

## VITA

Jon F. Carlson

**Date and Place of Birth:** July 3, 1940, Newport News, Virginia

### Academic Degrees:

B.A. 1962 Old Dominion University  
M.S. 1965 University of Virginia  
Ph.D. 1967 University of Virginia

### Professional Experience:

2002- Professor Emeritus, University of Georgia  
1992-2002 Distinguished Research Professor, University of Georgia  
1982-2002 Professor, University of Georgia  
1976-1982 Associate Professor, University of Georgia  
1968-1976 Assistant Professor, University of Georgia  
1967-1968 Instructor, University of Virginia  
1966-1967 Junior Instructor, University of Virginia  
1964-1966 Teaching Assistant, University of Virginia  
1962-1963 Teacher, Northside Junior High School

Coordinator of the Department of Mathematics Graduate program, University of Georgia, 1977-1983.

### Publications - Journal Articles:

- (1) J. F. Carlson, *Automorphisms of groups of similitudes over  $\mathbb{F}_3$* , Pac. J. Math., **28**(1969), 485-488.
- (2) J. F. Carlson, *Block idempotents and the Brauer correspondence*, Bull. Austral. Math. Soc., **5**(1971), 337-340.
- (3) J. F. Carlson, *A basis for some relative permutation representation rings*, J. Algebra, **32**(1974), 561-575.
- (4) J. F. Carlson, *Free modules over group algebras of  $p$ -groups*, International Conference on Representations of Algebra, Carleton University Lecture Notes, #**9**(1974), Chap. 7, 7.01-7.03.
- (5) J. F. Carlson, *Calculating some relative homology over group rings*, Acta Math. Hungar., **26**(1975), 1-2.
- (6) J. F. Carlson, *The modular representation ring of a cyclic 2-groups*, J. London Math. Soc. (2), **11**(1975), 91-92.
- (7) J. F. Carlson, *Free modules over some modular group rings*, Australian J. Math., (Series A) part **1**(1975), 49-55.
- (8) J. F. Carlson, *Almost free modules over modular group algebras*, J. Algebra, **41**(1976), 243-254.

- (9) J. F. Carlson, *Cyclic modules over some modular group algebras*, Studia Sci. Math. Hung., **11**(1976), 327-333.
- (10) J. F. Carlson, *Periodic modules over modular group algebras*, J. London Math. Soc. (2), **14**(1977), 431-436.
- (11) J. F. Carlson, *Restrictions of modules over modular group algebras*, J. Algebra, **53**(1978), 334-343.
- (12) J. F. Carlson, *The dimensions of periodic modules over modular group algebras*, Illinois J. Math., **23**(1979), 295-306.
- (13) J. F. Carlson, *Periodic modules with large periods*, Proc. Amer. Math. Soc., **76**(1979), 209-215.
- (14) J. F. Carlson, *Endo-trivial modules over  $(p, p)$ -groups*, Illinois J. Math., **24**(1980), 287-295.
- (15) J. F. Carlson, *The structure of periodic modules over modular group algebras*, J. Pure Appl. Algebra, **22**(1981), 43-56.
- (16) J. F. Carlson, *The dimensions of modules and their restrictions over modular group algebras*, J. Algebra, **69**(1981), 95-104.
- (17) J. F. Carlson, *The complexity and varieties of modules*, Proceedings of Oberwolfach Conference on Integral Representations and Applications, Springer Lecture Notes No. 882, (1981), 415-422.
- (18) J. F. Carlson, *Complexity and Krull dimensions*, Proceedings of International Conference on Representations of Algebras III, Puebla, Mexico, August 1980, Springer Lecture Notes in Mathematics No. 903, (1981) 62-67.
- (19) D. Burry and J. F. Carlson, *Restrictions of modules to local subgroups*, Proc. Amer. Math. Soc., **84**(1982), 181-184.
- (20) J. F. Carlson, *The varieties and the cohomology ring of a module*, J. Algebra **85**(1983), 104-143.
- (21) J. F. Carlson, *The cohomology of irreducible modules over  $SL(2, p^n)$* , Proc. London Math. Soc. (3), **47**(1983), 480-492.
- (22) J. F. Carlson, *The variety of an indecomposable module is connected*, Invent. Math., **77**(1984), 291-299.
- (23) J. F. Carlson, *The cohomology ring of a module*, J. Pure Appl. Algebra, **36**(1985), 105-121.
- (24) J. F. Carlson, *The variety of a module*, in it Orders and Their Applications, Proceedings Oberwolfach, 1984. Lecture Notes in Mathematics, Vol. 1142, Springer, Berlin, 1985, pp. 88-95.
- (25) M. Auslander and J. F. Carlson, *Almost split sequences and group algebras*, J. Algebra, **103**(1986), 122-140.
- (26) D. J. Benson and J. F. Carlson, *Nilpotent elements in the Green ring*, J. Algebra, **104**(1986), 329-350.
- (27) J. F. Carlson and M. J. Collins, *Filtrations for projective modules*, Bull. London Math. Soc., **18**(1986), 591-592.
- (28) J. F. Carlson, *Varieties and transfers*, J. Pure and Appl. Algebra, **44**(1987), 99-105.

