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Education:

Institution	Dates Attended	Degree Date	Degree
University of Western Ontario	1970-1975	1975	BSc.
University of Western Ontario	1975-1976	1976	M.A.
Pennsylvania State University	1976-1981	1981	Ph.D.

Academic Experience:

University of Western Ontario, 1975-1976; Teaching Assistant
Pennsylvania State University, 1976-1981; Graduate Assistant
The University of Texas at San Antonio, 1981-1983; Assistant Professor
Utah State University, 1983-1987; Assistant Professor
Utah State University, 1987-1993; Associate Professor
Utah State University, 1993-2006; Full Professor
Baylor University, 2007-2019; Full Professor and Chair of Department
Baylor University, 2012-2016; Associate Dean for Research, Graduate School
Baylor University, August 2019 - present; Full Professor

Visiting Positions:

University of Surrey (England), 1987; Visiting Associate Professor
University of South Africa, 1990; Visiting Associate Professor
University of Wales, Cardiff, 1990-1991; Visiting Associate Professor
Carlos III University, Madrid, Spain, 1999-2000; Visiting Full Professor
Carlos III University, Madrid, Spain, 2002; Visiting Full Professor
University of Gabes, Tunisia, Visiting Full Professor
KAIST, Daejeon, South Korea, 2002-2004; Visiting Full Professor

Refereed Publications:

1982:

1. “Nonclassical orthogonal polynomials as solutions to second order differential equations”, (with S.D. Shore), **Canad. Math. Bull.**, 25(3), 1982, 291-295.
2. “The Krall polynomials: a new class of orthogonal polynomials”, **Quaestiones Math.**, 5(3), 1982, 255-265.

1983:

3. “A singular sixth order differential equation with orthogonal polynomial eigenfunctions”, (with A.M. Krall), in **Lecture Notes in Mathematics, No. 964**, 1983, Proceedings of Conference on Ordinary and Partial Differential Equations, Dundee, Scotland, 1982, Springer-Verlag, New York, 435-444.
4. “The Krall polynomials as solutions to a second order differential equation”, **Canad. Math. Bull.**, 26(4), 1983, 410-417.
5. “Symmetry factors for differential equations”, **Amer. Math. Monthly**, 90(7), 1983, 462-464.

1984:

6. “On the classification of differential equations having orthogonal polynomial solutions”, **Ann. Mat. Pura Appl.**, 4, 1984, 35-53.
7. “Weight distributions and moments for a certain class of orthogonal polynomial eigenfunctions”, **Proceedings of the Conference on Differential Equations**, Birmingham, Alabama, North-Holland Math. Studies, 92, 1984, 413-419.

1986:

8. “Orthogonal polynomials and singular Sturm-Liouville systems I”, (with A.M. Krall), **Rocky Mountain J. Math.**, 16(3), 1986, 435-479.
9. “An application of a new theorem on orthogonal polynomials and differential equations”, **Quaestiones Math.**, 10(1), 1986, 49-61.

1987:

10. “Distributional solutions of the hypergeometric differential equation”, (with R.P. Kanwal), **J. Math. Anal. Appl.**, 122(3), 1987, 325-345.
11. “On the classification of differential equations having orthogonal polynomial solutions II”, (with A.M. Krall), **Ann. Mat. Pura Appl.**, 4, 1987, 77-102.

12. “*A curious set of numbers*”, (with A.M. Krall), **Fibonacci Quarterly**, 25(4), 1987, 352-355.
13. “*Sturm-Liouville operators and orthogonal polynomials*”, (with A.M. Krall), Proceedings of Conference on Differential Equations, Bifurcation and Chaos, University of Toronto, 1986, in **Oscillation, Bifurcation and Chaos**, CMS-AMS Colloquium Series, Volume 8, 1987, 247-259.
14. “*Distributional solutions of ordinary differential equations*”, (with R.P. Kanwal and A.M. Krall), Proceedings of Conference on Differential Equations, **Oscillation, Bifurcation and Chaos**, University of Toronto, 1986, in Oscillation, Bifurcation and Chaos, CMS-AMS Colloquium Series, Volume 8, 1987, 227-246.

1988:

15. “*Differential operators and the Legendre type polynomials*”, (with W.N. Everitt), **Differential and Integral Equations**, 1(1), 1988, 97-116.
16. “*A characterization of formally symmetric ordinary differential expressions*”, (with D. Race), in **Differential Equations and Applications**, Proceedings of International Conference on Theory and Applications of Differential Equations, Columbus, Ohio, March 1988, Ohio University Press, 164-169.
17. “*Orthogonal polynomial solutions to ordinary and partial differential equations*”, Proceedings of International Conference on Orthogonal Polynomials and their Applications, Segovia, Spain, 1986, in Orthogonal Polynomials and their Applications, **Lecture Notes in Mathematics, No. 1329**, 1988, 98-124.

1989:

18. “*Orthogonal polynomials in weighted Sobolev spaces*”, (with W.N. Everitt and S.C. Williams), Proceedings of International Conference on Orthogonal Polynomials and their Applications, Laredo, Spain, 1987, in Orthogonal polynomials and their Applications (editor: J. Vinuesa), **Lecture Notes in Pure and Applied Mathematics, No. 117**, Marcel Dekker, New York, 1989, 53-73.

