lurie, Daniel Kalman Biss, Samit Dasgupta, Yueh-Hsing Lin, Claus Mazanti Sorensen, Theodore Haw-Yun Hwa, Samuel Jacob Klein Jr., Katherine Anne Paur, Bridget Helen Penny, Scott Nicholas Sanders.

Seventh award, 1996: Davesch Maulik, Nicholas Karl Eriksson, Logan Joseph Kleinwaks, Eric Jon Landquist, Vanesa Miranda-Diaz, Jason Charles Stone, Lauren Kiyomi Williams, Ryan Thomas Hebert, Kendrick Norris Kay, Scott

Nicholas Sanders, Claus Mazanti Sorensen, Yvette Karen Wood.

Eighth award, 1997: Davesch Maulik, Nicholas Eriksson, Jeremy Rahe, Jennifer Pelka, Yen-Jen Chen, Sylvain Halle, Melanie Schechter, Matthew Seligman, Thomas Mack, Susannah Rutherglen, Jy-Ying Janet Chen, Chun-Hsiang Fu, Daniel Ying-Jeh Little.

Ninth award, 1998: Jonathan Adam Kelner, Michael Yanchee Lee, Daniel Yamins, Alexey Evgenjevitch Eroshin, Sarah Flannery, Jeremy Ryan Rahe, Jennifer Rose Walk, Richard Lee Barnes, Matthew Christopher Ong, David Carl Rennard, Anna Welling Salamon, Hui Yu.

Tenth award, 1999: Amit Kumar Sabharwal, Andrew Chi, Jennifer Lynn Pelka, Ching-Tang Chen, C. Andrew McManus, Jennifer Rose Walk, Heidi Lee Williams, Jack Nelson Bewley, Adam Douglas Bryant, Jason A. Loy, John William Pope, Bryce Leitner Roberts.

Eleventh award, 2000: Jayce R. Getz, Adel Ahmed Chaudhuri, Zachary Howard Cohn, Ching Tang Chen, Elaine Pei-San Gee, Siarhei Markowski, Ilya Malakhovskiy, Vassily Vladimirovich Starodubtsev, Daniel Richard Green, Daniyar Z. Kamenov, Craig Allan Schroeder.

Twelfth award, 2001: Abdur Rasheed Sabar, Yuri Georgievich Kudryashov, Serge A. Tishchenko, Jason Wah Lone Chiu, Craig Allen Schroeder, Hasuk Francis Song, Daniel Wicks, Jennifer Shyamala Sayaka Balakrishnan, Christopher Ryan Bruner, Lindsey Jo Cable, Michael Harry Kaleta, Matthew Howard Stemm, Heon Joon Choe, Jesse Scott Trana.

Thirteenth awards, 2002: Jacob Licht, Matthew Aaron Tesch, Andrew Michael Korth, Chun-Chen Yeh, Liang Chen, Ashum Karahanovich Kaibhanov, Amanda Bryce Shaw, Mary Augusta Brazelton, Nikita Rozenblyum, Jonathan Charles Zweig, Boris O. Figovsky, Ronli Phyllis Diakow.

Fourteenth awards, 2003: Andrew Michael Leifer, Raymond Chun-Hung To, David Guillaume Pothier, Alexandr V. Medvedev, Ethan James Street, Hyeyoun Chung, Anatoly Preygel, Lester Wayne Mackey, Evgeniy E. Loharu, Sergey O. Ivanov, Robert Shea Bracco, Brian Todd Rice, Alexey V. Baran, Evgeny A. Amosov, Artem G. Viktorov, Jeremy Takashi Warshauer, Alan Craig Taylor, Hannah Chung.

Fifteenth awards, 2004: Brett Alexander Harrison, Ilya Gurwich, Brian Todd Rice, Sam Jay Lewallen, Brianna Rachel Satinoff, Huan-Chun Yeh, Ning Zhang, Carlos Eduardo Arreche-Aguayo, Tair Assangali, Nurlan Bakitzhanov, Allison Paige Berke, Ginger Beardslee Howell, Nimish P. Ramanlal.