- (29) J. F. Carlson, *Cohomology rings of induced modules*, J. Pure and Appl. Algebra, **44**(1987), 85-97.
- (30) D. J. Benson and J. F. Carlson, *Complexity and multiple complexes*, Math. Zeit., **195**(1987), 221-238.
- (31) D. J. Benson and J. F. Carlson, *Diagrammatic methods for group representations and cohomology*, Comm. in Algebra, **15**(1987), 53-121.
- (32) J. F. Carlson, *Varieties for modules*, Proc. Sym. Pure Math., **47**(1987), 37-44.
- (33) J. F. Carlson, *Products and projective resolutions*, Proc. Sym. Pure Math., **47**(1987), 399-408.
- (34) J. F. Carlson, *On the exponents of homology and cohomology of finite groups*, Proc. Amer. Math. Soc., **102**(1988), 814-816.
- (35) J. F. Carlson and K. W. Roggenkamp, *Ito's theorem and character degrees revisited*, Archiv. Math., **50**(1988), 214-217.
- (36) J. F. Carlson and A. Jones, *Wild categories of periodic modules*, Illinois J. Math., **32**(1988), 557-561.
- (37) J. F. Carlson and A. Jones, *An exponential property of lattices over group rings*, J. London Math. Soc., (2) **39**(1989), 467-479.
- (38) J. F. Carlson, *Exponents of modules and maps*, Invent. Math. **95**(1989), 13-24.
- (39) D. J. Benson, J. F. Carlson and G.R. Robinson *On the vanishing of cohomology*, J. Algebra, **131**(1990), 40-73.
- (40) A. Adem and J. F. Carlson, *Discrete groups with large exponents in cohomology*, J. Pure and Appl. Algebra, **66**(1990), 111-120.
- (41) J. F. Carlson, *Cohomology and modules over group algebras*, Proceedings of the International Congress of Mathematicians, Kyoto 1990, Springer-Verlag, Tokyo, 1991, 317-324.
- (42) D. J. Benson and J. F. Carlson, *The cohomology of extra special groups*, Bull. London Math. Soc., **24** (1992), 209-235.
- (43) J. F. Carlson, *Projective resolutions and degree shifting for cohomology of group rings*, in Representations of Algebras and Related Topics, H. Tachikawa and S. Brenner, Eds., London Math. Soc. Lecture Note Series No. 168, Cambridge Univ. Press, Cambridge, 1992, 80-126.
- (44) D. J. Benson and J. F. Carlson, *Periodic modules with large period*, Quart. J. Math., **43**(1992), 283-296.
- (45) D. J. Benson and J. F. Carlson, *Products in negative cohomology*, J. Pure Appl. Algebra, **82**(1992), 107-129.
- (46) J. F. Carlson and D. N. Clark, *Ext for Hilbert modules*, The Madison Symposium on Complex Analysis, A. Nagel and E. Stout, eds., Contemp. Math. **137**(1992), 113-118.
- (47) J. F. Carlson and D. Happel, *Contravariantly finite subcategories and irreducible maps*, Proc. Amer. Math. Soc., **117**(1993), 61-65.
- (48) G. Avrunin and J. F. Carlson, *Nilpotency degree of cohomology rings in characteristic two*, Proc. Amer. Math. Soc., **118**(1993), 339-343.

- (49) J. F. Carlson, *Varieties and modules of small dimension*, Archiv. Math., **60**(1993), 425-430.
- (50) D. J. Benson and J. F. Carlson, *Projective resolutions and Poincaré duality complexes*, Trans. Amer. Math. Soc., **342** (1994), 447-488.
- (51) J. F. Carlson, *Systems of parameters and the structure of cohomology rings of finite groups*, Contemp. Math. **158**(1994), 1-7.
- (52) D. J. Benson and J. F. Carlson, *Functional equations for Poincaré series of group cohomology*, Bull. London Math. Soc., **26**(1994), 438-448.
- (53) J. F. Carlson, P. Donovan and W. W. Wheeler, *Complexity and quotient categories for group algebras*, J. Pure and Appl. Algebra **93**(1994), 147-167.
- (54) J. F. Carlson and G. R. Robinson, *Varieties and modules with vanishing cohomology*, Math. Proc. Cam. Phil. Soc. **116**(1994), 245-251.
- (55) J. F. Carlson, D. N. Clark, C. Foias and J. P. Williams *Projective Hilbert  $\mathbb{A}(\mathbb{D})$ -modules*, New York J. Math **1**(1994), 26-38.
- (56) J. F. Carlson, *Decompositions of the trivial module*, Proceedings of Conference on Representation Theory of Finite Groups and Algebras, S. Koshitani, ed., RIMS Kokyuroka 877, Research Institute for the Math. Sciences, Kyoto, Japan 1994, pp. 6-11.
- (57) J. F. Carlson and L. G. Kovacs, *Tensor factorizations of group algebras and modules*, J. Algebra, **175** (1995), 385-407.
- (58) J. F. Carlson and D. N. Clark, *Cohomology and extensions of Hilbert modules*, J. Functional Analysis, **128**(1995), 278-306.
- (59) J. F. Carlson *Depth and transfer maps in the cohomology of groups*, Math. Z., **218**(1995), 461-468.
- (60) J. F. Carlson and H.-W. Henn, *Depth and the cohomology of wreath products*, Manuscripta Math., **87**(1995), 145-151.
- (61) J. F. Carlson, *Transfers and the structure of cohomology rings*, Proceedings of Conference on Algebraic Combinatorics, T. Yoshida, ed. RIMS, Kokyuroka 896, Research Institute for the Mathematical Sciences, Kyoto 1995 pp. 1-7.
- (62) J. F. Carlson and W. W. Wheeler, *Varieties and localizations of module categories*, J. Pure Appl. Algebra, **102**(1995), 137-153.
- (63) J. F. Carlson, *Quotient categories of modules over group algebras*, in '93 Galway/St. Andrews, C.M. Campbell et.al., eds., Cambridge University Press, Cambridge (1995), pp. 113-119.
- (64) J. F. Carlson, D. Nakano and K. Peters, *On the vanishing of extensions of modules over reduced enveloping algebras*, Math. Ann., **302**(1995), 541-560.
- (65) D. J. Benson, J. F. Carlson and J. Rickard, *Complexity and varieties for infinitely generated modules*, Math. Proc. Cam. Phil. Soc., **118**(1995), 223-243.
- (66) J. F. Carlson and H.-W. Henn, *Cohomological detecting and regular elements in group cohomology*, Proc. Amer. Math. Soc., **124**(1996), 665-670.

