HYMAN BASS

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Birth: October 5, 1932 in Houston, Texas, U.S.A. Citizenship: U.S.A.

EDUCATION

B.A.	(1955)	Princeton University:	Mathematics
M.S.	(1956)	University of Chicago:	Mathematics
Ph.D.	(1959)	University of Chicago:	Mathematics: Advisor: I. Kaplansky

PROFESSION

Teaching and research in mathematics and mathematics education. Chief fields of research interest:
In mathematics: algebraic K-theory; number theory; group theory (geometric methods); algebraic geometry.
In mathematics education: Subject matter knowledge entailed in teaching; practice-based research on teaching and learning; teacher education; reasoning and proof in school mathematics; analysis of curriculum materials; mathematical practices, and their teaching.

CAREER:

University of Michigan

Samuel Eilenberg Distinguished University Professor 2008-present; Roger Lyndon Collegiate Professor of Mathematics and Mathematics Education, 1999- 2008

Columbia University Mathematics Department.

Adrain Professor: 1992-99; Professor: 1965-92; Chair: 1975-79; Associate Professor and Chair at Barnard: 1964-65; Assistant Professor: 1963-64; Ritt Instructor: 1959-62.

FELLOWSHIPS

Guggenheim Fellow, Inst. des Hautes Études Scientifiques, Paris - 1968-69
Sloan Fellow - 1964-66
NSF Postdoctoral Fellow, College de France - 1962-63
NSF graduate fellow, University of Chicago - 1955-59

RECENT GRANTS

CURRENT & RECENT PAST

Contextual Research and Large Empirical Research — Developing the theory of mathematical knowledge for teaching by investigating its nature, measurement, and growth, (co-PI) National Science Foundation, $2,720,029, 9/1/2010 – 8/31/2015

Teaching Mathematical Knowledge for Teaching: Adapting Locally Developed Materials and Approaches for Use in Diverse Institutions and Settings. National Science Foundation , Course, Curriculum and Laboratory Improvement, Phase 2. $499,822, 2009-20011, (Co-PI with Mark Thames and Laurie Sleep)

Measuring Knowledge for Teacher Effectiveness, Gates Foundation (project member), $562,795, 10/1/2009 – 12/31/2011
Developing Teaching Expertise @ Mathematics, National Science Foundation, (project member) $1,354,273, 9/1/2011 – 8/31/2013
Developing Teaching Expertise @ Mathematics, Cisco Learning Institute, (co-PI) $2,146,017, 9/1/2008 – 8/31/2010

OTHER ACADEMIC APPOINTMENTS

Hebrew University of Jerusalem, Institute for Advanced Study, summer, 2000
University of Michigan, visiting professor, 1997-1998.
Tata Institute of Fundamental Research in Bombay, India, visiting professor; winter 1965-66, summer 1969, summer 1976, fall 1979, fall 1990, summer 1995.
Hong Kong University, External Examiner, Dept. of Mathematics, 1994-97
University of Southern California, Visiting Distinguished Lecturer - Jan., 1986; Jan., 1987; May, 1989; Jan. and May, 1990, Jan., 1991, Jan., 1992, Jan., 1993, Jan., 1994.
Mathematical Sciences Research Institute, Berkeley - Sept., 1989
Universita di Roma - May, 1987
Ecole Normale Superieure, Spring 1980.
Mittag-Leffler Institute, Stockholm - April, 1980
Institute for Advanced Study in Princeton, visiting member - Summer 1964, 1965-66, Summer 1975, Summer 1979.
Univ. of California, Berkeley - Winter 1977-78
Univ. of Utah, Salt Lake City - Fall 1977
Instituto de Matematica Pura e Applicada, Rio de Janeiro, visiting professor; Summer 1977.
Cambridge University in England, Trinity College, visiting professor - Lent term, 1973.
Universite de Paris, brief visiting appointments - Fall 1968, Spring 1973.
Institut des Hautes Études Scientifiques, Paris, visiting member - 1968-69.
Universidad Nacional Autonoma de Mexico, visiting professor - Summer 1965.