Sixteenth awards, 2005: Scott Duke Kominers, Samuel Mohun Bhagwat, Matthew Ryan Tierney, Elad Oster, John Michael Sillcox, Carlos Manuel Fonseca, Manuel Luis Rivera, Niket Ranjan Pandey, Robert Thomas Cordwell, Paul Francis Jacobs, Valentina N. Dobrovolskaya, Vladimir N. Trubnikov, Oleg V. Mikhaylovsky, Mikhail A. Ptichkin.

Seventeenth awards, 2006: Michael Anthony Viscardi, Daniel Abraham Litt, Brett Alexander Harrison, Anarghya A. Vardhana, Gleb A. Pogudin, Nicholas Michael Wage, Sohan Venkat, Meelap Vijay Shah, Manuel Luis Rivera-Morales, Bakhytzhon Baizhanov.

Eighteenth awards, 2007: Dmitry Vaintrob, Cheng-Tao Chung, Daniel K. Bezdek, Christopher Lopez, Hagai Helman, Albert C. Liu, Nikita M. Savushkin, Lado Meskhishvili, Almas U. Abdulla, Avi W. Levy, Ardit Kroni, Alexey S. Telishev.

Nineteenth awards, 2008: Alexander Lee Churchill, Shrivani Mikkilineni, David Alex Rosengarten, Eric Kerner Larson, Alex Hao Chen, Paul Myer Kominers, Matthew Michael Wage, Swara Satya Kopparty, Sana Raoof, Nurlan Taiganov, Artem A. Timoshenko, Sarah Lee Sellers.

Twentieth awards, 2009: Joshua Vekhter, Andrei Triffo, Yale Wang Fan, Almas Abdulla, Sarah Lee Sellers, Sohini Sengupta, Sameer Kirtikumar Deshpande, Jeffrey Chan, Alicia Zhang, Martin Augustine Camacho, Michael Christopher Yurko, Wenhan Cui, Matthew Henry Stoffregen, Nilesh Tripuraneni.

Twenty-first awards, 2010: Yale Wang Fan, Joshua W. Pfeffer, Anirudha Balasubramanian, Kate A. Geschwind, Almas Abdulla, Jacob B. Hurwitz, Evgenia I. Alekseeva, Akhil Mathew, Jonathan F. Li.

Twenty-second awards, 2011: Manosij G. Dastidar, John Tilla Parish IV, Tzu-Hsuan Su, Vasily Sergeevich Bolbachan, Benjamin Jerome Kraft, Anirudh Prabhu, Ryan Thomas Baker, Rebecca Chen, Kate Alexandra Geschwind, Georgiy Vladimirovich Kolyshev, Aaron Lawrence Zweig.

Next awards: June 2012.

Public Policy Award

This award was established in 2007 by the American Mathematical Society (AMS) to recognize a public figure for sustained and exceptional contributions to public policies that foster support for research, education, and innovation. The award will be given annually, starting in 2009.

The Award for Distinguished Public Service

This award was established by the AMS Council in response to a recommendation from their Committee on Science Policy. The US\$4,000 award is presented every two years to a research mathematician who has made a distinguished contribution to the mathematics profession during the preceding five years.

First award, 1990: To Kenneth M. Hoffman for his outstanding leadership in establishing channels of communication between the mathematical community and makers of public policy as well as the general public.

Second award, 1992: To Harvey B. Keynes for his multifaceted efforts to revitalize mathematics education, especially for young people.

Third award, 1993: To Isadore M. Singer in recognition of his outstanding contributions to his profession, to science more broadly, and to the public good by bringing the best of mathematics and his own insights to bear on the activities of the National Academy of Sciences; on committees of the National Research Council, including the two so-called David Committees on the health of the mathematical sciences, and the Committee on Science, Engineering, and Public Policy; on the President's Science Advisory Council; on decisions of Congress, through testimony concerning the support of mathematics and mathematical research; and on a host of critical situations over many years in which his wisdom and intervention helped gain a hearing for the problems of his community and the contributions it makes to the nation.

Fourth award, 1995: To Donald J. Lewis for his many contributions to mathematical education, mathematics policy, and mathematical research and administration during a career that has spanned several decades.