- (67) J. F. Carlson, *The decomposition of the trivial module in the complexity quotient category*, J. Pure Appl. Algebra, **106**(1996), 23-44.
- (68) J. F. Carlson, *The cohomology of groups*, The Handbook of Algebra, M. Hazewinkel, ed., Elsevier, Amsterdam, 1996, pp. 581-610.
- (69) D. J. Benson, J. F. Carlson and J. Rickard, *Complexity and varieties for infinitely generated modules*, II, Math. Proc. Cam. Phil. Soc. **120**(1996), 597-615.
- (70) J. F. Carlson and C. Peng, *Relative projectivity and ideals in cohomology rings*, J. Algebra, **183**(1996), 929-948.
- (71) *Varieties and induction*, Bol. Soc. Math. Mex. **2**(1996), 101-114.
- (72) J. F. Carlson, *Modules over group algebras*, Analele Stintifice Univ. Constanta **4**(1996), 31-42.
- (73) J. F. Carlson, E. Green and G. J. A. Schneider, *Computing the ext algebras for the group algebras of finite groups*, J. Sym. Comp., **24**(1997), 317-325.
- (74) J. F. Carlson and W. W. Wheeler, *Homomorphisms in higher complexity quotient categories*, Group Representations: Cohomology, Group Actions and Topology, A. Adem, J. Carlson, S. Priddy and P. Webb, eds., Proc. Sym. Pure Math., **63** American Math. Soc. (1997), Providence, R. I. 115-155.
- (75) D. J. Benson, J. F. Carlson and J. Rickard, *Thick subcategories of the stable category*, Fund. Math. **153**(1997), 59-80.
- (76) J. F. Carlson and D. N. Clark, *Projectivity and extensions of Hilbert modules over  $A(D^N)$* , Mich. Math. J., **44** (1997), 365-373.
- (77) J. F. Carlson, *Cohomology, representations and quotient categories of modules*, Geometry and Cohomology in Group Theory, P. Kropholler, G. Niblo and R. Stöhr, eds., London Math. Soc. Lecture Note Ser. No. 252, Cambridge Univ. Press, Cambridge, 1998, pp. 45-73.
- (78) J. F. Carlson, C. Peng and W. W. Wheeler, *Transfer maps and virtual projectivity*, J. Algebra **204**(1998), 286-381.
- (79) J. F. Carlson, *A characterization of endo-trivial modules over  $p$ -groups*, Manuscripta Math. **97**(1998), 303-307.
- (80) A. Bajer and J. F. Carlson *An embedding theorem for Lie algebras*, Proc. Amer. Math. Soc. **127**(1999), 3445-3449.
- (81) J. F. Carlson, J. Maginnis and R. J. Milgram, *The cohomology of the sporadic groups  $J_2$  and  $J_3$* , J. Algebra **214**(1999), 143-173.
- (82) J. F. Carlson, *Problems in the computation of group cohomology*, Prog. in Math. **173**(1999), 107-120.
- (83) J. F. Carlson, *Varieties of cohomology with twisted coefficients*, Acta Math. Sinica, (Engl. Ser.), **15**(1999), 81-92.
- (84) J. F. Carlson, *Cohomology and induction from elementary abelian subgroups*, Quarterly J. Math. **51**(2000), 169-181.
- (85) J. F. Carlson and R. Rouquier, *Self-equivalences of stable module categories*, Math. Zeit. **233**(2000), 165-178.
- (86) J. F. Carlson, *The thick subcategory generated by the trivial module*, 285-296, Trends in Mathematics, Birkäuser, Basel (2000).

- (87) D. J. Benson and J. F. Carlson, *The cohomology of the double cover of the Mathieu group  $M_{12}$* , J. Algebra **226**(2000), 547-576.
- (88) J. F. Carlson, *Vanishing of cohomology and orthogonal subcategories*, Proceedings of the International Conference on Representation Theory, June 9 - July 3, 1998, East China Normal University, Shanghai, Springer-Verlag, Beijing, (2000), 37-56.
- (89) J. F. Carlson and J. Thévenaz, *Torsion endotrivial modules*, Algebras and Representation Theory, **3** (2000), 303-335.
- (90) J. F. Carlson, *Calculating group cohomology: Tests for completion*, J. Symb. Comp. **31**(2001), 229-242.
- (91) A. Adem, J. F. Carlson, D. Karagueuzian and R. J. Milgram, *The cohomology of the Sylow 2-subgroup of the Higman-Sims group*, J. Pure Appl. Algebra **164**(2001), no.3, 275-305.
- (92) J. F. Carlson, *Connections between group cohomology and representations*. Algebra-Representation Theory (Constanta, 2000), 23-46, NATO Sci. Ser. II Math. Phys. Chem., **28**, Kluwer Acad. Publ., Dordrecht, 2001.
- (93) J. F. Carlson, Z. Lin, D. Nakano and B. Parshall, *The restricted nullcone*, Contemporary Math. **325**(2003), 51-75.
- (94) J. F. Carlson and J. Thévenaz, *The classification of endotrivial modules*, Invent. Math. **158**(2004), 389-411.
- (95) J. F. Carlson and J. Thévenaz, *The classification of torsion endotrivial modules*, Ann. of Math.(2) **165**(2005), 823-883.
- (96) J. F. Carlson, *Coclass and cohomology*, J. Pure Appl. Algebra, **200**(2005), 251-266.
- (97) J. F. Carlson, *Cohomology, computations and commutative algebra*, Notices Amer. Math. Soc. **52**, No.4 (2005), 426-434.
- (98) J. F. Carlson *Constructing endotrivial modules*, J. Pure and Appl. Algebra, **206**(2006), 83-110.
- (99) J. F. Carlson and G. Matthews, *Generators and relations for matrix algebras*, J. Algebra **300**(2006), 134-159.
- (100) J. F. Carlson, N. Mazza and D. K. Nakano, *Endotrivial modules for finite groups of Lie type*, Journal Reine Angew. Math. **595**(2006), 96-120.
- (101) J. F. Carlson, *When is projectivity detected on subalgebras?*, Discovering Mathematics With Magma, Algorithms and Computation in Mathematics, Vol. 19, Springer-Verlag, Berlin, 2006.
- (102) J. F. Carlson, *Support varieties for modules*, Discovering Mathematics With Magma, Algorithms and Computation in Mathematics, Vol. 19, Springer-Verlag, Berlin, 2006.
- (103) J. F. Carlson, *Maximal elementary abelian subgroups of rank 2*, J. Group Theory **10**(2007), 5-14.
- (104) J. F. Carlson *Cohomology and representation theory*. Group representation theory, 3-45, EPFL Press, Lausanne, 2007.
- (105) J. F. Carlson, E. M. Friedlander and J. Pevtsova, *Modules of constant Jordan type*, J. Reine Angew. Math. **2008** (2008), 191-234.