1990:

19. “*Orthogonal polynomials and higher order singular Sturm-Liouville systems*”, (with A.M. Krall), **Acta Applicandae Mathematicae**, 17, 1990, 99-170.
20. “*Symmetry factors for differential equations with applications to orthogonal polynomials*”, **Acta Mathematica Hungarica**, 56(1-2), 1990, 57-63.
21. “*Symmetric and symmetrisable ordinary differential expressions*”, (with D. Race), **Proc. London Math. Soc.**, 1, 1990, 334-356.

22. “*On some properties of the Legendre type linear differential expression*”, (with W.N. Everitt and A.M. Krall), **Quaestiones Math.**, 13(1), 1990, 83-106.
23. “*Right-definite spectral theory of self-adjoint differential operators with applications to orthogonal polynomials*”, (with W.N. Everitt and S.M. Loveland), in **Polinomios Ortogonales Y Aplicaciones** (editor: Luis Arias), Acta del VI Simposium, Proceedings of Conference on Orthogonal Polynomials and their Applications, Gijon, Spain, 1989, University of Oviedo, 1990, 1-32.
24. “*The density of polynomials in a weighted Sobolev space*”, (with W.N. Everitt), **Rendiconti di Matematica**, Roma, Series VII (10), 1990, 835-852.

1991:

25. “*The left-definite Legendre type problem*”, (with W.N. Everitt and S.C. Williams), **Journal of Constructive Approximation**, 7, 1991, 485-500.
26. “*Orthogonal polynomials and spectral theory: a survey*”, (with W.N. Everitt), Proceedings of Erice Conference on Orthogonal Polynomials and their Applications, in *Orthogonal polynomials and their applications* (editors: L. Gori, C. Brezinski, A. Ronveaux), **IMACS Annals on Computing and Applied Mathematics, Volume 9**, J.C. Baltzer AG, Basel, Switzerland, 1991, 21-55.

1992:

27. “*Differential operators and the Laguerre type polynomials*”, (with W.N. Everitt, A.M. Krall and V.P. Onyango-Otieno), **SIAM J. Math. Anal.**, 23(3), 1992, 722-736.
28. “*The Legendre type operator in a left-definite Hilbert space*”, (with A.M. Krall and W.N. Everitt), **Quaestiones Math.**, 15(4), 1992, 467-475.
29. “*Discrete inequalities, orthogonal polynomials and the spectral theory of difference operators*”, (with W.D. Evans and B.M. Brown), **Proc. Royal. Soc. London**, Series A, (437), 1992, 355-373.
30. “*A solution to the general Bessel moment problem*”, (with K.H. Kwon, W.D. Evans, W.N. Everitt and A.M. Krall), in **World Scientific Series in Applied Analysis I**, 1992, 205-220.

1993:

31. “*Orthogonal polynomials and approximation in Sobolev spaces*”, (with W.N. Everitt and S.C. Williams), **J. Comput. Appl. Math.**, 48, 1993, 69-90.
32. “*Real orthogonalizing weights for Bessel polynomials*”, (with W.D. Evans, W.N. Everitt and K.H. Kwon), **J. Comput. Appl. Math.**, 49, 1993, 51-57.

33. “*Orthogonal polynomials and extensions of Copson’s inequality*”, (with W.D. Evans and B.M. Brown), **J. Comput. Appl. Math.**, 48, 1993, 33-48.
34. “*Some properties of the sixth-order Legendre-type differential expression*”, (with W.N. Everitt and S.M. Loveland), **Rendiconti di Matematica**, 13, 1993, 773-799.
35. “*The Legendre polynomials under a left-definite energy norm*”, (with A.M. Krall), **Quaestiones Math.**, 16(4), 1993, 393-403.
36. “*On the completeness of orthogonal polynomials in left-definite Sobolev spaces*”, (with W.N. Everitt and R. Wellman), in **Topics in Polynomials of One and Several Variables and their Applications** (editors: Th. M. Rassias, H.M. Srivastava, A. Yanushauskas), World Scientific, Singapore, 1993, 173-197.

1994:

37. “*Characterizations of classical type orthogonal polynomials*”, (with K.H. Kwon, J.K. Lee and B.H. Yoo), **Proc. Amer. Math. Soc.**, 120(2), 1994, 485-493.
38. “*Characterizations of orthogonal polynomials satisfying differential equations*”, (with K.H. Kwon and B.H. Yoo), **SIAM J. Math. Anal.**, 25(3), 1994, 976-990.
39. “*Properties of the operator domains of the fourth-order Legendre-type differential expressions*”, (with W.N. Everitt and S.M. Loveland), **Differential and Integral Equations**, 7, 1994, 795-810.
40. “*Polynomials orthogonal in a Sobolev space*”, (with A. Iserles), in Linear and complex analysis problem book II (editors: V.P. Havin and N.K. Nikolski), **Lecture Notes in Mathematics, No. 1574**, Springer-Verlag, New York, 1994, 190-193.

