

**DAVID A. BUCHSBAUM**  
**Professor of Mathematics**

**BIRTHDATE:** November 6, 1929

**EDUCATION:**

1949 A.B. Columbia College, New York  
1954 Ph.D.. Columbia University, New York

**PROFESSIONAL CAREER:**

1953–54 Instructor of Mathematics Princeton University  
1955–56 Instructor of Mathematics University of Chicago  
1956–59 Assistant Professor, Brown University  
1959–60 Associate Professor, Brown University  
1961–63 Associate Professor, Brandeis University  
1962–64 Chairman of the Mathematics Dept. Brandeis University  
1963–1999 Professor, Brandeis University  
1980–82 Chairman, Department of Mathematics Brandeis University  
1994–96 Chairman, Department of Mathematics Brandeis University  
1999– Professor Emeritus, Brandeis University

**AWARDS AND HONORS:**

1954–55 NSF Postdoctoral Research Fellowship  
1957–99 National Science Foundation Research Grants  
1960–61 National Science Foundation Senior Postdoctoral Research Fellowship  
1965–66 Guggenheim Fellowship  
1980 Sonderforschungsbereich Mathematik Research Appointment, (Bonn, Spring semester)  
1983 SERC Fellowship (England), (Queen Mary College, University of London, Spring semester)  
1989 JSPS Research Fellowship (Japan), Kyoto University (Spring)  
1990–91 National Science Foundation Special Year Grant in Representation Theory, Commutative Algebra and Combinatorics  
1994 Berenson Chair in Mathematics, Brandeis University  
1995 Election to American Academy of Arts and Sciences  
1998 Bimester conference on Commutative algebra, homological algebra and representation theory, April to June, in Italy (Catania, Rome and Genoa)

2012 Elected Fellow of American Mathematical Society

**VISITING PROFESSORSHIPS:** (Partial sampling)

- 1967 University of Genoa (May - June)
- 1968 University of Rome (May - June)
- 1969 University of Rome (March - April)
- 1971 University of Rome (May - June)
- 1972 University of Rome (May - June)
- 1974 University of Rome (May - June)
- 1975 University of Montpellier (France) (Spring semester)  
University of Genoa (summer)
- 1976 PUC (Rio de Janeiro, Brazil, Summer)
- 1977 University of Rome (May - June)
- 1979 University of Catania (May - June)
- 1980 University of Rome (May - June) (except 1983, '89, '91)
- 1987 Central University of Venezuela (Caracas, August)
- 1989 Central University of Venezuela and IVIC (January)
- 1992 IVIC (Instituto Venezolano de Investigaciones Cientificas,  
January)
- 1994 IVIC (July - August)
- 1995 University of Bologna and Politecnico di Torino (Sept - Oct)
- 1996 University of Valladolid, Spain (June)

**EDITORIAL BOARDS:**

- 1964-1999 Journal of Algebra.
- 1966-70 Algebra Editor, Trans. Am. Math. Soc.
- 1980- Rendiconti del Circolo Matematico di Palermo.

**INVITED ADDRESSES:** (Partial sampling over the past several years):

- 1989 Universities of Kyoto, Tokyo, Nagoya
- 1990 Universities of Turin, Genoa
- 1991 Universities of Warwick (England), Arkansas (main lecturer, special conference on Determinantal Ideals and Representation Theory)
- 1992 Universities of Georgia, Bologna, Catania, Caracas, Colorado
- 1993 Universities of Rome (Tor Vergata), Rome III (Conference on Italian Algebraic Geometry to inaugurate the newest University of Rome)

