

# Curriculum Vitae

Georgia Benkart

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University of Wisconsin - Madison  
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## PERSONAL DATA:

Citizenship:	USA
Home Address:	702 South Prospect Avenue Madison, Wisconsin, 53711
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## EDUCATION:

Ph.D.	Yale University 1974
M.Phil.	Yale University 1973
B.S.	Ohio State University 1970

## AREAS OF SPECIALIZATION:

Lie Algebras, Representation Theory, Combinatorics

## EMPLOYMENT:

### Academic Positions:

University of Wisconsin	Professor of Mathematics 1983–
University of Wisconsin	Associate Professor 1979-1983
University of Wisconsin	Assistant Professor 1976-1979
University of Wisconsin	C.C. MacDuffee Instructor 1974-1976

### Visiting Positions:

Mathematical Sciences Research Institute	Visiting Professor, Spring 2000
Institute for Advanced Study	Visiting Professor, February 1999
Mathematical Sciences Research Institute	Visiting Professor, Spring 1997
Institute for Advanced Study	Visiting Professor, Fall 1996
Aspen Center for Physics	Visiting Associate Professor, Summer 1979
University of Virginia	Visiting Assistant Professor, Fall 1976

## HONORS:

Polya Lecturer, Mathematical Association of America 2000-2002  
University of Wisconsin WARF Mid-Career Faculty Research Award 1996  
University of Wisconsin Distinguished Teaching Award 1987  
University of Wisconsin Romnes Fellowship 1985  
Phi Beta Kappa, Woodrow Wilson Fellow  
B.S. Summa Cum Laude with Distinction in Mathematics Ohio State Univ. 1970

**INVITED ADDRESSES:**

- September 2000 Fields Institute, Toronto, Workshop on Infinite-Dimensional Lie Algebras  
September 2000 AMS Meeting, Toronto  
Special Session on Infinite-Dimensional Lie Algebras 45 min. talk  
August 2000 Conference on Jordan Algebras, Oberwolfach, Germany (plenary lecture)  
June 2000 Lie Theory Workshop, Algebra 2000, University of Alberta, Canada  
May 2000 Seoul National University, Korea  
May 2000 University of California, Berkeley, Noetherian Ring  
May 2000 University of California, Berkeley  
April 2000 Lie Groups, Lie Algebras, and their Representations Conference  
University of California, Santa Cruz  
February 2000 MSRI, Noncommutative Algebra and Algebraic Geometry Conference  
October 1999 University of Wisconsin, Parkside  
October 1999 Korea Institute for Advanced Study, Lie Theory Conference  
June 1999 Seoul National University, Korea, Summer Algebra Camp  
June 1999 Korea Institute for Advanced Study (3 lectures)  
May 1999 The Taft Lectures, University of Cincinnati  
May 1999 Macalester College  
April 1999 AMS Meeting, Buffalo, New York  
Special Session on Representations of Lie Algebras  
March 1999 Brandeis-Harvard-MIT-Northeastern Colloquium  
March 1999 Yale University  
February 1999 Center for Communications Research  
February 1999 Princeton University  
October 1998 Lie Theory Conference, University of California Riverside  
August 1998 Universidad de la Rioja, Spain (2 lectures)  
July 1998 Combinatorial Methods In Representation Theory Workshop  
Research Institute for Mathematical Sciences, Kyoto University, Japan  
July 1998 Conference on Generalizations of Kac-Moody Algebras  
Oberwolfach, Germany (2 lectures)  
June 1998 Formal Power Series, Algebraic Combinatorics, Fields Institute, Toronto  
May 1998 Conference on Affine and Quantum Affine Algebras  
North Carolina State University  
May 1998 Conference on Algebraic Combinatorics & Applications, Oakland University  
April 1998 Spring Lecture Series, University of Arkansas  
March 1998 AMS Meeting, Manhattan, Kansas  
Special Session on Representations of Quantum Groups and Algebraic Groups  
October 1997 AMS Meeting, Milwaukee  
Special Session on Enveloping Algebras and Quantum Groups  
August 1997 Recent Progress in Algebra Conference  
Korean Advanced Institute of Science and Technology, Taejon, Korea  
August 1997 Korea Institute for Advanced Study  
August 1997 Seoul National University, Korea - 2 lectures  
June 1997 Universidad de Oviedo, Spain  
June 1997 International Conference on Jordan Structures  
Universidad de Malaga, Spain  
May 1997 Universidad de la Rioja, Spain  
May 1997 University of California, Santa Cruz  
April 1997 University of California, Riverside  
April 1997 Lie Groups, Lie Algebras, and their Representations Conference, UCLA