- (106) J. F. Carlson, Z. Lin and D. Nakano, *Support varieties for modules over Chevalley groups and classical Lie algebras*, Trans. Amer. Math. Soc. **360**(2008), 1879-1906.
- (107) D. J. Benson and J. F. Carlson, *Varieties and cohomology for infinitely generated modules*, Archiv Math. **91**(2008), 122–125.
- (108) J. F. Carlson, *Rank Varieties*, in Trends in Representations Theory of Algebras and Related Topics, A. Skowronski, Ed. European Mathematical Society Publishing House, 2008 .
- (109) P. Balmer, D. J. Benson and J. F. Carlson, *Gluing representations via idempotent modules and constructing endotrivial modules*, J. Pure Appl. Algebra, **213**(2009), 173 -193.
- (110) J. F. Carlson, N. Mazza and D. Nakano, *Endotrivial modules for the symmetric and alternating groups*, Proc. Edinburgh Math. Soc. **52**(2009), 45-66.
- (111) J. F. Carlson, Max Neunhoffer and Colva Roney-Dougal, *A polynomial-time reduction algorithm for groups of semilinear or subfield class*, Journal of Algebra, **322**(2009), 613-637.
- (112) J. F. Carlson, S. Chebolu and J. Minac, *Freyd's generating hypothesis for the stable module category of a finite group*, Proc. Amer. Math. Soc. **137**(2009), 2575-80.
- (113) J. F. Carlson and E. M. Friedlander, *The exact category of modules of constant Jordan type*, in Algebra, Arithmetic and Geometry: In honor of Yu. I. Manin, Vol 1, 269-290, Progr. Math. **269**, Birkhäuser Boston, Inc. Boston, MA, 2009.
- (114) J. F. Carlson, D. J. Hemmer and N. Mazza, *The group of endotrivial modules for the symmetric and alternating groups*, Proc. Edinburgh Math. Soc.(2) **53**(2010), 83-95.
- (115) J. F. Carlson, S. Chebolu and J. Minac, *Finite generation of Tate cohomology*, Representation Theory **15**(2011), 244-257.
- (116) J. F. Carlson, N. Mazza and J. Thévenaz, *Endotrivial modules for  $p$ -solvable groups*, Trans. Amer. Math. Soc, **363**(2011), 4979-4996.
- (117) J. F. Carlson, E. Friedlander and A. Suslin, *Modules for  $Z/p \times Z/p$* , Comment. Math. Helveticii **86**(2011), 609-657.
- (118) J. F. Carlson and D. Nakano, *Endotrivial modules for group schemes*, Journal Reine u. Angew. Math. **2011**(2011), 149-178.
- (119) J. F. Carlson and D. Nakano, *Endotrivial modules for finite group schemes II*, Bull. Inst. Math., Acad. Sinica (New Series), **7**(2012) No. 2, pp. 271-289.
- (120) J. F. Carlson, E. M. Friedlander and J. Pevtsova, *Representations of elementary abelian  $p$ -groups and bundles on Grassmannians* Advances in Math. **229**(2012), 2985-3051.
- (121) University of Georgia VIGRE Algebra Group, *Second cohomology for finite groups of Lie Type*, J. Algebra **360**(2012), 21–52.