1995:

41. “*On recurrence relations for Sobolev orthogonal polynomials*”, (with W.D. Evans, F. Marcellán, C. Market, and A. Ronveaux), **SIAM J. Math. Anal.**, 26(2), 1995, 446-467.
42. “*The symmetric form of the Koekoek’s Laguerre type differential equation*”, (with W.N. Everitt and R. Wellman), **J. Comput. Appl. Math.**, 57, 1995, 115-121.
43. “*The Laguerre type operator in a left-definite Hilbert space*”, (with W.N. Everitt, A.M. Krall and V.P. Onyango-Otieno), **J. Math. Anal. Appl.**, 192, 1995, 460-468.
44. “*The orthogonality of the Laguerre polynomials $\{L_n^{-k}(x)\}$ for positive integers k* ”, (with K.H. Kwon), **Annals of Numerical Mathematics**, 2(1-4), 1995, 289-303.
45. “*Sobolev orthogonal polynomials and spectral differential equations*”, (with K.H. Kwon, I.H. Jung and D.W. Lee), **Trans. Amer. Math. Soc.**, 347(9), 1995, 3629-3643.

46. “*Differential equations and Sobolev orthogonality*”, (with K.H. Kwon, I.H. Jung and D.W. Lee), **J. Comput. Appl. Math.**, 65, 1995, 173-180.

47. “*Hermitian differential operators, distributions and bilinear forms*”, (with W.N. Everitt and K.H. Kwon), in **Selecta Analytica**, Virian Press, U.K., 1995, 71-81.

1996:

48. “*Zeros of orthogonal polynomials in certain discrete Sobolev spaces*”, (with S.S. Han and K.H. Kwon), **J. Comput. Appl. Math.**, 67, 1996, 309-325.

49. “*New characterizations of classical orthogonal polynomials*”, (with K.H. Kwon and B.H. Yoo), **Indag. Math. N.S.**, 7(2), 1996, 199-213.

50. “*Sobolev orthogonal polynomials and second order differential equations II*”, (with K.H. Kwon and D.W. Lee), **Bull. Korean Math. Soc.**, 33(1), 1996, 135-170.

1997:

51. “*On the spectral analysis of the Laguerre polynomials $\{L_n^{-k}(x)\}$ for positive integers k* ”, (with W.N. Everitt, K.H. Kwon and R. Wellman), in **Spectral Theory and Computational Methods of Sturm-Liouville Problems**, Lecture Notes in Pure and Applied Mathematics (editors: Don Hinton and Philip W. Schaefer), Volume 191, Marcel Dekker, New York, 1997, 251-283.

52. “*Differential equations having orthogonal polynomial solutions*”, (with K.H. Kwon and D.W. Lee), **J. Comput. Appl. Math.**, 80, 1997, 1-16.

53. “*Classification of classical orthogonal polynomials*”, (with K.H. Kwon), **J. Korean Math. Soc.**, 34(4), 1997, 973-1008.

1998:

54. “*A catalogue of HELP and HELP-type integral and series inequalities*”, (with M. Benammar, C. Bennewitz, M.J. Beynon, B.M. Brown, N.G.J. Dias, W.D. Evans, W.N. Everitt and V.G. Kirby), **Recent Progress in Inequalities, Math. Appl.**, 430, 1998, 127-160.

55. “*Sobolev orthogonal polynomials and second-order differential equations*”, (with K.H. Kwon), **Rocky Mountain J. Math.**, 28(2), 1998, 547-594.

1999:

56. “*An Integral Operator with Applications*”, (with R S. Chisholm and W.N. Everitt), **J. of Inequal. & Applications**, 3(1999), 245-266.

57. “Bochner-Krall orthogonal polynomials”, (with K. H. Kwon and G. J. Yoon), **Proceedings of International Workshop on Special Functions, Asymptotics, Harmonic Analysis and Mathematical Physics**, Hong Kong, June 1999, World Scientific Publishers, 181-193.
58. “*H.J.S. Smith and the Fermat two squares theorem*”, (with W.N. Everitt, S.J.R. Vorster, and F.W. Clarke), **The American Mathematical Monthly**, 106(7), 1999, 652-665.

2000:

59. “*The left-definite spectral theory for the classical Hermite differential equation*”, (with W. N. Everitt and R. Wellman), **J. Comput. Appl. Math.** 121, 2000, 313-330.

2001:

60. “*Orthogonal polynomial eigenfunctions of second order partial differential equations*”, (with K.H. Kwon and J.K. Lee), **Trans. Amer. Math. Soc.**, 353(9), 3629-3647, 2001.
61. “*Orthogonal polynomial solutions to spectral type differential equations: Magnus’ conjecture*”, (with K. H. Kwon, and G. J. Yoon), **J. Approximation Theory** 112, 189-215, 2001.
62. “*Orthogonal polynomial solutions of linear ordinary differential equations*”, (with W. N. Everitt, K. H. Kwon, and R. Wellman), **J. Comput. Appl. Math.** 133 (2001), 85-109.
63. “*Self-adjoint operators generated from non-Lagrangian symmetric differential equations having orthogonal polynomial eigenfunctions*”, (with W.N. Everitt, K.H. Kwon, J.K. Lee, and S.C. Williams), **Rocky Mountain J. Math.**, 31(3), 899-937, 2001.