INVITED PLENARY LECTURES, AND LECTURESHIPS

Invited speaker, MAA New Jersey Section, Nov., 2015
Invited lead contributor, Project IMPULS seminar, "Essential Mathematics for the next generation: What to teach and how should we teach it." Tokyo, Oct, 2015
Invited Plenary, ICMI Study 23, Teaching and Learning Whole Numbers," Macau, China
Closing plenary, Convesations Among Colleagues,, Wayne State U, March, 2015
Plenary Lecture, Ramanujan Mathematical Society meeting, Pune, India, May, 2014
Interdisciplinary Colloquium Speaker, Kaput Center, U. Mass. Dartmouth, April, 2013
Spencer Lecture, U Missouri @ St Louis, April, 2008
Centennial of the International Commission on Mathematical Instruction, Rome, 2006 Opening Plenary
International Congress on Mathematical Education 10, Copenhagen, July 2004, Opening Plenary Address.
American Mathematical Society, Retiring Presidential Address, Phoenix, January, 2004
Kieval Lecturer, Humboldt State University, Arcata, CA, February, 2003
Erdos Lecture, University of Florida, February, 2001.
Myhill Lecturer, SUNY Buffalo, April, 2000.
Kolchin Memorial Lecture, Columbia University, February, 2000.
Knight Lecturer, University of Manitoba, June, 1997.
McLean Lecturer, Collegiate School, May, 1997
AMS Arnold Ross Lecturer, U. Maryland, April, 1996.
Western Canada Algebra Conference, Principal Lecturer, Feb., 1993.
Phi Beta Kappa Visiting Scholar, 1991-92
Kansas State University, Distinguished Lecturer - 198?
University of Indiana, Distinguished Lecturer - 1982.
University of Oklahoma, Karcher Lecturer - August, 1979.
University of Tennessee, Barrett Memorial Lecturer - March, 1978.

American Mathematical Society - invited addresses: Cambridge, MA, fall, 1969; Pretoria,SA, summer, 1997; Colloquium Lecturer, Atlanta, January, 1978.
Univ. of California at Santa Barbara, Visiting Lecturer - January, 1977.
Haverford College, Phillips Lecturer - fall 1970, fall 1975.
International Congresses of Mathematicians, invited half-hour addresses - Moscow, 1966; Vancouver, 1974.
CBMS Regional conference on Algebraic K-theory, Colorado State Univ., principal lecturer – August, 1973.
British Mathematical Colloquium, invited address - spring, 1973.
Battelle Conference on Algebraic K-theory, Seattle, Washington, organizer, lecturer, and proceedings editor - August, 1972.
Advanced Institute in Algebra, Univ. of Madurai, India, principal lecturer - summer 1971.
Mathematical Association of America, Hedrick Lecturer – summer, 1968
NSF Institute on Algebraic Groups, Bowdoin College, principal lecturer - summer 1968.
NSF Algebra Institute, Univ. of Oregon, principal lecturer - summer 1962.

RECENT INVITED PRESENTATIONS, PROFESSIONAL MEETINGS, WORKSHOPS, & REVIEWS

2015

(Apr) National Academy of Sciences, DC, annual meeting.
(Apr) Amer. Educ. Research Association, annual meeting, Chicago
(Apr) MSRI & IAS sponsored math festival in DC
(Apr) NCTM Research Conf., Boston, MA, Group presentation on the study of beginning mathematics teaching
(Mar) Mathematical Knowledge for educators workshop, in honor of Roger Howe, Texas A&M U. Invited talk: "Is the real number line something to be built or occupied?"
(Mar) Conversations among colleagues annual meeting, Wayne State U, closing plenary talk on, "Seeing elementary mathematics instruction with a mathematical eye"
(Mar) MSRI, Current issues in mathematics education workshop
(Mar) MSRI, Academic sponsors meeting
(Feb) Association of Mathematics Teacher Educators, annual meeting, Orlando, FL, talk on "Connected mathematical thinking."
(Jan) Center for the study of curriculum (MSU), San Diego, CA, Panel on time allotment for the Common Core
(Jan) JMM, San Antonio, TX, Creating coherence in the K-12 curriculum, invited talk, "Mathematical connections: curricular and cognitive."