- (122) J. F. Carlson, *Endotrivial Modules*, Recent developments in Lie algebras, groups and representation theory, 99-111, Proc. Sympos. Pure Math., 86, Amer. Math. Soc., Providence, RI, 2012.
- (123) J. F. Carlson, N. Mazza and J. Thévenaz, *Endotrivial modules for groups with quaternion and semi-dihedral Sylow subgroups*, J. Europ. Math. Soc. **15**(2013), 157-177.
- (124) University of Georgia Vigre Algebra Group *First cohomology for finite groups of Lie Type: Simple modules with small dominant weights*, Trans. Amer. Math. Soc. **365**(2013), no. 2, 1025-1050.
- (125) J. F. Carlson, N. Mazza and J. Thévenaz, *Torsion-Free endotrivial modules*, J. Algebra, **398**(2014), 413-433.
- (126) J. F. Carlson and D. Nakano, *On the structure of cohomology rings of  $p$ -nilpotent Lie algebras*, Transformation Groups **19**(2014), 721-734.
- (127) J. F. Carlson, N. Mazza and D. Nakano, *Endotrivial modules for the general linear group in a nondefining characteristic*, Math. Zeit. **278**(2014), 901925.
- (128) J. F. Carlson and S. Iyengar, *Thick subcategories of the bounded derived category of a finite group*, Trans. Amer. Math. Soc. **367**(2015), 2703-2717.
- (129) J. F. Carlson, J. Thévenaz, *The torsion group of endotrivial modules*, Alg. and Num. Theory, **9**(2015). 749-765.
- (130) J. F. Carlson, E. Friedlander and J. Pevtsova, *Elementary subalgebras of Lie algebras*, J. Algebra, **442**(2015), 155-189.
- (131) J. F. Carlson, M. Hauge and J. Rickard, *Blocks and support varieties*, J. Algebra, **442**(2015), 137-154.
- (132) J. F. Carlson, N. Mazza and D. Nakano, *Endotrivial modules for groups of Lie type  $A$  in a nondefining characteristic*, Math. Z. **282**(2016), 1 - 24.
- (133) J. F. Carlson, E. Friedlander and J. Pevtsova, *Vector bundles associated to Lie algebras*, J. Reine u. Angew. Math. **716**(2016), 147-178.
- (134) J. F. Carlson, S. K. Chebolu and J. Mináč, *Ghosts and Strong Ghosts in the stable category*, Canad. Math. Bull. **59**(2016), 682-692.
- (135) J. F. Carlson and S. Iyengar, *Hopf algebra structures and tensor products for group algebras*, New York J. Math. **23**(2017), 1-14.
- (136) J. F. Carlson and P. Webb, *The graded center of a triangulated category*, J. Australian Math. Soc. **102**(2017), 74-95.
- (137) J. F. Carlson, *Toward a classification of endotrivial modules*, "Finite simple groups: thirty years of the atlas and beyond", 139-150, Contemp. Math., **694**, Amer. Math. Soc., Providence, RI, 2017.
- (138) P. Balmer and J. F. Carlson, *Separable commutative rings in the stable module category of cyclic groups*, Algebras and Rep. Theory **218**(2)(2018), 399-417.
- (139) D. J. Benson and J. F. Carlson, *Nilpotence and generation in the stable module category*, J. Pure Appl. Algebra, **222**(2018), 3566-3584.

**Publications - Journal Articles in Press:**



- (1) J. F. Carlson, *Thick subcategories of the relative stable category*, in "Geometric and Topological Aspects of the Representation Theory of Finite Groups, Springer Proceedings in Mathematics and Statistics, Springer, (to appear).
- (2) J. F. Carlson, *Computing with matrix and basic algebras*, in Advances in Algebra - Research from the Southern Regional Algebra Conference 2017, Springer Proceedings in Mathematics and Statistics (to appear).
- (3) J. F. Carlson and D. J. Benson, *Virtual projectivity and the stable module category*, (submitted).

### **Publications - Journal Articles in Preparation:**

- (1) J. F. Carlson, J. Grodal, N. Mazza and D. Nakano, *Endotrivial modules for groups of Lie type in nondefining characteristics*, (in preparation).
- (2) J. F. Carlson, L. Wang and J. Zhang, *Relative derived categories and the Green correspondence*, (in preparation).
- (3) J. F. Carlson and J. Thévenaz, *The  $p$ -local control of endotrivial modules*, (in preparation).
- (4) L. Avramov, J. F. Carlson and S. B. Iyengar, *coalgebra structures on commutative Hopf algebras*, (in preparation).

### **Publications - Books:**

- (1) J. F. Carlson, *Module Varieties and Cohomology Rings of Finite Groups*, Lecture Notes of the University of Essen, Vol. **13** (1985).
- (2) J. F. Carlson, *Modules and group algebras*, ETH Lecture Notes, Birkhäuser (1996) Basel.
- (3) A. Adem, J. Carlson, S. Priddy and P. Webb, eds., *Group Representations: Cohomology, Group Actions and Topology*, Proceedings of Symposia in Pure Mathematics, Vol. 63, American Math. Soc. (1997), Providence, R. I.
- (4) J. F. Carlson and L. Townsley, L. Valero-Elizondo and M. Zhang *Cohomology rings of finite groups*, Kluwer, Dordrecht, 2003.
- (5) J. F. Carlson, S. B. Iyengar and J. Pevtsova, *Geometric and Topological Aspects of the Representation Theory of Finite Groups*, Springer Proceedings in Mathematics and Statistics, Springer-Verlag, (to appear).

### **Other Publications:**

- (1) J. F. Carlson, Review of *Methods of Representation Theory with Applications to Finite Groups and Orders*, Vol 1 by C.W. Curtis and I. Reiner, Bull. Amer. Math. Soc. (New Series), **8**(1983), 112-116.
- (2) J. F. Carlson, Review of *Methods of Representation Theory with Application to Finite Groups and orders*, Vol. 2 by C.W. Curtis and I. Reiner, Bull. Amer. Math. Soc. (New Series), **19**(1988), 484-488.

### Unpublished notes

- (1) A. Adem, J. F. Carlson and R. J. Milgram, *The cohomology of the Higman-Sims group*.
- (2) J. F. Carlson and K. W. Roggenkamp, *Lifting modules of group rings and Gorenstein Orders using syzygy functors*.