2002:

64. “*A general left-definite theory for certain self-adjoint operators with applications to differential equations*”, (with R. Wellman), **J. Differential Equations**, 181(2), 2002, 280-339.
65. “*On generalized Riesz points*”, (with W.Y. Lee and R. Harte), **J. Operator Theory**, 47(2002), 187-196.
66. “*On the right-definite and left-definite spectral theory of the Legendre polynomials*”, (with J. Arvesú and F. Marcellán), **J. Comput. Anal. and Appl.**, 4(4)(2002), 363-387.
67. “*On properties of the Legendre differential expression*”, (with W. N. Everitt and V. Marić), **Result. Math.** 42(2002), 42-68.

68. “Legendre polynomials, Legendre-Stirling numbers, and the left-definite spectral analysis of the Legendre differential expression”, (with W. N. Everitt and R. Wellman), **J. Comput. Appl. Math.**, 148(2002), 213-238.

2004:

69. “Orthogonal polynomials satisfying partial differential equations belonging to the basic class”, (with J. K. Lee and B. H. Yoo), **J. Korean Math. Soc.** 41(2004), 1049-1070.
70. “The fourth-order Bessel-type differential equation”, (with J. Das, W. N. Everitt, D. B. Hinton, and C. Markett), **Applicable Analysis**, 83(4) (2004), 325-362.
71. “On analytic sampling theory”, (with A. García), **J. Comput. Appl. Math.**, 171 (2004), 235-246.
72. “The Sobolev orthogonality and spectral analysis of the Laguerre polynomials $\{L_n^{-k}\}$ for positive integers k ”, (with W. N. Everitt and R. Wellman), **J. Comput. Appl. Math.**, 171 (2004), 199-234.

2005:

73. “Additional properties of the fourth-order Bessel-type differential equation”, (with W. N. Everitt, H. Kalf, and C. Markett), **Math. Nachr.**, 278(12-13) (2005), 1538-1549.

2006:

74. “A construction of real weight functions for certain orthogonal polynomials in two variables”, (with J. K. Lee), **J. Math. Anal. Appl.** 319(2006), no. 2, 475-493.
75. “Sobolev orthogonal polynomials in two variables and second-order partial differential equations”, (with J. K. Lee), **J. Math. Anal. Appl.**, 322(2006), no. 2, 1001-1017.
76. “Construction of differential operators having Bochner-Krall orthogonal polynomials as eigenfunctions”, (with K. H. Kwon and G. J. Yoon), **J. Math. Anal. Appl.**, 324(2006), 285-303.
77. “The fourth-order Bessel equation: eigenpackets and a generalized Hankel transform”, (with W. N. Everitt, H. Kalf, and C. Markett), **Integral Transforms Spec. Funct.**, 17(2006), no. 12, 845-862.

2007:

78. “Left-definite variations of the classical Fourier expansion theorem”, (with A. Zettl), **Electron. Trans. Numer. Anal.**, 27 (2007) 124-139.

79. “Some remarks on classical Lagrangian symmetric differential expressions and their composite powers”, (with W. N. Everitt and D. Tuncer), **Adv. Dyn. Syst. Appl.** 2(2), 2007, 187-206.

80. “Jacobi-Stirling numbers, Jacobi polynomials, and the left-definite analysis of the classical Jacobi differential expression”, (with W. N. Everitt, K. H. Kwon, R. Wellman, and G. J. Yoon), **J. Comput. Appl. Math.**, 208 (2007), 29-56.

2009:

81. “A Combinatorial Interpretation of the Legendre-Stirling Numbers”, (with George Andrews), **Proc. Amer. Math. Soc.**, 137(8) (2009), 2581-2590.

82. “Quasi-separation of the biharmonic partial differential equation”, (with W. N. Everitt, B. T. Johansson, and C. Markett), **IMA (Oxford) J. Appl. Math.** 2009 74(5), pp. 685-709.

83. “Ghost matrices and a characterization of symmetric Sobolev bilinear forms”, (with K. H. Kwon and G. J. Yoon), **Linear Algebra Appl.**, 431 (2009), 104-119.

84. “Properties of the solutions of the fourth-order Bessel-type differential equation”, (with W. N. Everitt and C. Markett), **J. Math. Anal. Appl.**, 359 (2009), 252-264.

2010:

85. “Variation of parameters and solutions of composite products of linear differential equations”, (with J. L. López), **J. Math. Anal. Appl.**, 369 (2010). 658-670.

86. “Left-definite theory with applications to orthogonal polynomials”, (with A. Bruder, D. Tuncer, and R. Wellman), **J. Comput. Appl. Math.**, 233(2010), 1380-1398.

2011:

87. “The Legendre-Stirling Numbers”, (with G. E. Andrews and W. Gawronski), **Discrete Math.**, 311 (2011), 1255-1272.

88. “The Legendre equation and its self-adjoint operators”, (with A. Zettl), **Electron. J. Diff. Equ.**, Vol. 2011 (2011), No. 69, pp. 1-33.

2012:

89. “Non-classical Jacobi polynomials and Sobolev orthogonality”, (with A. Bruder), **Results Math.**, 61(2012), no. 3-4, 283-313.

90. “Classical and Sobolev orthogonality of the nonclassical Jacobi polynomials with parameters $\alpha = \beta = -1$ ” (with A. Bruder), **Ann. Mat. Pura Appl.**, 193(2) (2014), 431-455.