**INVITED ADDRESSES cont.:**

- April 1997 Representation Theory and Symmetric Functions Workshop, MSRI  
 April 1997 Intermountain MAA Meeting, Logan Utah, hour address  
 March 1997 University of Iowa  
 January 1997 Hong Kong University of Science and Technology Colloquium  
 January 1997 Hong Kong University of Science and Technology Algebra Seminar  
 December 1996 Rutgers University Colloquium  
 November 1996 Yale University  
 November 1996 Institute for Advanced Study  
 November 1996 Rutgers University Algebra Seminar  
 September 1996 Workshop in Algebra  
 Ottawa-Carleton Institute of Mathematics and Statistics, Canada  
 August 1996 Kansas State University  
 July 1996 Korean Advanced Institute of Science and Technology, Taejon, Korea  
 July 1996 Daewoo Workshop, Hallym University, Chunchon, Korea  
 (series of 3 lectures)  
 July 1996 Seoul National University, Seoul, Korea  
 May 1996 Utah State University  
 May 1996 Lie Algebra Conference, Ohio State University  
 May 1996 Modern Algebra and Its Applications, Vanderbilt University  
 April 1996 Yale University  
 March 1996 Miniconference Group Representations in Physics, University of Iowa  
 March 1996 Group Representations in Physics,  
 Special Session AMS Meeting, University of Iowa  
 February 1996 Conference on Jordan and Lie Algebras, Oberwolfach, Germany  
 May 1995 University of Minnesota  
 April 1995 Awards Day, Macalester College  
 March 1995 Lie Theory Special Session, AMS Meeting, Chicago  
 March 1995 The Gentry Lectures, Wake Forest University  
 February 1995 Modular Interfaces Conference, University of California, Riverside  
 January 1995 Symposium on Representation Theory, Seoul National Univ., Korea,  
 Principal lecturer - 4 lectures  
 January 1995 Workshop on Algebra, Morelia, Mexico  
 November 1994 University of Chicago  
 July 1994 Universidad de Oviedo, Spain  
 June 1994 Universidad de Zaragoza, Spain - series of 4 lectures  
 February 1994 Western Canada Algebra Conference (sponsored by Univ. of Alberta) 2 lectures  
 January 1994 AMS-MAA Invited Hour Address, Cincinnati  
 July 1993 3rd International Conf. on Nonassociative Algebras & Applications, Oviedo, Spain  
 May 1993 Queens University Conference on Modern Trends in Lie Theory  
 April 1993 University of Wisconsin, Parkside  
 December 1992 Holiday Symposium - New Mexico State University  
 Principal lecturer - 10 hours of lectures  
 August 1992 Conference on Jordan and Lie Algebras, Oberwolfach, Germany  
 June 1992 SIAM Meeting on Discrete Mathematics, Vancouver B.C.  
 April 1992 Wisconsin Section MAA, Hour Address, University of Wisconsin, Whitewater  
 April 1992 Yale University Conference in Honor of George Seligman