### Algorithms and Software

- (1) Packages for homological algebra and basic algebras, which have been included in the computer algebra system MAGMA since 1998. A package to compute ext algebras of basic algebras was added in 2008. Also the chapter describing the code in the Handbook of Magma Functions. Functionality for homomorphisms, automorphism, quotient algebras and subalgebra was added in 2012.
- (2) Packages for computing cohomology rings for finite groups, which computed most of the appendix in the book [101]. A newer version of the packages was released in MAGMA in the spring of 2005.
- (3) With Graham Matthews, a computer package to compute generators and relations for matrix algebras, described in [99]. The package was included in the release of MAGMA in the spring of 2005 and several improvements have been made since that time. Functions to compute the basic algebra of a matrix algebra and specific functions for computing Hecke algebras and Schur algebras were added in 2008. Functions for automorphisms and isomorphisms of basic algebras. Also the chapter describing the code is in the Handbook of Magma Functions.

### Invited Seminars and Convergence Lectures (since 2013):

This list does not include seminars and lectures at UGA.

“Modules of constant radical rank and bundles on Grassmannians”, seminar on Representation Theory, University of Bielefeld, January 29, 2013.

“Modules of constant radical type and associated bundles”, Commutative Algebra Colloquium, Mathematical Sciences Research Institute, Berkeley, February 20, 2013.

“Thick subcategories of the bounded derived category”, Group Theory Seminar, University of Chicago, March 14, 2013.

“Modules of constant Jordan type”, Mathematics Colloquium, DePaul University, March 15, 2013.

“Thick subcategories of the bounded derived category”, Algebra Seminar, Kansas University, April 9, 2013.

“Support varieties and module of constant radical type”, Algebra Seminars, Kansas State University, April 10. 12, 2013.

“Modules of constant Jordan type”. 50<sup>th</sup> William J. Spencer Lecture, Kansas State University, April 11, 2013.

“Homological Methods in the representation theory of finite groups”, The Third International Symposium on Groups, Algebras and related topics in Beijing, celebrating the 50th anniversary of the Journal of Algebra, (plenary lecture), Peking University, Beijing, China, June 10, 2013.

“Cohomology rings of  $p$ -nilpotent Lie algebras”, 6<sup>th</sup> International Conference on Representation Theory, Zhangjiajie, China, June 18. 2013.

“Cohomology rings of  $p$ -nilpotent Lie algebras”, Computational Algebra Seminar, University of Sydney, October 23, 2013.

“Endotrivial modules for the general linear group”, Special Session of the AMS meeting, Knoxville, TN, March 22, 2014.

“Endotrivial modules for the general linear group”. Algebra Seminar, EPFL, Lausanne, March 31, 2014.

“A new look at endotrivial modules”, Conference on Representation Theory and Geometry, University of Southern California, May 19, 2014.

“Random (?) elements of a matrix algebra”, Conference on Groups, Computations & Geometry, Colorado State University, June 12, 2014.

“Endotrivial Modules”, Sixteenth International Conference on Representations of Algebras, Tsinghua International Mathematics Forum, Sanya, China, August 26. 2014.

“Triangulated categories”, Five week series of lectures (four hours per week) Peking University, Beijing China, September 2 – October 2, 2014.

“Thick subcategories of the stable category”, Beijing Normal University. September 17, 2014.

“Modules of constant Jordan type”, Tsinghua University, Beijing, China, September 25, 2014.

“The relative stable category”, Conference on Geometric Methods in Representation Theory, University of Iowa, November 16, 2014.

“Thick subcategories of the relative stable category” Workshop on Computations, Groups and Algorithms, Friedrich-Schiller University, Jena, Germany, February 19, 2015.

“Thick subcategories of the relative stable category”, Algebra Seminar, University of Bielefeld, May 19, 2015.

“Thick subcategories of the relative stable category”, Conference on Groups, Representations, and Cohomology, Isle of Skye, June 19-26, 2015.

“Endotrivial Modules”, Algebra Seminar, University of Aberdeen, June 30, 2015.

“Modules of Constant Jordan Type”, Pure Mathematics Colloquium, University of Saint Andrews, July 2, 2015.

“Modules of Constant Jordan Type”, Colloquium, University of Utah, September 24, 2015.

“Relative Stable Categories”. Commutative Algebra Seminar, University of Utah, September 25, 2015.

“Endotrivial Modules”, Conference on the Atlas of Finite Groups: Thirty Years and Beyond, Princeton University, November 4, 2015.

“Group algebras and Hopf algebras”, Algebra Seminar, University of Auckland, December 4, 2015.

“Group algebras and Hopf algebras”, Representation Theory Seminar, University of Bielefeld, January 29, 2016.

“Rank varieties”, Colloquium, University of Arizona, April 28, 2016.

“Group algebras and Hopf algebras”, Southeast Lie Theory meeting, University of Virginia, May 25, 2016.

“Relative stable categories”. XXI Coloquio Latinoamericano de Algebra, Buenos Aires, Argentina, July 28, 2016.

“Endotrivial module for groups of Lie type in nondefining characteristics”. Endo- $p$ -permutation and trivial source modules in the representation theory of finite groups, Bernoulli Institute, EPFL, Lausanne, August 30, 2016.

“Block, basic algebras and computations”, Morita equivalence problems for blocks of finite groups”, Bernoulli Institute, EPFL, Lausanne, (two lectures) September 5, 6, 2016.

“Nilpotence and generation in the stable module category”, Conference on Geometric Methods in Representation Theory, University of Missouri, Columbia, November 20, 2016.

“Nilpotence and generation in the stable module category”, Special session on Group Representations and Cohomology, Annual meeting of the American Mathematical Society, Atlanta, GA, January 4, 2017.

“Hopf algebras and group algebras”, Algebra Seminar, Peking University, Beijing, March 3, 2017.

“Computing with matrix and basic algebras”, (Plenary lecture) Southern Regional Algebra Conference, University of South Alabama, March 18, 2017.