91. “Franciszek Hugon Szafraniec: A Scholar of Eminence” (with D. Cichoń and J. Stochel), **Complex Anal. Oper. Theory**, 6(2012), no. 3, 529-531.

2013:

92. “The Jacobi-Stirling Numbers”, (with G. E. Andrews, E. Egge, W. Gawronski), **J. Combinatorial Theory Ser. A**, 120(2013), 288-303.
93. “On the spectra of left-definite operators”, (with R. Wellman), **Complex Anal. Oper. Theory**, 7(2) (2013), 437-455.
94. “Factorization of second-order linear differential equations and Liouville-Neumann expansions”, (with E. García, J. L. López, and E. Pérez Sinusía), **Mathematical and Computer Modelling**, 57 (2013), 1514-1530.
95. “The Spectral Analysis of the X_1 -Laguerre Polynomials”, (with M. J. Atia and J. Stewart), **Advances in Dynamical Systems and Applications**, 8(2) (2013), 181-192.

2014:

96. “Asymptotics of Stirling and Chebyshev-Stirling Numbers of the Second Kind”, (with W. Gawronski and T. Neuschel), **Stud. Appl. Math.** 133 (2014), 1-17.
97. “Diagonalizability and Symmetrizability of Sobolev-Type Bilinear Forms: A Combinatorial Approach”, (with H. K. Kim, K. H. Kwon, and G. J. Yoon), **Linear Algebra Appl.**, 460 (2014), 111-124.

2015:

98. “A Spectral Study of the Second-Order Exceptional X_1 -Jacobi Differential Expression and a Related Non-classical Jacobi Differential Expression”, (with C. Liaw, J. Stewart, and Q. Wicks), **J. Math. Anal. Appl.** 422 (2015), no. 1, 212–239 .
99. “On the Asymptotic Normality of the Legendre-Stirling Numbers of the Second Kind”, (with W. Gawronski and T. Neuschel), **European J. Combin.**, 49 (2015), 218–231..
100. “Spectral analysis for the exceptional X_m -Jacobi equation”, (with C. Liaw and J. Stewart), **Electron. J. Diff. Equ.**, Vol. 2015 (2015), No. 194, pp. 1-10.

2016:

101. “The spectral analysis of three families of exceptional Laguerre polynomials”, (with C. Liaw, R. Milson, and J. Stewart), **J. Approx. Theory** 202 (2016), 5–41.
102. “Glazman-Krein-Naimark Theory, Left-Definite Theory and the Square of the Legendre Polynomials Differential Operator”, (with Q. Wicks), **J. Math. Anal. Appl.**, 444 (2016), no. 1, 1-24.

2018:

103. “*Differential operator for discrete Gegenbauer-Sobolev orthogonal polynomials: eigenvalues and asymptotics*”, (with Juan F. Mañas–Mañas, Juan J. Moreno–Balcázar and R. Wellman), **J. Approx. Theory**, 230 (2018) 32-49.
104. “*On Birman’s sequence of Hardy-Rellich-type inequalities*”, (with F. Gesztesy, I. Michael and R. Wellman), **J. Differential Equations** 264 (2018), 2761-2801.
105. “*Factorizations and Hardy-Rellich-type Inequalities*”, (with F. Gesztesy), in **Non-Linear Partial Differential Equations, Mathematical Physics, and Stochastic Analysis**. The Helge Holden Anniversary Volume, F. Gesztesy, H. Hanche-Olsen, E. R. Jakobsen, Yu. Lyubarskii, N. H. Risebro, and K. Seip (eds), EMS Congress Reports, ETH-Zürich, 2018, pp. 207-226.

2019:

106. “*Radial and logarithmic refinements of Hardy’s inequality*” (with F. Gesztesy, I. Michael and M. Pang), **St. Petersburg Math. J.**, 30(2019), No. 3, 429-436.
107. “*Trace formulas applied to the Riemann ζ -function*”, (with M. Ashbaugh, F. Gesztesy, L. Hermi, K. Kirsten and H. Tossounian), in **Integrability, Supersymmetry and Coherent States. A Volume in Honour of Professor Véronique Hussin**, Sengül Kuru, Javier Negro, Luis M. Nieto (eds), CRM Series in Mathematical Physics, Springer, 2019.
108. “*Self-adjoint operators in extended Hilbert spaces $H \oplus W$: an application of the general GKN-EM theorem*”, (with R. Wellman), **Operators and Matrices**, 13(3), 2019, 667-704.
109. “*On weighted Hardy-like inequalities*”, (with C. Chuah, Fritz Gesztesy, Tao Mei, Isaac Michael and Michael M. H. Pang), to appear in **Mathematical Inequalities & Applications**.
110. “*Green’s Formula and Euler’s Formula for $\zeta(2n)$* ”, (with M. Ashbaugh, F. Gesztesy, L. Hermi, K. Kirsten and H. Tossounian), submitted for publication.
111. “*A Sequence of Weighted Birman-Hardy-Rellich Inequalities with Logarithmic Refinements*”, (with F. Gesztesy, Isaac Michael, and Michael M.H. Pang), in preparation.
112. “*On Self-Adjoint Boundary Conditions for Singular Sturm–Liouville Operators Bounded From Below*”, (with F. Gesztesy and R. Nichols), submitted for publication.
113. “*An Application of the GKN-EM Theory: A New Spectral Analysis of the Sixth-Order Krall Differential Expression*”, (with K. Elliott and R. Wellman), in preparation.