**INVITED ADDRESSES cont.:**

April 1992 MIT  
 February 1992 Northwestern University - 2 lectures  
 May 1991 Universidad de Zaragoza, Spain - series of 4 lectures  
 March 1991 North Carolina State University  
 March 1991 Loyola University, Chicago  
 October 1990 Midwest Lie Theory Seminar - University of Wisconsin, Parkside  
 August 1990 Conference on Nonassociative Algebras and Hadronic Mechanics,  
 University Northern Iowa  
 April 1990 Algebra Day - University of Ottawa  
 August 1989 Canadian Math. Soc. Seminar on Lie Theory, Differential Equations  
 Université de Montréal  
 June 1989 Canadian Math. Soc. Summer Meeting - University of Windsor  
 April 1989 Marquette University  
 March 1989 University of Windsor  
 March 1989 University of Michigan - 2 lectures  
 February 1989 Ohio State University - 2 lectures  
 December 1988 Lie Algebras and Kac-Moody Algebras Conference,  
 North Carolina State University  
 August 1988 Conference on Jordan and Lie Algebras, Oberwolfach, Germany  
 April 1988 MAA Meeting, Hour Address, St. Paul, Minn.  
 April 1988 Macalester College  
 October 1987 University of Wisconsin, Milwaukee  
 August 1987 Workshop on Lie Algebras, Madison, Wi.  
 August 1985 Conference on Jordan and Lie Algebras, Oberwolfach, Germany  
 February 1985 Université de Montréal  
 October 1984 University of Wisconsin, Parkside  
 September 1984 University of Wisconsin, Milwaukee  
 June 1984 Canadian Math. Soc. Conference on Lie Algebras and Related Topics  
 University of Windsor  
 August 1983 Fifth Workshop on Lie-Admissible Formulations,  
 Institute for Basic Research, Cambridge Mass.  
 August 1982 Conference on Jordan and Lie Algebras, Oberwolfach, Germany  
 April 1982 University of Wisconsin, Milwaukee  
 January 1982 Conference on Non-Potential Interactions and Their Lie-Admissible  
 Formulations, Orleans, France  
 August 1981 Fourth Workshop on Lie-Admissible Formulations  
 Institute for Basic Research, Cambridge Mass.  
 June 1981 Yale University Conference in honor of Nathan Jacobson  
 May 1981 Rutgers Conference on Lie Algebras and Related Topics  
 October 1980 University of Wisconsin, Parkside  
 August 1980 Third Workshop on Lie-Admissible Formulations  
 Institute for Basic Research, Cambridge Mass.  
 August 1980 MAA-AMS Joint Summer Meeting, Hour Address  
 Ann Arbor, Michigan  
 August 1979 Conference on Jordan and Lie Algebras, Oberwolfach, Germany  
 June 1979 Aspen Center for Physics

**INVITED ADDRESSES cont.:**

April 1979      University of Illinois, Champaign-Urbana  
 April 1979      Michigan State University  
 March 1979      Indiana University  
 March 1979      University of Michigan  
 March 1979      Nonassociative Algebras and Applications, AMS Meeting  
                          Honolulu, Hawaii  
 April 1977      Yale University  
 October 1976    University of Virginia  
 August 1976     Conference on Jordan and Lie Algebras, Oberwolfach, Germany  
 February 1975   University of Wisconsin, Madison  
 January 1975    Lie Algebras, AMS Meeting, Washington D.C.  
 April 1974      Fordham University  
 April 1974      University of Georgia  
 March 1974      Vanderbilt University  
 February 1974   Bucknell University

**RESEARCH GRANTS:**

National Science Foundation 1975–present  
 CRDF Cooperative Grants Program 1996  
 National Science Foundation US-USSR Cooperative Program 1992.  
 National Science Foundation - Special Year of Lie Algebras 1987-1988.