Fifth award, 1997: No award made.

Sixth award, 1998: To Kenneth C. Millett for his work devoted to underrepresented minority students in the mathematical sciences. Professor Millett founded the University of California, Santa Barbara, Achievement Program and directed the mathematics component of the Summer Academic Research Internship and the Summer Institute in Mathematics and Science at UCSB.

Seventh award, 2000: To Paul J. Sally Jr. for the quality of his research, for his service to the [American Mathematical] Society as trustee, but more importantly for his many efforts in improvement of mathematics education for the nation's youth and especially for members of minority and underrepresented groups and for his longitudinal mentoring of students, in particular the mathematics majors at Chicago.

Eighth award, 2002: To Margaret H. Wright for notable contributions to the federal government and the scientific community and for encouraging women and minority students.

Ninth award, 2004: To Richard A. Tapia for inspiring and teaching thousands of people (from elementary school students to senior citizens) to study and appreciate the mathematical sciences.

Tenth award, 2006: To Roger Howe for his multifaceted contributions to mathematics and to mathematics education.

Eleventh award, 2008: To Herbert Clemens for his superb research in complex algebraic geometry, his continuing efforts in education, and his seminal role in the founding and continuation of the Park City/IAS Mathematics Institute.

Twelfth award, 2010: To Carlos Castillo-Chavez for having a major impact with his efforts and activities in improving the representation in the broad mathematical sciences of the nation's traditionally underrepresented and economically disadvantaged students.

Next award: January 2012.

Citation for Public Service

To provide encouragement and recognition for contributions to public service activities in support of mathematics, the Council of the Society established the Citation for Public Service. The award is no longer being made.

First award, 1991: Andre Z. Manitius for the contributions he made to the mathematical community while employed in the Division of Mathematical Sciences at the National Science Foundation.

Second award, 1992: Marcia P. Sward for her contributions toward establishing and directing the Mathematical Sciences Education Board from its inception in the fall of 1985 until August 1989.

Third award, 1998: Liang-Shin Hahn and Arnold E. Ross. Liang-Shin Hahn 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. Arnold E. Ross for inspiring generations of young people through the summer mathematics programs he created and has continued to run for nearly 40 years.

AAS-AMS-APS Public Service Award

This award was established in 1999 by the American Mathematical Society (AMS), the American Astronomical Society (AAS), and the American Physical Society (APS) to recognize a public figure for his or her sustained and exceptional contributions to public policies that foster support for research, education, and industrial innovation in the physical sciences and mathematics. As of January 2007, the AMS no longer participates in this award, but instead offers the AMS Public Policy Award.

First award, 2000: To William Frist, Joseph L. Lieberman, and Harold Varmus.

Second award, 2001: To Vernon Ehlers and Neal Lane.

Third award, 2002: To James T. Walsh and Barbara Mikulski.

Fourth award, 2003: To Sherwood L. Boehlert, Alan B. Mollohan, and Pete V. Domenici.

2004: No award made.

2005: No award made.

2006: No award made.

Waldemar J. Trjitzinsky Memorial Awards

The Society received a bequest from the estate of Waldemar J., Barbara G., and Juliet Trjitzinsky, the income from which is used to assist students who have declared a major in mathematics at a college or university that is an institutional member of the AMS. These funds help support students who lack adequate financial resources and who may be in danger of not completing the degree program in mathematics for financial reasons. Each year the Society selects a number of geographically distributed schools who in turn make one-time awards to beginning mathematical students to assist them in pursuit of careers in mathematics. The amount of each scholarship is currently US\$3,000, and the number of scholarships awarded each year varies.

First award, 1991: Duke University (Robert Lane Bassett, Linie Yunwen Chang, Kara Lee Lavender), University of Scranton (Thomas A. Shimkus), Montana State University (Melissa Cockerill, Deborah Fagan, Sherry Heis), Howard Payne University (Pamela Jo Chaney).

Second award, 1992: Allegheny College (Julianne Stile), Memphis State University (Cassandra Burns), University of California at Irvine (James Anthony Nunez), University of Puerto Rico (Juan Ramon Romero-Oliveras).