2014

(Dec) Advisory Board of SimStudent, Carnegie Mellon U., Pittsburgh
(Nov) National Medal of Science Awards, DC
(Nov) National Academy of Education, annual meeting, NAS, DC
(Nov) Detroit area council of teachers of mathematics, PD session with Steve Debacker and Nina White
(Oct) NAS Regional meeting in Ann Arbor
(Oct) CTB Smarter Balance, Level setting panel, Dallas, TX
(Oct) American Academy of Arts & Sciences, Cambridge, MA
(Oct) CBMS Conf. on The first two years of college math, Reston, VA, invited talk.
(Aug) National Medal of Science Panel Meeting, NSF, Arlington, VA
(Jul) EML, U. Michigan, PD Workshop on the teaching of mathematical practices.
(Jun) India: Invited talks (both math and math educ.) at TIFR, Mumbai; IISER Pune; U. Punjab, Chandigarh; IISER Mohali; and IIT Bombay
(May) Spencer Foundation, Chicago, Meeting on Instruction as Participation in the Formation of Knowledge, framing presentation.
(Apr) National Academy of Sciences meeting, Wash. D.C.
(Apr) American Univ. of Beirut, Algebra Conference, invited speaker
(Apr) NCTM, New Orleans, presenter at Research Session, and invited speaker at main conference.

(Apr) AERA, Philadelphia, presenter
(Mar) MSRI, Berkeley, CA, Current Issues in Math Educ. Workshop, speaker
(Feb) Rutgers U., New Brunswick, NJ, Conference speaker, and Adv Bd of Validation of Proof Comprehension project
(Feb) Association of Mathematics Teacher Educators, Irvine, CA
(Jan) Banff International Research Station, Workshop on Mathematicians in School Mathematics Education, opening speaker
(Jan) Joint Mathematics Meetings, Baltimore
(Jan) Israel, Dec 30 – Jan 12, Hebrew U., Jerusalem (lecture), and Weitzmann Inst., Rehovot, Workshop on use of video in professional development.

HONORS AND PRIZES

Elected (inaugural) fellow of the American Mathematical Society, 2012
Mary P. Dolciani Award for distinguished contributions to the mathematics education of K-16 students, Mathematical Association of America, 2013
Elected National Academy of Education, 2009
The U. S. National Medal of Science, July, 2007. Member of the nominating committee, 2009-2015
The Yueh-Gin Gung and Dr. Charles Y. Hu Award for Distinguished Service to Mathematics, Mathematical Association of America, 2006
Elected Associate Fellow of the Third World Academy of Sciences (Trieste, Italy), 2002.
Princeton Class of 1955 Award, 1997.
Phi Beta Kappa National Visiting Scholar, 1991-92.
Elected member of the National Academy of Sciences, 1982.
Elected member of the American Academy of Arts and Sciences, 1980.
Elected Fellow of the American Association for the Advancement of Science, 1986.
Cole Prize in Algebra, American Mathematical Society, 1975.
Van Amringe Prize, Columbia University, for the book, "Algebraic K-theory," 1969.

EDITORIAL ACTIVITIES

Birkhauser/*Springer*, *Progress in Mathematics:* 1995-present
Scientific Committee for the Ferran Sunyer i Balaguer Prize
Bulletin, American Mathematical Society: 1969-77, 1982-1986
Journal of Pure and Applied Algebra: 1970-86
Communications in Algebra, 1974-1985
Annals of Mathematics, 1978-1984
American Journal of Mathematics: 1971-77
Academic Press Series in Pure and Applied Mathematics: 1974-94
North-Holland Mathematical Library, North-Holland Publishing Co.: 1971- 85
Journal of the Indian Mathematical Society: 1968-70
Cambridge Tracts in Pure and Applied Mathematics: 1968- 84
Britannica Yearbook on Science: occasional contributor