**OTHER SCIENTIFIC ACTIVITIES:****Editorships:**

American Mathematical Society Surveys and Monographs Editorial Board 1994–present  
                          Chair 1995–1996  
 Journal of Algebra 1991–present  
 Korean Mathematical Colloquium 1996–present  
 Nova Journal of Algebra and Geometry 1991–1995  
 Communications in Algebra 1985-1990  
 Algebras, Groups and Geometries 1984-1990

**Refereeing and Reviewing for:**

Proceedings Amer. Math. Soc., Transactions Amer. Math. Soc., Pacific Journal,  
 Journal of Algebra, Canadian Journal, Journal of Math. Physics, Linear Algebra  
 and its Applications, American Math. Monthly, Journal of Pure and Applied  
 Algebra, Proceedings of the Edinburgh Math. Society, Mathematische Annalen,  
 Algebras, Groups and Geometries, Israel Journal of Mathematics, International  
 Mathematical Research Notices

Mathematical Reviews

Grant Reviews for National Science Foundation, National Security Agency, National Research and Engineering Council - Canada, Research Council of Chile, Hong Kong Research Grants Council

**NATIONWIDE PANELS:**

American Mathematical Society Central Sections Program Committee 1999-2000

Review Team of the University of Nevada, Department of Mathematics, 1998

American Mathematical Society - NSF Panel on ICM 98 Travel Grants 1997

American Mathematical Society Council 1995-1996

American Mathematical Society Review Committee on Policy Committees 1996

NSF Committee of Visitors 1995

NSF Panel on Conference Board of the Mathematical Sciences Conferences 1990-1992

NSF Panel on Minority Research Initiatives and Research Opportunities for Women 1993.

**PH.D. STUDENTS:**

Matthew Bloss (current)

Manish Chakrabarti (current)

Samuel Lopes (current)

Shantala Mukherjee (current)

Jeffrey Hildebrand (2000)

Cheryl Grood (1998)

Dongho Moon (1998)

Oliver Eng (1996)

Robert Leduc (1994)

Thomas Halverson (1993)

Qing Wang (1992)

Karl Peters (1992)

Chanyoung Lee (1992)

Jeffrey Stroemer (1991)

Mark Hall (1987)

Wayne Neidhardt (1985)

Steven Kass (1984)

Suren Fernando (1983)

**PUBLICATIONS:**

1. The Lie inner ideal structure of associative rings, *Journal of Algebra* **43** (1976), 561-584.
2. On inner ideals and ad-nilpotent elements of Lie algebras, *Trans. Amer. Math. Soc.* **232** (1977), 61-81.
3. On the existence of ad-nilpotent elements (with I.M. Isaacs) *Proc. Amer. Math. Soc.* **63** (1977), 39-40.
4. Lie algebras with self-centralizing ad-nilpotent elements (with I.M. Isaacs and J.M. Osborn), *Journal of Algebra* **57** (1979) 279-309.
5. Albert-Zassenhaus Lie algebras and isomorphisms (with I.M. Isaacs and J.M. Osborn), *Journal of Algebra* **57** (1979) 310-338.
6. Lie algebras with nilpotent centralizers (with I.M. Isaacs), *Canad. Journal of Math.* Vol. XXXI No. 5 (1979) 929-941.
7. Derivations and automorphisms of matrices symmetric relative to a canonical involution, *Journal of Algebra* **62** (1980), 418-429.
8. Derivations and automorphisms of nonassociative matrix algebras (with J.M. Osborn), *Trans. Amer. Math. Soc.* **263** (1981), 411-430.
9. The derivation algebra of a real division algebra (with J.M. Osborn), *Amer. Journal of Math.* **103** (1981), 1135-1150.
10. An investigation of real division algebras using derivations (with J.M. Osborn) *Pacific Journal Math.* **96** (1981) 265-300.
11. Flexible Lie-admissible algebras (with J.M. Osborn), *Journal of Algebra* **70** (1981), 11-31.
12. Applications of isotopy to real division algebras (with D.J. Britten and J.M. Osborn), *Hadronic Journal* **4** (1981) 497-529.
13. Flexible Lie-admissible algebras with the solvable radical of  $A^-$  abelian and Lie algebras with nondegenerate forms (with D.J. Britten and J.M. Osborn), *Hadronic Journal* **4** (1981) 274-326.
14. Real division algebras and other algebras motivated by physics (with J.M. Osborn), *Hadronic Journal* **4** (1981) 392-443.
15. Real flexible division algebras (with D.J. Britten and J.M. Osborn), *Canadian Journal of Math.* **34** (1982), 550-588.
16. On the determination of rank one Lie algebras of prime characteristic (with J.M. Osborn), *Algebraists' Homage, Papers in Ring Theory and Related Topics*, *Contemporary Math.* Amer. Math. Soc. **13** (1982) 263-265.
17. Representations of rank one Lie algebras of prime characteristic (with J.M. Osborn), *Lie Algebras and Related Topics*, *Lect. Notes in Math.* **933** Springer-Verlag (1982) 1-37.