Third award, 1993: University of California at Los Angeles (Michelle L. Lanir), State University of New York at Geneseo (Jodi C. Wright), Eastern New Mexico University (Rebecca K. Moore), University of Virginia (Mikhail Krichman).

Fourth award, 1994: Boise State University (William Hudson and Margaret Norris), Illinois Institute of Technology (Guanghong Xu), Temple University (Coleen Clemetson), University of Maryland at College Park (Mikhail G. Konikov).

Fifth award, 1995: University of Arizona (Mark Robert Moseley), Arkansas State University (Donna J. Shepherd), Mississippi State University (Clayton T. Hester), Montclair State College (James R. Jarrell III).

Sixth award, 1996: Murray State University (Christie M. Safin), Stanford University (Andreea Nicoara), Union

College (Allison Pacelli), Western Illinois University (Lorna Renee Sanders).

Seventh award, 1997: Georgetown University (Martin Akguc), Loyola Marymount University (Laura Steiner, Claudia Catalan, Elizabeth Madrigal), New York University (Emily Press), Southern Illinois University at Carbondale (Laura Wasser).

Eighth award, 1998: Stevens Institute of Technology (Kelly Cornish), Georgia State University (Kevin A. Wilson), Iowa State University (Matthew A. Halverson), University of Nevada at Las Vegas (Dumitru C. Tutuianu).

Ninth award, 1999: City University of New York (Hulya Cebecioglu), Reed College (Jeremy Copeland), University of Texas at San Antonio (Danielle Lyles), Western Kentucky University (Marcia Jean Mercer).

Tenth award, 2000: California State University at Long Beach (Yen Hai Le), Case Western Reserve University (Alexander Statnikov), Clarkson University (Matthew Bartholomew), University of Houston (Alyssa Burns).

Eleventh award, 2001: Columbia University (Alexander Ivanov Sotirov), Florida Atlantic University (Gregory Nevil Leuchiali Maxwell), Henderson State University (Ann Smith), John Carroll University (Andrea C. Forney), Seattle University (Sinead Pollom), University of Texas at Austin (Virginia Roberts), University of Utah (Paul T. Watkins), Worcester Polytechnic Institute (Yakov Kronrod and Megan Lally).

Twelfth award, 2002: Stephen F. Austin State University (Marcus A. Arreguin), Bates College (Challis Kinnucan), Brigham Young University (Julie Brinton), The College of William and Mary (Suzanne L. Robertson), Furman University (Kevin L. Smith), University of Hartford (Aimee J. Groudas), University of Southern California (Peter Kirkpatrick), University of Texas at Dallas (Kevin R. Pond).

Thirteenth award, 2003: Bryn Mawr College (Thida S. Aye), Minnesota State University at Mankato (Andrew Richard Tackmann), University of Maryland at Baltimore County (Maria Christin Llewellyn), Colorado College (Rahbar Virk), California State University, Hayward (Sarah Deiwert and Angela Martinho), Lehigh University (Timothy P. Lewis), State University of New York at Potsdam (Bishal Thapa).

Fourteenth award, 2004: Beloit College (Laura Wolfram), Lafayette College (Prince Chidyagwai, Ekaterina Jager, Blerta Shtylla), Michigan State University (Antonio Veloz), University of Pennsylvania (Daniel Pomerleano), Portland State University (Kathryn Carr and Cass Bath), Santa Clara University (Olivia Gistand).

Fifteenth award, 2005: Abilene Christian University (Carissa Joy Strawn), Amherst College (Jennifer A. Roberge), Arizona State University (Yukiko Kozakai), University of Missouri, Kansas City (Melanie Marie Meyer), University of North Carolina at Greensboro (Christian Sykes), University of Rhode Island (Christopher Piecuch), Ohio State University (Sophia Leibman and Gabor Revesz).

Sixteenth award, 2006: California State University, San Bernardino (Lorena Pulido and Jennifer Renee Winter), University of Missouri, Rolla (Sean Michael Eagan), University of Central Missouri (Khadijah Shadeed), Boston College (Elizabeth Rini), Eckerd College (Elizabeth R. Morra), University of California, San Diego (John Roosevelt Quinn), Swarthmore College (Adam Joseph Lizzi).