“Separable commutative rings in the stable module category of cyclic groups”, Maurice Auslander Distinguished Lectures and Conference, Woods Hole, MA. April 28, 2017.

“An obstreperous class of modules”. Representation Theory Seminar, University of Bielefeld, Bielefeld, Germany, May 26, 2017.

“Separable ring objects in the stable module category”, Special Session on Cohomology of Groups, Mathematical Congress of the Americas, Montreal, July 26, 2017.

“ $p$ -Divisible modules”, Pure Mathematics Seminar, Melbourne University, Melbourne, Australia, October 2, 2017.

“ $p$ -Divisible modules”, Department of Mathematics Seminar, University of Auckland, Auckland, New Zealand, October 17, 2017.

“Orbits of subspaces”. Computational Algebra Seminar, University of Sydney, October 25, 2017.

“Virtual Projectivity”, Meeting on *Geometric Methods in Representation Theory*, University of Iowa, Iowa City, November 19, 2017.

“ $p$ -Divisible modules”, Commutative Algebra Seminar, University of Utah, Salt Lake City, December 1, 2017.

“Support varieties”, Connections for Women, workshop, MSRI, February 2, 2018.

“Virtual projectivity, strong nilpotence and zombies”, Representation Theory Seminar, MSRI, May 1, 2018

## Honors and Visiting Positions:

Philip Francis DuPont Fellowship, 3 years, University of Virginia.  
 Fulbright senior research fellowship, Universität Essen, West Germany, Summer semester 1984 (4 months).  
 Visiting Professor for one month, École Normale Supérieure, Paris, June 1985.  
 Visiting Professor for one month, University of Chicago, April 1986.  
 Invited Participant, Symposium on Representation Theory of Groups and Related Topics, University of Manchester, March-May, 1988.  
 Visiting Professor, Universität Essen, January-March, 1989.  
 Visiting Professor, University of Bielefeld, January 1990.  
 Invited speaker, Algebra Section, International Congress of Mathematicians, Kyoto, Japan, August 1990.  
 Invited participant, Algebra Symposium on Groups, Rings and Representations, University of Warwick, March-June, 1991.  
 Visiting Fellow, Mathematics Research Section, The Australian National University, Canberra, January-March, 1992.  
 Visiting Fellow, Centre for Mathematics and its Applications, Australian National University, Canberra, March-May, 1994.  
 Visiting Member, Forschungsinstitut für Mathematik, ETH, Zürich, April-July, 1995.  
 Visiting Member, Mathematical Institute, Oxford, April-July 1997  
 Humboldt Research Award for Senior Scientists  
 Visiting Professor, University of Sydney, January 1999.  
 Visiting Fellow, University of Stuttgart, March-July 1999 (supported by the Humboldt Foundation).  
 Visiting Fellow, University of Stuttgart, April-July 2000 (supported by the Humboldt Foundation).  
 Visiting Professor, University of Sydney, July, 2003.  
 Visiting Professor, Max Planck Institut für Mathematik, Bonn, Germany, September-Novembers, 2003 (supported by the Humboldt Foundation).  
 Visiting Professor, University of Sydney, October-November, 2004.  
 Visiting Professor, Ecole Polytechnique (EPFL), Lausanne, February-June, 2005.  
 Visiting Professor, University of Sydney, May, 2006.  
 Visiting Professor, Rheinisch-Westfälische Technische Hochschule, Aachen, March-June, 2007 (supported by the Humboldt Foundation).  
 Visiting Professor, University of Sydney, April-June, 2012.  
 Named Fellow of the American Mathematical Society (Inaugural Class), January, 2013.  
 Visiting Professor, University of Sydney, October, 2013.  
 Visiting Professor, Peking University, September-October, 2014.  
 Visiting Professor, University of Sydney, November 2015.

#### **Ph.D. Students:**

Directed dissertation of

Stephen Kuhn - PhD. Mathematics (1978)

Deborah Sherman - PhD. Mathematics (1994)  
 Chuang Peng - PhD. Mathematics (1995)  
 Peteris Daugulis - PhD. Mathematics (1998)  
 Jason Whitt - PhD. Mathematics (1998)  
 Mucheng Zhang - PhD. Mathematics (2000)  
 Graham Matthews- PhD. Mathematics (2004)

### **Masters Students:**

Victoria Seals, Mathematics, MA, Fall 1993

### **Grant Support from NSF:**

DMS 7801685: "Representations of Modular Group Algebras", June 1, 1978 - November 30, 1980, \$14,600.

DMS 8002509: "Representations of Modular Group Algebras", June 15, 1980 - November 30, 1982, \$19,000.

DMS 8201469: "Modular Representations of Groups" (co-P. I. with Leonard Chastkofsky), June 1, 1982 - May 30, 1986. \$68,700

DMS 8501760: "Representations of Groups and Algebras", June 1, 1985 - November 30, 1987, \$41,100.

INT 8617583: "Scientific Visit to Study Integral Representations of Finite Groups", April 1, 1987 - April 30, 1987, \$3,991.40.

Conference on Cohomology and Representation Theory of Finite and Algebraic Groups, University of Georgia (Jan. 1988) \$6000.

DMS 8701068: "Modular Representations of Finite Groups", July 1, 1987 - December 30, 1990. \$68,200

DMS 9001689: "Modular Representations of Finite Groups", June 1, 1990 - November 30, 1993, \$123,150.

DMS 9001929: "Modular Representations of Finite Groups", June 1, 1993 - November 30, 1998, \$244,894.

DMS 9526513: "1996 Summer Research Institute, 'Cohomology, Representations and Actions of Finite Groups'", (co-principal investigator with Samuel M. Rankin, Associate Executive Director, American Mathematical Society) \$151,793, Grant awarded to the American Mathematical Society.