Technical reports and other publications:

1. “*An old classification problem in orthogonal polynomials and consequences of its modern interpretation*”, (with W.N. Everitt and K.H. Kwon), in **Seminario Avanzado en Teoria de Aproximación** (editor: F. Marcellán and J. Vinuesa), Laredo, 1994, 67-76.
2. “*Left-definite theory of differential operators: on the generalization of the Sonine-Hahn classification theorem for orthogonal polynomials*”, (with W.N. Everitt and K.H. Kwon), in **Seminario Avanzado en Teoria de Aproximación** (editor: F. Marcellán and J. Vinuesa), Laredo, 1994, 77-83.
3. “*Some new results and some open problems in the subject of differential equations /orthogonal polynomials*”, (with W.N. Everitt and K.H. Kwon), in **Seminario Avanzado en Teoria de Aproximación** (editor: F. Marcellán and J. Vinuesa), Laredo, 1994, 84-87.
4. “*Differential equations and Bochner-Krall orthogonal polynomials*”, (with A.M. Krall), **USU Technical Report**, 50 pages.
5. “*Notes on the DPS classification problem and the $(TPS \cap DPS)$ classification problem*”, (with W.N. Everitt), **USU Technical Report #56**, 28 pages.
6. “*The operator domains for the Legendre^(r) differential expression*”, (with W.N. Everitt and S.M. Loveland), **USU Technical Report #57**, 56 pages.
7. “*Classification Problems in Differential Equations and Orthogonal Polynomials*”, **USU Technical Report #92**, 23 pages.
8. “*The Frobenius Program: A User’s Guide*”, (with B.M. Brown, W.N. Everitt and D.K.R. McCormack). **USU Technical Report #94**, 28 pages.
9. “*Orthogonal polynomials and spectral theory: a survey (updated version)*”, (with W.N. Everitt).
10. “*Analytic and functional analytic problems in differential equations and orthogonal polynomials*”, **USU Technical Report #116**, 19 pages.
11. “*The Frobenius Program: A User’s Guide*”, (with B.M. Brown, W.N. Everitt, and D.K.R. McCormack), 30 pages.

Colloquium and Conference Talks:

1. “*A new set of orthogonal polynomials*”, contributed talk, AMS annual meeting, San Francisco, 1980.
2. “*A sixth order differential equation having orthogonal polynomial solutions*”, colloquium talk, University of Western Ontario, February, 1981.
3. “*Orthogonal polynomials and differential equations*”, colloquium talk, University of Manitoba, April, 1981.
4. “*Weight distributions and moments for a certain class of orthogonal polynomials*”, invited talk, Southeastern Differential Equations Conference, North Carolina State University, October, 1982.
5. “*On the classification of differential equations having orthogonal polynomial solutions*”, contributed talk, Special Session, AMS annual meeting, Denver, 1983.
6. “*Orthogonal polynomials, weight distributions, and differential equations*”, invited lecture, University of Toronto Mini-Conference on Differential Equations and Orthogonal Polynomials, April, 1983.
7. “*Weight distributions and moments for a certain class of differential equations*”, contributed talk, International Conference on Ordinary and Partial Differential Equations, University of Alabama, Birmingham, April, 1983.
8. “*Orthogonal polynomials, weight distributions and differential equations*”, colloquium talk, University of Manitoba, April, 1983.
9. “*Orthogonal polynomials, weight distributions and differential equations*”, colloquium talk, University of Calgary, April, 1983.
10. “*A survey of recent results on the connections between orthogonal polynomials and differential equations*”, invited lecture, AMS meeting, University of Notre Dame, April, 1984.
11. “*Symmetry factors and orthogonal polynomials*”, colloquium talk, University of Utah, December, 1985.
12. “*Necessary and sufficient conditions for the existence of symmetry factors for real and ordinary differential expressions*”, contributed talk, International Conference on Ordinary and Partial Differential Equations, University of Alabama, Birmingham, March, 1986.
13. “*Sturm-Liouville operators and orthogonal polynomials*”, invited lecture, Canadian Mathematical Society Seminar on Differential Equations, University of Toronto, July, 1986.