Positions:
Distinguished Professorship; Professorship; Associate Professorship; Assistant Professorship (tenure-track).
 Applications in all areas of mathematics are invited for the above positions. The current annual salary range is between 0.15-1.0 million RMB. Salary will be determined by applicants' qualification. Strong promise/track record in research and teaching are required. Completed applications must be electronically submitted, and must contain curriculum vitae, research statement, teaching statement, selected reprints and/or preprints, three reference letters on academic research and one reference letter on teaching, sent electronically to msc-recruitment@math.tsinghua.edu.cn
 Applications are welcome at any time. The review process starts in December 2010, and closes by April 30, 2012. Applicants are encouraged to submit their applications before November 30th.

Seventeenth award, 2007: Susan Christine Massey (University of Washington), Amy Streifel (Lewis and Clark College), Rosemary Holguin (SUNY at New Paltz), Emily Jean Ognacevic (Saint Louis University), Betsy Kay Barr (University of Tennessee Knoxville), Kayla Rose Boyle (University of Northern Iowa).

Eighteenth award, 2008: Aaron Peterson (Luther College), Faith L. Buell (Wright State University), Phillip David Lorren (Georgia Southern University), Daksha Shakya (Ithaca College), Joseph Zancocchio (College of Staten Island (CUNY)), Amanda J. Mueller (University of Wisconsin Milwaukee), Hans Parshall (Humboldt State University).

Nineteenth award, 2009: Alison Lynette Ashe (University of Vermont); Kendall Olivia Brown (Truman State University); Zehui Chen (Smith College); Jonathan Jordan Edwards (Kenyon College); David Hassan (University of California, Santa Barbara); Ana-Cristina Cerda Jimenez (California State University, Fresno); Mantatisi S. Walker (Jackson State University).

Twentieth award, 2010: Vianey Carolina Leos Barajas (California State University, Bakersfield); Langston W. Joiner (University of Cincinnati); Michelle Chu (Emory University); Perla Salazar (Kansas State University); Dana C. Haymon (University of Oklahoma); James S. Wratten Jr. (Rochester Institute of Technology); Bebi Z. G. Rajendra (York College).

Twenty-first award, 2011: David Samuel Allen (Colorado State University); Xavier Eduardo Garcia (University of Minnesota Twin Cities); Jeffrey Hart (California State University San Marcos); Amina S. Mendez (Ohio Wesleyan University); Amanda Nicole Rodriguez (Texas A&M University Corpus Christi); Tyler Wippel (Central Michigan University); Maocai Wu (Brooklyn College-CUNY).

Next awards: Fall 2012.

AMERICAN MATHEMATICAL SOCIETY

New AMS-Distributed Publications



Nonlinear Potential Theory on Metric Spaces
 Anders Björn and Jana Björn

A publication of the European Mathematical Society (EMS). Distributed within the Americas by the American Mathematical Society.
EMS Tracts in Mathematics, Volume 17; 2011; 415 pages; Hardcover; ISBN: 978-3-03719-099-9; List US\$84; AMS members US\$67.20; Order code EMSTM/17



Invariant Manifolds and Dispersive Hamiltonian Evolution Equations
 Kenji Nakanishi and Wilhelm Schlag

A publication of the European Mathematical Society (EMS). Distributed within the Americas by the American Mathematical Society.
Zurich Lectures in Advanced Mathematics, Volume 14; 2011; 258 pages; Softcover; ISBN: 978-3-03719-095-1; List US\$52; AMS members US\$41.60; Order code EMSZLEC/14



Exploring New Structures and Natural Constructions in Mathematical Physics
 Koji Hasegawa, Takahiro Hayashi, Shinobu Hosono, and Yasuhiko Yamada

Published for the Mathematical Society of Japan by Kinokuniya, Tokyo, and distributed worldwide, except in Japan, by the AMS.
Advanced Studies in Pure Mathematics, Volume 61; 2011; 441 pages; Hardcover; ISBN: 978-4-931469-64-8; List US\$78; AMS members US\$62.40; Order code ASPM/61

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