1994 Universities of Rome (Tor Vergata), Caracas  
 1995 Opening address, 1995 Jornadas de Matemticas, Venezuela;  
 University of Bologna; Politecnico di Torino  
 1996 MIT (Rotafest); University of Rome; University of Valladolid  
 (Spain)  
 1997 Special session: regional meeting of the AMS (Montreal)  
 1998 Universities of Messina, Genoa  
 1999 Universities of Bologna, Catania; Politecnico di Torino;  
 Special session: annual meeting of the AMS (Washington, D.C.)  
 2000 Universities of Athens (Greece), Genoa, Bologna, Prato, Turin  
 2001 Universidad Central di Venezuela  
 2002 Universities of Bologna and Pescara  
 2003 MSRI  
 2004 Universities of Rome: La Sapienza; Tor Vergata; Roma Trè  
 2005 Universities of Torino, Trieste  
 2007 MSRI  
 2008 University of Rome, Tor Vergata  
 2009 Universitat Politècnica de Catalunya  
 2010 University of Rome

## BIBLIOGRAPHY

### BOOKS AND COURSE NOTES

1. *Groups, rings, modules* (with M. Auslander).<sup>1</sup> Harper and Row, New York-London (1974).
2. *Generic free resolutions and Schur complexes*. Notes by Giandomenico Boffi. Brandeis Lecture Series Notes, 3 (1983).
3. *Threading Homology Through Algebra: Selected Patterns* (with G. Boffi). Oxford University Press (Clarendon), Oxford (2006)

### PAPERS

1. *Exact categories, appendix to Homological Algebra*, (H. Cartan and S. Eilenberg) Princeton Univ. Press (1956), 279-386.
2. *Exact categories and duality*, Trans. Amer. Math. Soc. 80 (1955), 1-34.

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<sup>1</sup>Also available for free download from <http://hdl.handle.net/2027/mdp.39015015615886>. A paper-bound edition of the book, with the title *Modern Linear Algebra*, can be obtained from <http://www.lulu.com/content/paperback-book/modern-linear-algebra/12661579>.

3. *Homological dimension in Noetherian rings*, (with M. Auslander) Proc. Nat. Acad. Sci. 42 (1956), 36-38.
4. *Homological dimension in local rings*, (with M. Auslander) Trans. Amer. Math. Soc. 85 (1957), 390-405.
5. *A survey of homological algebra*, Nat. Acad. Sci. - Nat. Res. Council (1957) 52-59.
6. *Homological dimension in Noetherian rings II* (with M. Auslander) Trans. Amer. Math. Soc. 88 (1958), 194-206.
7. *Codimension and multiplicity*, (with M. Auslander) Ann. of Math., 68 (1958) 625- 657.
8. *Corrections to 'Codimension and multiplicity'* (with M. Auslander), Ann. of Math. (2) 70 (1959), 395-397.
9. *A note on homology in categories*, Ann. of Math., 69 (1959), 66-74.
10. *On ramification theory in Noetherian rings*, (with M. Auslander), Amer. J. of Math. 81 (1959) 749-764.
11. *Unique factorization in regular local rings*, (with M. Auslander), Proc., Nat. Acad. Sci. U.S.A., 45 (1959), 733-734
12. *Satellites and universal functors*, Ann. of Math., 71 (1960), 199-209.
13. *Some remarks on factorization in power series rings*, J. Math. and Mech., 10 (1961), 749-754.
14. *Invariant factors and two criteria for projectivity of modules*, (with M. Auslander), Trans. Amer. Soc., 104 (1962), 516-522.
15. *A generalized Koszul complex*, (with D. S. Rim), Bull. Amer. Math. Soc. 69 (1963), 382- 385.
16. *A generalized Koszul complex, I*, Trans. Amer Math. Soc., 111 (1964), 183-196
17. *A generalized Koszul complex, II, Depth and multiplicity*, (with D.S. Rim), Trans. Amer. Math. Soc., 111 (1964), 197-224.
18. *A generalized Koszul complex, III*, (with D.S. Rim), Proc. Amer. Math. Soc., 16 (1965), 555-558.
19. *Complexes in local ring theory*, CIME (1965), 223-228.
20. *Homology and universality relative to a functor*, Report on Midwest Conference on Category Theory, Springer, (1968), 28-40.
21. *Lectures on Regular local rings*, Springer-Verlag, Lecture Notes in Math. (1969).
22. *Complexes Associated with the Minors of a Matrix*, Ist. Naz. di Alta Mat. Symposia Matematica (1V.), pp. 255-283), (1970).
23. *Lifting modules and a theorem on finite free resolutions* (with D. Eisenbud) Ring Theory, Academic Press, (1972).
24. *Homological and Commutative Algebra*, CIME (1973), 11 - 39.