18. The construction of examples of Lie-admissible algebras, *Proceedings of the First International Conf. on Non-Potential Interactions and their Lie-admissible Treatment*, Part A, Hadronic J. **5** (1982) 431-493.
19. Power-associative products on matrices (with J.M. Osborn), *Proceedings of the First International Conf. on Non-Potential Interactions and their Lie-admissible Treatment*, Part D, Hadronic J. **5** (1982) 1859-1892.
20. Power-associative Lie-admissible algebras, *Journal of Algebra* **90** (1984) 37-58.
21. Rank one Lie algebras (with J.M. Osborn), *Annals of Math.* **119** (1984) 437-463.
22. Bimodules for flexible Lie-admissible algebras, *Algebras, Groups and Geometries* **1** (1984) 109-126.
23. A Kac-Moody bibliography, *Lie Algebras and Related Topics*, Britten, Lemire, and Moody, eds. *Canad. Math. Soc. Conf. Proc.* **5** (1986) 111-135.
24. Cartan subalgebras in Lie algebras of Cartan type, *Lie Algebras and Related Topics*, Britten, Lemire, and Moody, eds. *Canad. Math. Soc. Conf. Proc.* **5** (1986) 157-187.
25. Derivations, central extensions, and affine Lie algebras (with R.V. Moody), *Algebras, Groups and Geometries* **4** (1986) 456-492.
26. *Abstract Algebra* by I.N. Herstein, a book review, *Amer. Math. Monthly* **94** (1987), 804-806.
27. Toral rank one Lie algebras, (with J.M. Osborn), *Journal of Algebra* **115** (1988) 238-250.
28. *Lie Algebras, Madison 1987*, Proc. of a Workshop held in Madison, Wisconsin, August 23-28, 1987, (with J.M. Osborn), *Lect. Notes. in Math.* **1373** (1989), Berlin, Heidelberg, New York.
29. Graded Lie algebras with classical reductive null component, (with T.B. Gregory), *Math. Ann.* **285** (1989), 85-98.
30. Isomorphism classes of Hamiltonian Lie algebras, (with T.B. Gregory, J.M. Osborn, H. Strade, and R.L. Wilson), *Lie Algebras, Madison 1987*, Springer Lecture Notes in Math. **1373** (1989), 42-57.
31. Partitions, tableaux, and stability in the representation theory of classical Lie algebras, *Lie Theory, Differential Equations, and Representation Theory*, Proc. of the Annual Seminar of the Canadian Math. Soc. (1990), 47-76.
32. Simple modular Lie algebras with 1-sections that are classical or solvable, *Comm. in Algebra* **18** (1990), 3633-3638.
33. *Stability in Modules for Classical Lie Algebras - A Constructive Approach*, (with D.J. Britten and F.W. Lemire), *Memoir Amer. Math. Soc.* **430** (1990), Providence, R.I. (168 pages).
34. Simple Lie algebras of characteristic  $p$  with dependent roots, (with J.M. Osborn), *Trans. Amer. Math. Soc.* **318** (1990), 783-807.