SCIENTIFIC SOCIETIES AND COMMITTEES

American Mathematical Society:
President, 2001-2003
President-elect, 2000-2001
Board of Trustees, 1995-98
Committee on Education, chair, 1995- 2000
Federal Policy Agenda Comm. 1992-95
Science Policy Committee 1982-90; Chair, 2003 - 2006
Executive Committee and Long Range Planning Comm., 1984-1988
Member of Council, 1969-1977
Representative as Amer. Jour. Math. Editor, 1971-1977,
Vice President, 1980-81
Mathematical Association of America.
American Association for the Advancement of Science,
Chairman, Section A 1987-1988; 1997-1998

Visiting Committees for various mathematics departments and systems:
Princeton, Northwestern, U. Iowa, UCSB, Dartmouth, U. Virginia, Institute for Advanced Study, Rutgers University, The System of Mathematical Centers in Portugal, St John's U., Vanderbilt, Florida State System, University of Texas at Austin, DePaul University, University of Illinois at Chicago, University of Nebraska, Ramanujan Mathematical Society
NSF: Division of Mathematics, Advisory Panel, 1973-75; Waterman Award Committee, 2008-2010
National Medal of Science Award Committee, 2010-2018
Committee to select speakers in the algebra section for the International Congresses of Mathematicians, 1970, 1974, 1978 (chairman). For the section on Teaching and Popularization of Mathematics (chair) 2002.
Société des collaborateurs de N. Bourbaki, 1970-1982.
Mathematical Sciences Research Institute, Berkeley,
Board of Trustees, Chair, 1981-86
Science Advisory Council, Member, 1987-92, Chair, 1989-92.
Steering Committee,1989-92.
Educational Advisory Committee, 2004 - present
American Academy of Arts and Sciences, member, 1981 -
National Academy of Sciences, member, 1982-
National Research Council:
Various Committees and Panels,
Board on Mathematical Sciences, member,1984-87, 1993-96
Mathematical Sciences Education Board, member, 1991-93, Chair, 1993-2000.
Study panel on how children learn mathematics, which produced the study, "Adding It Up; Helping children learn mathematics," (2001).
Center for Science, Mathematics and Engineering Education, 1993-2000.
US National Committee on Mathematics Instruction, 1998 - 2010
National Academy of Education, member 2009 - Membership Committee 2011-2013
National S&T Center for Computation and Visualization of Geometric Structures,
University of Minnesota,
External Advisory Board, 1991-95,
Board of Governors, 1995-97.
Institute for Advanced Study,
Member, Board of Trustees, 1992 -1997
Oversight Board, Park City/IAS Mathematics Institute, 1993 - present
International Commission on Mathematics Instruction, President, 1998-2006.
RAND Mathematics Panel, 1999-2002
Conference Board of the Mathematical Sciences, Editorial Board of the Series, *Issues in Mathematics Education*, 2008 - present

CURRENT PROFESSIONAL SERVICE

Advisory Boards:
- Carnegie Mellon U.: SimStudent enhancement project
- U. Arizona, Institute of Mathematics & Education
- Institute for Advanced Study: Park City Mathematics Institute Oversight Board
- U. Pennsylvania: Standards assessment and curriculum in Mathematics Education
- RMC Research: SECPDM (Surveys)
- SERP: Algebra Assignments Project
- San Diego State U.: Project **Z**

Editorial: Member of Editorial Boards of:
- Birkhauser/Springer Series, *Progress in Mathematics*
- Scientific Committee for the Ferran Sunyer i Balaguer Prize
- CBMS Series, *Issues in Mathematics Education*

Reviewing for: the Journal of Mathematical Behavior; Journal of Research in Mathematics Education, Notices of the American Mathematical Society, Science Magazine, Michigan State University; University of Illinois at Chicago; The Spencer Foundation; The Royal Society of the U. K.
Association of Mathematics Teacher Educators: Professional Development Committee
National Academy of Education: Membership Committee
Mathematical Sciences Research Institute: Education Advisory Committee.