25. *What makes a complex exact?* (with D. Eisenbud), J. of Alg., Vol 25, No. 2, May 1973.
26. *Remarks on Ideals and Resolutions* (with D. Eisenbud), Symposia Math., Vol. XI, Acad. Press (1973).
27. *Some Structure Theorems for Finite Free Resolutions* (with D. Eisenbud), Adv. in Math. 12, pp. 84-139. (1974).
28. *On a Problem in Linear Algebra* (with D. Eisenbud), Proc. of the Kansas Conference on Commutative Rings, Lecture Notes in Mathematics No. 311, Springer 1973.
29. *Generic free resolutions and a class of generically perfect ideals* (with D. Eisenbud), Adv. in Math. 18, pp. 245-301, (1975).
30. *Complexes and ideals' resolutions.* Séminaire P. Dubreil, F. Aribaud, M.-P. Malliavin (1974/75), Algèbre, Exp. No.21, 8 pp.
31. *Algebra structures for finite free resolutions, and some structure theorems for ideals of codimension 3* (with D. Eisenbud), Am. J. of Math. 99 (1977), 447-485
32. *What annihilates a module?* (with D. Eisenbud), J. of Algebra, 47 (1977), 231-243.
33. *Generic free resolutions II.* Can. J. Math. 30, No. 3 (1978), 549-572.
34. *A new construction of the Eagon-Northcott Complex,* Adv. in Math. 34, No. 1 (1979), 58-76
35. *Resolution of determinantal ideals; the submaximal minors* (with K. Akin and J. Weyman). Adv. in Math. 39 (1981), 1-30.
36. *Some exact Complexes and Filtrations related to certain special Young Diagrams* (with K. Akin). Proceedings of the Conference on Commutative Algebra: Durham 1981, 92-108.
37. *Gorenstein ideals of height 3* (with D. Eisenbud). Seminar D. Eisenbud, B. Singh, W. Vogel, 2 (1982), 30-48.
38. *Schur functors and Schur complexes* (with K. Akin and J. Weyman) Adv. in Math. 44, No. 3 (1982), 207-278.
39. *Characteristic-free representation theory of the general linear group* (with K. Akin). Adv. in Math. V. 58, No. 2 (1985) 149-200.
40. *Resolutions and representations of the general linear group.* Advanced Studies in Pure Math 11. Comm. Alg. and Combinatorics. Tokyo (1987) pp. 21-28.
41. *A remark on the structure maps for finite free resolutions.* Comm. in Algebra, 51 (1987).
42. *Characteristic-free realizations of Giambelli and Jacobi-Trudi determinantal identities* (with K. Akin). Proc. KIT Mathematics Workshop (1987). pp. 1-61.