14. “*Constructing weight functions for orthogonal polynomials*”, invited lecture, Constructive Function Theory Conference, Edmonton, Alberta, July, 1986.
15. “*Ordinary and partial differential equations with orthogonal polynomial eigenfunctions: a unified theory*”, plenary lecture, Second International Conference on Orthogonal Polynomials and their Applications, Segovia, Spain, September, 1986.
16. “*A survey of Sturm-Liouville equations with orthogonal polynomial solutions*”, colloquium talk, University of Birmingham, England, May, 1987.
17. “*A survey of Sturm-Liouville equations with orthogonal polynomial solutions*”, colloquium talk, King’s College, University of London, England, May, 1987.
18. “*On the construction of weight functions for a certain class of orthogonal polynomials for a certain class of orthogonal polynomials*”, colloquium talk, Oxford University, May, 1987.
19. “*Orthogonal polynomials in Sobolev spaces*”, plenary lecture, International Congress of Orthogonal Polynomials and Applications, Laredo, Spain, September, 1987.
20. “*Orthogonal polynomials and right- and left-definite boundary value problems*”, colloquium talk, University of Western Ontario, December, 1987.
21. “*A characterization of formally symmetric differential expressions*”, invited lecture, International Conference on Theory and Applications of Differential Equations, Columbus, Ohio, March, 1988.
22. “*On the construction of weight distributions for a certain class of orthogonal polynomials*”, colloquium talk, University of Ottawa, March, 1988.
23. “*Left-definite boundary value problems and a conjecture of Hahn*”, colloquium talk, University of Ottawa, March, 1988.
24. “*On the construction of weight distributions for a certain class of orthogonal polynomials*”, colloquium talk, Penn State University, March, 1988.
25. “*A characterization of formally symmetric differential expressions*”, contributed lecture, Intermountain Section of Mathematical Association of America, Logan, Utah, April, 1988.
26. “*Constructing weight distributions for a certain class of orthogonal polynomials*”, colloquium talk, Idaho State University, January, 1989.
27. “*Symmetric and symmetrisable differential expressions*”, invited lecture, International Conference on Differential Equations: Theory and Applications in Stability and Control, Colorado College, Colorado Springs, June, 1989.

28. “*Constructing weight functions for orthogonal polynomials*”, colloquium talk, University of Granada, Granada, Spain, September, 1989.
29. “*Constructing weight functions for orthogonal polynomials*”, colloquium talk, Polytechnic University of Madrid, Madrid, Spain, September, 1989.
30. “*Spectral differential equations and the theory of singular differential operators*”, main address, Spanish National Conference on Orthogonal Polynomials and their Applications, Gijon, Spain, September, 1989.
31. “*The five Legendre^(r) differential equations*”, main address, Spanish National Conference on Orthogonal Polynomials and their Applications, Gijon, Spain, September, 1989.
32. “*Spectral differential equations and orthogonal polynomials*”, colloquium talk, University of South Africa, Pretoria, South Africa, February, 1990.
33. “*Spectral differential equations and orthogonal polynomials*”, colloquium talk, The University of the Witwatersrand, Johannesburg, South Africa, February, 1990.
34. “*Constructing weight distributions for a certain class of orthogonal polynomials*”, colloquium talk, University of South Africa, Pretoria, South Africa, March, 1990.
35. “*Spectral differential equations and orthogonal polynomials*”, colloquium talk, University of Pretoria, Pretoria, South Africa, March, 1990.
36. “*Orthogonal polynomials: a historical lecture*”, colloquium talk, University of Bophuthatswana, Mmabatho, Bophuthatswana, March, 1990.
37. “*Sobolev orthogonality*”, plenary lecture, Inaugural Meeting of Contact Group for Special Functions”, Namur, Belgium, September, 1990.
38. “*Constructing weight functions for a certain class of orthogonal polynomials*”, colloquium talk, University of Twente, Enschede, The Netherlands, November, 1990.
39. “*Constructing weight functions for a certain class of orthogonal polynomials*”, colloquium talk, University of Groningen, Groningen, The Netherlands, November, 1990.
40. “*Symmetric differential expressions*”, invited lecture, Special Meeting on Spectral Theory (organizers: H.D. Niessen, A. Schneider, J. Weidmann), Olberwolfach, Germany, January, 1991.
41. “*A real-valued weight function for the Bessel polynomials*”, colloquium talk, University of Aachen, Aachen, Germany, January, 1991.
42. “*Orthogonal polynomials and spectral theory*”, colloquium talk, University of Sussex, Brighton, England, February, 1991.

43. “*A real-valued weight function for the Bessel polynomials*”, colloquium talk, University of Cambridge, Cambridge, England, February, 1991.
44. “*Differential equations for the generalized Laguerre and Jacobi polynomials*”, colloquium talk, The University of Birmingham, Birmingham, England, May, 1991.
45. “*The Bessel moment problem*”, plenary lecture, Gregynog Symposium on Pure Mathematics, Gregynog, Wales, May, 1991.
46. “*A survey of left-definite spectral theory and Sobolev orthogonal polynomials*”, Workshop on Orthogonal Polynomials and Sobolev Spaces, Leganés, Spain, June, 1992.
47. “*A solution to the Bessel moment problem*”, colloquium talk, University of Zaragoza, Zaragoza, Spain, June, 1992.
48. “*An old classification problem in orthogonal polynomials and the consequences of its modern interpretation*”, plenary lecture, Seminario avanzado en teoría de aproximación, Laredo, Spain, September, 1992.
49. “*Spectral theory of differential operators I: the theory of Glazman-Krein-Naimark (right-definite theory)*”, plenary lecture, Seminario avanzado en teoría de aproximación, Laredo, Spain, September, 1992.
50. “*Spectral theory of differential operators II: the left-definite theory of differential operators and the generalization of the Sonine-Hahn classification theorem for orthogonal polynomials*”, plenary lecture, Seminario avanzado en teoría de aproximación, Laredo, Spain, September, 1992.
51. “*Some new results and some open problems in the subject of differential equations/orthogonal polynomials*”, plenary lecture, Seminario avanzado en teoría de aproximación, Laredo, Spain, September, 1992.
52. “*Sobolev orthogonal polynomials and second-order differential equations*”, invited lecture, Gregynog Workshop on Computational Techniques in Spectral Theory and Related Topics, Gregynog, Wales, July, 1993.
53. “*A generalization of Bochner’s characterization theorem of the classical orthogonal polynomials*”, colloquium lecture, Carleton University, Ottawa, Canada, December, 1993.
54. “*Orthogonal polynomials, left-definite boundary value problems and W.N. Everitt*”, invited lecture, W.N. Everitt Conference, Tuscaloosa, Alabama, March, 1994.
55. “*Sobolev orthogonal polynomials and second-order differential equations*”, invited lecture, Banach Institute, Warsaw, Poland, March, 1994.