35. Tableaux and insertion schemes for spinor representations of the orthogonal Lie algebra  $so(r + 1, C)$  (with J. Stroomer), *J. Combin. Theory A* **57** (1991), 211-237.
36. *Lie Algebras and Related Topics*, (with J.M. Osborn) Contemporary Math. Amer. Math. Soc. **110** (1990), Providence. R.I. (313 pages).
37. Projection maps for tensor products of  $gl(r, C)$ -representations, (with D.J. Britten and F.W. Lemire), *Publ. RIMS, Kyoto* **28** (1992), 983-1010.
38. Graded Lie algebras of Kac-Moody type, (with S.-J. Kang and K.C. Misra), *Adv. in Math.* **97** (1993), 154-190.
39. A combinatorial model for tensor products of the spin representation, (with J. Stroomer) *Hadronic Mechanics and Nonpotential Interactions*, (1993), 37-51.
40. Contributions to the classification of simple modular Lie algebras, (with J.M. Osborn and H. Strade), *Trans. Amer. Math. Soc.* **341** (1994), 227-252.
41. Indefinite Kac-Moody Lie algebras of classical type, (with S.-J. Kang and K.C. Misra), *Adv. in Math.* **105** (1994), 76-110.
42. Weight multiplicities for affine Kac-Moody algebras, (with S.N. Kass) *Modern Trends in Lie Algebra Representation Theory*, V. Futorny and D. Pollack eds., Queens U. Press, **94** (1994) 1-12.
43. Tensor product representations of general linear groups and their connections with Brauer algebras, (with M. Chakrabarti, T. Halverson, R. Leduc, C. Lee, and J. Stroomer), *Journal of Algebra* **166** (1994), 529-567.
44. Stability in modules for general linear Lie superalgebras, (with C. Lee), *Nova J. of Algebra and Geometry*, **2** (1994), 383-409.
45. Lie algebras graded by root systems, (with E. Zelmanov), *Proc. of the Third International Conf. on Nonassociative Algebras and their Applications*, S. Gonzalez ed., Kluwer Publ. (1994), 31-38.
46. Finite dimensional simple Lie algebras with a nonsingular derivation, (with A.I. Kostrikin and M.I. Kuznetsov), *Journal of Algebra* **171** (1995), 894-916.
47. Indefinite Kac-Moody Lie algebras of special linear type, (with S.-J. Kang and K.C. Misra), *Pacific J. Math.* **170** (1995), 379-404.
48. The simple Lie algebras of characteristic three with classical reductive component  $L_0$ , (with A.I. Kostrikin and M.I. Kuznetsov), *Comm. in Algebra* **24** (1996), 223-234.
49. Tableau switching: algorithms and applications, (with F. Sottile and J. Stroomer), *J. Combin. Theory A.* **76** (1996), 11-43.
50. Weight multiplicity polynomials for affine Kac-Moody algebras of type  $A_r^{(1)}$ , (with S.J. Kang and K.C. Misra), *Compositio Math.* **104** (1996), 153-187.
51. Lie algebras graded by finite root systems and intersection matrix algebras (with E. Zelmanov), *Inventiones Math.* **126** (1996), 1-45.