DMS9870035: "Modular Representations of Finite Groups", June 1, 1998 - November 30, 2001, \$216,256.

DMS0100662: "Modular Representations of Finite Groups", July 15, 2001 - June 30, 2005, \$144,213.

DMS0401431: "Modular Representations of Finite Groups", June 1, 2004 - May 31, 2007, \$112,344.

DMS0654173: "Modular Representations of Finite Groups", June 1, 2007 - May 31, 2010, \$110,001. DMS101102: "Modular Representations of Finite Groups", June 1, 2010 - May 31, 2014, \$109,371.

### **Other grant activity:**

Partially supported by the University of Georgia Middle Grades Teacher Education Project (N.S.F. funded), Academic years 1987-89.

ARC DP1096599: “Computations in Associative Algebras and Representations”, January 1, 2010 - December 31, 2012, (joint with John Cannon and Derek Holt, to support the development of algorithms for computing in algebras in Sydney), A\$ 300,000.

Simons 315728: “Modular Representations of Finite Groups”, Simons Foundation, September 1, 2014 - August 31, 2015, \$ 7000.00.

H98230-15-1-0007: “Modular Representations of Finite Groups”, National Security Agency, May 6, 2015 - May 5, 2016, \$ 25,884.00.

Simons 054813-01: “Modular Representations of Finite Groups”, Simons Foundation, September 1, 2016 - August 31, 2021, \$ 35,000.00.

### **Other Activities:**

Member of Board of Editors for Communications in Algebra, 1985-90.

Member of the A.M.S. Committee to select speakers for Southeastern Section Meetings (1987-88).

Organizer of conference on “Cohomology and Representation Theory of Finite and Algebraic Groups”, Athens, Ga., Jan. 3-5, 1988.

Chairman of the organizing committee for the conference “Finite and Algebraic Groups: Representations and Cohomology”, Arcata, Ca. July 8-14, 1989, jointly sponsored by AMS, SIAM and IMS and supported by a grant from NSF.

Chairman of organizing committee for “Workshop on General Representation Theory”, MSRI, Berkeley, December 3-7, 1990.

Chairman of organizing committee for the conference “Cohomology, Representations and Actions of Finite Groups”, South Hadley, Mass., June 20-26, 1992, jointly sponsored by AMS, IMS and SIAM and supported by NSF.

Member of the AMS Committee to select speakers for the Southeast Section Meetings (1994-95).

Organizer (with A. Adem) Special Session on “Cohomology and Representations of Finite Groups” at the annual meeting of the American Mathematical Society in San Francisco, January 4-7, 1995.

Member of the Program Committee for the “Second Magma Conference on Computational Algebra”, Marquette University in Milwaukee, May 12-17, 1995.

Organizer (with J. Alperin) Special Session on “Representations of Finite Groups” for the annual meeting of the American Mathematical Society in Baltimore, Md., January 7-10, 1998.

Member of Board of Editors for the journal “Algebras and Representation Theory”, 1999 -.

Organizer (with A. Adem and H.-W. Henn) of a meeting at the Mathematisches Forschungsinstitut Oberwolfach (Germany) on the topic “Cohomology, Representations and Actions of Finite Groups”, July 23–29, 2000.

Organizer (with A. Adem) Special Session on “Group Cohomology and Applications to Homotopy Theory and Representation Theory” at the annual meeting of the American Mathematical Society in New Orleans, January 10-13, 2001.

Cochairman of organizing committee for the conference “Groups, Representations and Cohomology”, South Hadley, Mass., June 6-14, 2002, jointly sponsored by AMS, IMS and SIAM and supported by NSF.

Invited participant in the workshop on Computation in Algebra, Number Theory and Combinatorics, sponsored by the American Institute of Mathematics, at the National Science Foundation, September 21-22, 2002.

Member of the board of editors for the Computational Algebra section of the Journal of Algebra, 2004 -.

Organizer (with A. Adem and H.-W. Henn) of a meeting at the Mathmatisches Forschungs-institut Oberwolfach (Germany) on the topic “Cohomology, Representations and Actions of Finite Groups”, Sept, 4-10, 2005.

Chairman of the Organizing Committee for the semester program “Representation Theory of Finite Groups and Related Topics”, Mathematical Sciences Research Institute, Berkeley, January-May, 2008.

Member of the organizing committee for a meeting at the Banff International Research Station, Banff, Canada, on the topic “Flavors of Groups”, November 17-22, 2005.

Organizer (with A. Adem and H. Krause) of a workshop at the Mathmatisches Forschungs-institut Oberwolfach (Germany) on the topic “Cohomology, Representations and Actions of Finite Groups”, July 25 - 31, 2010.

Member of the organizing committee for a conference on Representation of Finite Groups and related topics, EPFL, Lausanne, June 22 - 25, 2010.

Editor (with John Cremona and Eamonn O’Brien) of a special issue of the Journal of Algrbra in honor of the birthdays of Derek Holt and John Cannon, 2009.

Organizer (with B. Eick, A. Hulpke, E. O’Brien and A. Seress) of a meeting on “Algorithms for Linear Groups”, November 16-21, 2014.

Organizer (with A. Adem, D. Benson and H. Krause) of a workshop at the Mathmatisches Forschungs-Institut Oberwolfach (Germany) on the topic “Cohomology, Representations and Actions of Finite Groups”, May 2-9, 2015.

Organizer (with A. Kustin) Special session on “Commutative Algebra”, AMS meeting, Athens, GA., March 5–6, 2016.

Organizer (with S. Iyengar and J. Pevtsova) of a meeting on “Geometric and topological aspects of the representation theory of finite groups” at the Pacific Institute of Mathematics, University of British Columbia, Vancouver. July 26 - August 5, 2016.