National Science Foundation: Committee to select nominees for the National Medal of Science.
International Commission on Mathematical Instruction: Contributions to the Klein Project.
UM Mathematics Department: Education Liaison Committee; Mathematics Teaching Seminar
UM School of Education: Unit coordinator for EMST (Engineering, mathematics, science, and technology); Capital Projects Committee; Promotion and Tenure Committee

MATHEMATICS PUBLICATIONS

1. Finite monadic algebras, Proc. AMS 9 (1958), 258-268.
2. Finitistic dimension and a homolgical generalization of semiprimary rings, Trans. AMS 95 (1960), 466-488.
3. Projective modules over algebras, Ann. of Math., 73 (1961), 532-542.
4. Injective dimension in noetherian rings, Trans. AMS 102 (1962), 18-29.
5. Torsion free and projective modules, Trans. AMS 102 (1962), 319-327.
6. (with S. Schanuel) The homotopy theory of projective modules, Bull. AMS 68 (1962), 425-428.
7. Big projective modules are free, Illinois Jour. Math. 7 (1963), 24-31.
8. On the ubiquity of Gorenstein rings, Math. Zeit. 82 (1963), 8-28.
9. (with J.-P. Serre and M. Lazard) Sous-groupes d'indice fini dans SL(n,Z), Bull. AMS 70 (1964), 385-392.
10. The stable structure of quite general linear groups, Bull. AMS 70 , (1964), 429-433.
11. An algebraic analogue of Bott's complex periodicity theorem, Mimeo. notes, Columbia University (1964).
12. Projective modules over free groups are free, Jour. of Algebra 1 (1964) 367-373.
13. K-theory and stable algebra, Publ. de l'Inst. des Hautes Etudes Scientifiques, no. 22 (1964) 489-544.
14. (with A. Heller and R. Swan,)The Whitehead group of a polynomial extension, Publ. de l'Inst. des Hautes Etudes Scientifiques, France, no. 22 (1964) 61-79.
15. A remark on an arithmetic theorem of Chevalley, Proc. AMS, 16 (1965), 875-878.
16. The Dirichlet unit theorem, induced characters, and Whitehead groups of finite groups, Topology, 4 (1966), 391-410.
17. Generators and relations for cyclotomic units, Nagoya Math. J. 27 (1966), 401-407.
18. Topics in Algebraic K-theory, Lecture notes, Tata Institute of Fundamental Research, Bombay (1966).
19. (with M.P. Murthy) Grothendieck groups and Picard groups of abelian group rings, Ann of Math. 86 (1967), 16-73.
20. Whitehead groups and Grothendieck groups of groups rings, (half-hour address), Proc. International Congress of Mathematicians, Moscow (1966) 262-268.
21. (with J. Milnor and J.-P. Serre) Solution of the congruence subgroup problem for SL_n ($n^3 3$) and Sp_{2n}($n^3 2$), Publ. IHES 33, Paris (1967), 59-137.
22. The congruence subgroup problem, Proc. Conference on Local Fields, Driebergen (1966), 16-22.
23. Algebraic K-theory, W.A. Benjamin, New York (1968), 762 pp.
24. Modules which support nonsingular forms, J. Algebra 13 (1969), 246-252.

    [B] A. Borel, Linear algebraic groups, W.A. Benjamin, New York (1969), 398 pp. Notes prepared, except for the last chapter, from a course of Borel at Columbia in the spring of 1968, and a course based on Borel's which I gave at the Bowdoin summer institute on algebraic groups in 1968.

    [S] J.-P. Serre, Groupes discrets, cours redigé avec la collaboration de H. Bass, Collège de France (1968).
25. Descending chains and the Krull ordinal of commutative rings, J. Pure and Applied Alg. 4 (1971), 347-360.
26. K_2 des corps globaux (d'après Tate, H. Garland), Séminaire Bourbaki, No. 394 (juin, 1971).
27. The degree of polynomial growth of finitely generated nilpotent groups, Proc. London Math. Soc. 25 (1972), 603-614.
28. (with T. Soundararajan), A property of profinite groups and the converse of classical Galois theory, Jour. Indian Math. Soc. 36 (1972), 1-7.
29. Proceedings of the Battelle Conference on algebraic K-theory, I, II, III, Springer Lecture Notes in Mathematics, vols. 341, 342, 342(1972).