52. Commuting Actions: A tale of two groups, *Contemporary Math. Amer. Math. Soc.* **194** (1996) 1-46.
53. Tensor representations for orthosymplectic Lie superalgebras and hook Schur functions, (with C. Lee Shader and A. Ram), *FPSAC 96, 8th International Conf. on Formal Power Series and Algebraic Combinatorics*, (1996), 25-36.
54. Modules with bounded weight multiplicities for simple Lie algebras (with D.J. Britten and F.W. Lemire), *Math. Zeitschrift* **225** (1997), 333-353.
55. Highest weight modules for locally finite Lie algebras, (with Yu. Bahturin), *Modular Interfaces, AMS/IP Studies in Advanced Math.* **4** (1997), 1-31.
56. Lie algebras graded by finite reduced root systems, *Lie Algebras and Combinatorics*, H.H. Cho and S.G. Hahn, eds., *Pure Math. Research Assoc., Korean Acad. Council*, vol. 16 (1997), 1-26.
57. Quantized enveloping algebras of Borcherds superalgebras, (with S.J. Kang and D. Melville), *Trans. Amer. Math. Soc.* **350** (1998), 3297-3319.
58. Tensor product representations for orthosymplectic Lie superalgebras, (with C. Lee Shader and A. Ram), *Journal of Pure and Applied Algebra* **130** (1998), 1-48.
59. Derivations and invariant forms of Lie algebras graded by finite root systems, *Canad. J. Math.* **50** (1998), 225-241.
60. On graded Lie algebras of characteristic three with classical reductive null component, (with T. Gregory and M.I. Kuznetsov), *The Monster and Lie Algebras*, ed. by J. Ferrar and K. Harada, de Gruyter Berlin, New York (1998), 149-164.
61. Down-up algebras and Witten's deformations of the universal enveloping algebra of  $sl_2$ , *Recent Progress in Algebra*, *Contemp. Math. Amer. Math. Soc.* **224** (1999), 29-45.
62. The classification of the simple modular Lie algebras. VI. Solving the final case by Helmut Strade. *Mathematical Reviews Featured Review*, 98j: 17020.
63. Differential posets and down-up algebras, *FPSAC 98, 10th International Conf. on Formal Power Series and Algebraic Combinatorics*, (1998), 43-54.
64. Down-up algebras (with T. Roby), *Journal of Algebra*, **209** (1998), 305-344; Addendum **213** (1999), 378.
65. Lie algebras graded by finite root systems from AD to BC, *Proc. International Conf. on Jordan Structures* Castellon, Cuenca, Fernandez, and Martin eds. (1999) 39-45.
66. Polynomial behavior of representations of affine algebras of type A, (with S.-J. Kang, H. Lee, K.C. Misra, and D.-U. Shin), accepted 1/12/00 *Compositio Math.* (21 pages).
67. Crystal bases for the quantum superalgebra  $U_q(gl(m, n))$ , (with S.-J. Kang and M. Kashiwara), *Journal of Amer. Math. Soc.* **13** (2000), 295-313.
68. Central extensions of Lie algebras graded by finite root systems, (with B. Allison and Y. Gao) *Math. Ann.* **316** (2000) 499-527.

69. A quantum octonion algebra, (with J. Perez-Izquierdo), *Trans. Amer. Math. Soc.* **352** (2000), 935–968.
70. The polynomial behavior of weight multiplicities for classical simple Lie algebras and classical affine Kac-Moody algebras, (with S.-J. Kang, H. Lee, and D.-U. Shin), *Quantum Affine Algebras and Related Topics*, Jing & Misra eds., *Cont. Math.* Amer. Math. Soc. 248 (1999) 1-29.
71. Crystal bases for quantum superalgebras, (with S.-J. Kang), RIMS, Kyoto accepted 11/11/99 (29 pages).
72. Lie algebras graded by the root system  $BC_r$ ,  $r \geq 2$ , (with B. Allison and Y. Gao), accepted 2/11/00 *Memoirs, Amer. Math. Soc.* (205 pages).
73. A Hopf structure for down-up algebras, (with S. Witherspoon), *Math. Zeitschrift* accepted 4/10/00 (26 pages).
74. Nathan Jacobson, (1910-1999), *Notices Amer. Math. Soc.*, **47** 1061-1071.
75. Two-parameter quantum groups and Drinfel'd doubles, (with S. Witherspoon), submitted 8/28/00.
76. Lie algebras graded by the root system  $BC_1$ , (with O. Smirnov), in preparation
77. Classical Lie superalgebras over simple associative algebras (with X. Xu and K. Zhao), in preparation.
78. The separation and annihilation theorems for down-up algebras, (with M. Gorelik), in preparation.
79. On The Recognition Theorem, (with T.B. Gregory and A. Premet), monograph in preparation.
80. *Combinatorial Representation Theory*, (with A. Ram), book in preparation.

(All papers except #23, #26, #62 and those in preparation have been refereed.)