43. *Characteristic-free representation theory of the general linear group, II. Homological considerations.* (with K. Akin). Adv. in Math. V 72 No. 2 (1988) 171-210.
44. *Jacobi-Trudi and Giambelli identities in characteristic-free form.* Contemp. Math. V. 88, (1989), pp. 219-226.
45. *Representations, resolutions and intertwining numbers.* (with K. Akin). Comm. Algebra, MSRI Publications, Springer 1989, pp. 1-19.
46. *Aspects of characteristic-free representation theory of  $GL_n$ , and some applications to intertwining numbers.* Acta Appl. Math. vol 21, (1990), pp 247-261.
47. *Some remarks on determinantal ideals and representation theory.* Rend. Sem. Mat. Un. Pol. Torino, Vol. 49, (1991).
48. *A note on the Poincaré resolution of the coordinate ring of the Grassmannian.* (with K. Akin). Journal of Algebra, Vol 152, pp 427- 433, (1992)
49. *Projective Resolutions of Weyl Modules.* (with G-C Rota). Proc. Natl. Acad. Sci. USA, vol 90, pp 2448-2450, (March, 1993)
50. *A New Construction in Homological Algebra.* (with G-C Rota). Proc. Natl. Acad. Sci. USA, vol 91, pp 4115-4119, (May,1994)
51. *On Lifting Maps between Weyl Modules: Can Bad Shapes Be Resolved by Better Shapes?* (with R. Sánchez). Advances in Math. vol 105 No. 1 (1994) 59 - 75.
52. *Approaches to Resolutions of Weyl Modules.* Abstract published in Proceedings of Conference on Syzygies and Geometry, Northeastern University (1995).
53. *Intertwined with Maurice.* Representation Theory and Algebraic Geometry, (A.Martsinkovsky and G. Todorov, eds.),Cambridge University Press (1997) 31-43.
54. *Intertwining Numbers; the Three-Rowed Case.* (with D. Flores de Chela). Journal of Algebra, Vol 183, pp 605-635, (1996).
55. *Letter-Place Methods and Homotopy.* Mathematical essays in honor of Gian-Carlo Rota. Birkhauser (1998) pp. 41-62.
56. *Maurice Auslander 1926-1994.* (with I. Reiten and C. M. Ringel). Representation Theory of Algebras (Cocoyoc, 1994), 1-15.
57. *On commutative algebra and characteristic-free representation theory.* J.Pure and Applied Algebra. vol 152. pp. 41-48, (September,2000)
58. *"Memorial Article: Gian-Carlo Rota (1932-1999),"* (with Edwin Beschler, Jacob T. Schwartz, Richard P. Stanley, Brian D. Taylor, and Michael Waterman). Notices of the AMS, February, 2000, volume 47, number 2, pages 203-216.

59. *Approaches to resolution of Weyl modules* (with G-C Rota). Advances in Applied Mathematics, Vol 27, Number 1, July 2001, pages 82-191
60. *Homotopies for resolutions of skew-hook shapes* (with Brian Taylor). Abstract presented at 13th International Conference on Formal Power Series and Algebraic Combinatorics. Arizona State University, (May, 2001)
61. *Homotopies for resolutions of skew-hook shapes* (with Brian Taylor). Advances in Applied Mathematics, Vol 30, Number 1-2, February, 2003, pages 26-43
62. *Homotopy equivalence of two families of complexes* (with G. Boffi). Trans. Amer. Math. Soc., Vol 356, Number 8, February, 2004, pages 3077–3107
63. *A characteristic-free example of a Lascoux resolution, and letter-place methods for intertwining numbers*. European Journal of Combinatorics, Vol 25, Issue 8, November, 2004, pages 1169–1179
64. *Alla Ricerca Delle Risoluzioni Perdute*. Rend. Sem. Mat. Univ. Pol. Torino Vol. 64, 4 (2006) *Syzygy* 2005, pages 373–379
65. *On the Littlewood-Richardson rule for almost skew-shapes* (with G. Boffi). Proc. Amer. Math. Soc., Vol 136, Number 4, April, 2008, pages 1155 – 1161.
66. *Resolutions of three-rowed skew- and almost skew-shapes in characteristic zero* (with M. Artale). European Journal of Combinatorics, Vol 31, Issue 1, January 2010, pages 325 – 335.
67. *Hilbert revisited*. Conferències FME (Barcelona), Vol VI, Curs E. Noether, 2008-2009, pages 151 – 168.
68. *Selections from the Letter-Place Panoply*. Commutative Algebra. Expository Papers Dedicated to David Eisenbud on the Occasion of His 65th Birthday. Editor: Irena Peeva, Springer, 2013