29a. Some problems in "classical" algebraic K-theory, Vol. II, 3-73.

29b. (with J. Tate), The Milnor ring of a global field, Vol. II, 349-446.

29c. Unitary algebraic K-theory, Vol. III, 57-265.

    [Q] D. Quillen, Finite generation of the groups K_i of rings of algebraic integers, Vol. I, 179-198: Article prepared from notes on Quillen's lecture.

30. Modules et anneaux semi-simples, § 1-9. Redaction prepared for the re-edition of Bourbaki's Algèbre, Ch. 8.
30a. Modules et anneaux semi-simples, the final three sections:§ 10. Groups et anneaux de Grothendieck; § 11. Représentations linéaires § 12. Représentations des groupes finis .
31. Introduction to some methods of algebraic K-theory, C.B.M.S. Regional Conf. Series in Math., No. 20 (1974), 68 pp.
32. L_3 of finite abelian groups, Ann. Math. 99 (1974), 118-153.
33. Clifford Algebras and spinor norms over a commutative rings, Amer. Jour. Math. XCVI (1974) 156-206.
34. Libération des modules projectifs sur certains anneaux de polynômes, Sém. Bourbaki, juin 1974, No. 448, 25 pp.
35. Algebraic K-theory: A historical survey, Proc. International Congress of Mathematicians, Vancouver (1974) 277-283.
36. Euler characteristics and characters of discrete groups, Inventiones Mathematicae 35 (1976) 155-196.
37. (with D.L. Wright)Localisation in the K-theory of invertible algebras, Journal of Pure and Applied Algebra, 89-105.
38. Some remarks on group actions on trees, Comm. in Algebra, 4 , (1976) 1091-1126.
39. (with E.H. Connell and D.L. Wright), Locally polynomial algebras are symmetric, Bull. AMS 82 (1976) 719-120.
40. (with E.H. Connell and D.L. Wright) Locally polynomial algebras are symmetric algebras, Invent. math 38 (1977) 279-299.
41. (with W. Pardon), Some hybrid symplectic group phenomena Jour. of Algebra, 53 (1978) 327-333.
42. Quadratic modules over polynomial rings, in Contributions to Algebra, in honor of E.R. Kolchin, Acad. Press, N.Y. (1977) 1-23.
43. Groups of integral representation type, Pacific Jour. Math.,86 (1980) 15-51.
44. Traces and Euler characteristics, in Combinatorial and Homological Methods in Group Theory, London Math. Soc. Lecture Notes 36 (1979) 1-26.
45. Projective Modules and Symmetric Algebras (notes by T.M. Viswanathan) Instituto Matematica Pura e Aplicada, Rio de Janeiro, Brazil (1978).
46. Report on the Fields Medal Prize to Daniel Quillen, Science, v. 202, (3 Nov., 1978), 505-506.
47. Lenstra's calculation of $G_0(R\pi)$, and applications to Morse-Smale diffeomorphisms, Integral representations and applications, LNM, 882, Ed. K.W. Roggenkamp, Springer-Verlag (1981), 287-318.
48. (with John Morgan, as editor) The Smith Conjecture, Academic Press, New York (1984).
49. Finitely generated subgroups of GL_2, in The Smith Conjecture, Academic Press, New York (1984) 127-136.
50. (with E.H. Connell and D. Wright) The Jacobian Conjecture: Reduction of degree and formal expansion of the inverse, Bull. Amer. Math. Soc. 7 (1982) 287-330.
51. Theorems of Jordan and Burnside for algebraic groups, Jour. Algebra, 82 (1983) 245-254.
52. (with Alex Lubotzky) Automorphisms of groups and of schemes of finite type, Israel Jour. Math 44 (1983) 1-22.
53. The Jacobian Conjecture and Inverse Degrees, in Arithmetic and Geometry, Vol. I, papers dedicated to I.R. Shafarevich, Birkhauser (1983) 65-75.
54. (with Gary Meisters) Polynomial flows in the plane, Advances in Math. 55 (1985) 173-208.
55. A non-triangular action of G_a on A^3, Jour. Pure and Applied Algebra, 33 (1984) 1-5.
56. (with William Haboush) Linearizing certain reductive group actions, Trans.Amer. Math. Soc. 292 (1985) 463-482.
57. (with Roger Alperin)" Length functions of group actions on Λ–trees," in Combinatorial Group Theory and Topology, Annals of Mathematics Studies 111, Princeton Univ. Press (1987) 265-378.
58. "Algebraic group actions on affine spaces," in Group Actions on Rings, Contemporary Mathematics, Amer. Math. Soc. vol 43 (1985) 1-23.
59. (with W. Haboush) Some equivariant K-theory of affine algebraic group actions, Comm. in Algebra 15 (1987) 181-217.

60. Group actions on non archimedean trees, Proc. Workshop in Arboreal Group Theory, MSRI (1988) , MSRI Publications 19, Springer-Verlag (1991) 69-131.
61. Differential structure of étale extensions of polynomial algebras, in Commutatave Algebra, MSRI Publications 15, Springer-Verlag (1989) 69-109.
62. La Conjecture Jacobiènne et Opérateurs Différentiels, Colloque en l'Honneur dePierre Samuel, Paris, (1987), Soc. Math. de France, Memoire no. 38, 39-50.
63. Linearizing flat families of linear representations, Topological methods in algebraic transformation groups., Progress in Math. Vol. 80, Birkhauser Boston (1989), 5-10.
64. "Linearization problems on affine varieties," in Algebraic Structures and Number Theory, Eds. S.P. Lam and K. P. Shum, World Scientific, Hong Kong (1988)1-9.
65. (with R. Guralnick) "Projective modules with free multiples and powers," Proc. Amer. Math. Soc. 96 (1986) 207-208.
66. (with R. Guralnick) "Torsion in the Picard Group and Extension of Scalars," Jour. Pure and Applied Algebra 52 (1988) 213-217.
67. "Covering theory for graphs of groups," Jour. Pure and Applied Algebra, 89 (1993) 3-47.
68. (with R. Kulkarni) "Uniform tree lattices." Jour. AMS 3, (1990) 843-902.
69. "The Ihara-Selberg zeta function of a uniform tree lattice" International Jour.Math. 3, (1992) 717-797.
70. "A finiteness property of affine algebras" Proc. AMS 110, (1990) 315-318.
71. John Milnor the Algebraist, in New Topological Methods in Mathematics, Publish or Perish, Inc. (1993) 45-84.
72. (with D. Estes abd R. Guralnick) "Eigenvalues of symmetric matrices and graphs," Jour. Algebra ,168 (1994)536-567.
73. (with A. Lubotzky) "Linear-central filtrations on groups," in "The mathematical heritage of Wilhelm Magnus - groups, geometry, and special functions, Contemporary Mathematics, AMS, vol 169 (1994) 45 - 97.
74. (with A. Lubotzky) "Rigidity of certain group actions on locally finite trees," Proc. London Math. Society, 69 (1994) 541-575.
75. (with M. V. Otero-Espinar, D. Rockmore, and C. Tresser) Cyclic Renormalization and Automorphism Groups of Rooted Trees, Springer Lecture Notes in Mathematics 1621, (1996) (176 pages).
76. (with Renfang Jiang) "Automorphism groups of tree actions and of graphs of groups," Jour. Pure and Applied Algebra, 112 (1996) 109-155.
77. (with I. Kra) "Lipman Bers (22 May 1914-29 October 1993)," Proc. Amer. Philosophical Society, 140, No. 2, June, 1996, 206-219.
78. "Samuel Eilenberg (1913-1998)," Memorial article, Notices AMS, November, 1998
79. (with Anderemi Kuku and Claudio Pedrini), Editor of Proceedings of a Workshop and Conference on Algebraic K-theory, at the International Center for Theoretical Physics in Trieste, September, 1997, World Scientific (1999).
80. "A professional autobiography," in Algebra, K-theory, Groups, Education, Proceedings of a conference on the occasion of the 65th birthday of Hyman Bass, Contemporary Mathematics, American Mathematical Society, (2000)
81. (with Alex Lubotzky) "Non-arithmetic super-rigid groups: Counterexamples to Platonov's Conjecture." Annals of Mathematics, 151 (2000), 1151-1173.
82. (with A. Lubotzky), "Tree lattices," Birkhauser Boston, (2001) (233 pages)
83. (with J. Tits) "Discreteness criteria for certain tree automorphism groups," Appendix to "Tree Lattices" Birkhauser Boston, (2001)
84. (with L. Carbone and G. Rosenberg) "The existence theorem for tree lattices," Appendix to "Tree Lattices" Birkhauser Boston, (2001)
85. (with A. Lubotzky, A. Magid, and S. Mozes) "The pro-algebraic completion of rigid groups." Geometrica Dedicata, 95 (2002), 19-58.
86. "Personal reminiscences of the birth of algebraic K-theory," K-Theory 30 (2003), 203-209.
87. "Equivariant Asanuma algebras," (in preparation).
88. "Biography of Samuel Eilenberg," in New Dictionary of Scientific Biography, Scribners, 2007
89. (w/ T.-Y. Lam) Irving Kaplansky (1917-2006), Notices of the American Mathematical Society, December, 2007, 1477-1493.

90. (Editor, w. T.-Y. Lam) "Collected papers of John Milnor: Algebra" American Mathematical Society, Providence, RI (2010)
91. Quillen, the Architect of Algebraic K-theory, Notices of the American Mathematical Society (November, 2012)
92. Milnor's work in algebra and its ramifications, in *The Abel Prize 2008-2012* (Eds. H. Holden and R. Piene), Springer Verlag, Berlin (2014)

MATHEMATICS EDUCATION PUBLICATIONS

1. Let's measure what's worth measuring. Commentary in Education Week, October 27, 1993.
2. Education at the Academy: The debate that never happened. In the National Academy of Sciences Letter to Members, Winter, 1993.
3. Education reform from a national perspective: the mathematics community's investment and future, Notices of the American Mathematical Society, Oct., 1994, 921-926.
4. Welcoming Remarks, in Mathematical Preparation of the Technical Work Force, Report of a Workshop, Mathematical Sciences Education Board, National Research Council, National Academy Press, 1995.
5. Mathematicians as educators. In Notices of the American Mathematical Society, January 1997, pp. 18 - 21. (Previous versions include a presentation at the Board on Mathematical Sciences workshop, Actions for the Mathematical Sciences in the Changed Environment.)
6. The mathematics education debates. Paper presented at the semiannual meeting of the Governing Board of the Center for Mathematics, Science, and Engineering Education, February 1998; also at the Research Presession of the National Council of Teachers of Mathematics, Washington, D.C., April, 1998.
7. Algebra with integrity and reality. Keynote address at the NRC Symposium on the Nature and Role of Algebra in the K-14 Curriculum. Proceedings published by the NRC (1998).
8. Research on university-level mathematics education: (Some of) what is needed, and why. Plenary lecture at Workshop (in Singapore, December, 1998), of the International Commission on Mathematics Instruction, in preparation of a study volume on The teaching and learning of mathematics at the university level, , to be published by Kluwer.
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In preparation:

1. (with Deborah Ball) Proving Mathematical Impossibility: Disproving Pedagogical Impossibility
2. Seeking, using, and developing mathematical structure
3. (with Jennifer Lewis) Interdisciplinary Collaboration of Educators and Mathematicians: The Case of Constructing Measures of Mathematical Knowledge for Teaching
4. Textbook for a capstone course on "Connected mathematical thinking," based on my Math 498 course.