56. “*Recent advances in the spectral theory of the Laguerre polynomials*”, invited lecture, Banach Institute, Warsaw, Poland, March, 1994.
57. “*A short course in orthogonal polynomials and their applications*”, MAA invitation, MAA Regional Meeting, Westminster College, Salt Lake City, April, 1994.
58. “*Sobolev orthogonal polynomials and a generalization of a theorem of Bochner*”, colloquium talk, Andong National University, Andong, South Korea, August, 1996.
59. “*Sobolev orthogonal polynomials and a generalization of a theorem of Bochner*”, colloquium talk, KAIST Institute, Taejon, South Korea, August, 1996.
60. “*The Glazman-Krein-Naimark Theorem and beyond*”, colloquium talk, KAIST Institute, Taejon, South Korea, August, 1996.
61. “*The Laguerre differential equation when α is a negative integer: spectral analysis*”, colloquium talk, KAIST Institute, Taejon, South Korea, August, 1996.
62. “*Sobolev orthogonal polynomials and a generalization of a theorem of Bochner*”, colloquium talk, Sung Kyun Kwan University, Suwon, South Korea, August, 1996.
63. “*Sobolev orthogonal polynomials and a generalization of a theorem of Bochner*”, colloquium talk, Changwon National University, Chang-Won, South Korea, September, 1996.
64. “*The Laguerre differential equation when α is a negative integer: spectral analysis*”, colloquium talk, Sung Kyun Kwan University, Suwon, South Korea, September, 1996.
65. “*The Laguerre differential equation when α is a negative integer: spectral analysis*”, colloquium talk, Seoul National University, Seoul, South Korea, September, 1996.
66. “*The Bessel moment problem: the $0 \neq 0$ solution*”, colloquium talk, University of Western Ontario, London, Ontario, Canada, December, 1996.
67. “*The spectral analysis of the Laguerre polynomials $\{L_n^{-k}(x)\}_{n=0}^{\infty}$ for positive integers k* ”, invited lecture, Eighth Symposium on Orthogonal Polynomials and their Applications, Seville, Spain, September, 1997.
68. “*Left-definite spectral theory with applications to differential equations and orthogonal polynomials*”, invited lecture, International Workshop on Special Functions, Hong Kong, June, 1999.
69. “*A general left-definite theory with applications to differential equations*”, invited lecture, Computation and Analytic Problems in Spectral Theory, Gregynog, Wales, July, 1999.

70. “*Orthogonal polynomials, linear differential equations, and the Kramer sampling theory*”, plenary lecture, Fifth International Symposium on Orthogonal Polynomials, Special Functions and their Applications, Patras, Greece, September 1999.
71. “*Left-definite spectral theory with applications to orthogonal polynomials*”, invited lecture, Fifth International Symposium on Orthogonal Polynomials, Special Functions and their Applications, Patras, Greece, September 1999.
72. “*Henry John Stephen Smith and Fermat’s Two Squares Theorem*”, colloquium lecture, Carlos III University, Leganés, Spain, October, 1999.
73. “*Left-definite spectral theory with applications to orthogonal polynomials*”, OPS Seminar Group lecture, Carlos III University, Leganés, Spain, October, 1999.
74. “*Henry John Stephen Smith and Fermat’s Two Squares Theorem*”, colloquium lecture, University of Valladolid, Valladolid, Spain, February, 2000.
75. “*A general left-definite theory of positive self-adjoint operators*”, colloquium lecture, University of Valladolid, Valladolid, Spain, February, 2000.
76. “*Two proofs of the Everitt-Marić result for the Legendre differential equation*”, invited lecture, Advanced Study Institute - NATO conference, Arizona State University, May, 2000.
77. “*The old meets the new: the method of Frobenius and Mathematica*”, invited lecture, Advanced Study Institute - NATO conference, Arizona State University, June, 2000.
78. “*The BKS(N,M) problem in orthogonal polynomials and differential equations*”, invited lecture, AMS Sectional Meeting, Birmingham, Alabama, November, 2000.
79. “*Left-definite spectral theory for a class of positive self-adjoint operators*”, colloquium lecture, Utah State University, January, 2001.
80. “*Left-definite spectral theory for a class of positive self-adjoint operators*”, colloquium lecture, University of Central Florida, February, 2001.
81. “*Stirling numbers, Legendre numbers and orthogonal polynomials*”, invited lecture, Sixth International Symposium on Orthogonal Polynomials, Special Functions and Applications, Rome, June, 2001.
82. “*Left-definite spectral theory and powers of differential equations*”, invited lecture, Twenty-first Annual Southeastern-Atlantic Regional Conference on Differential Equations, Wake Forest University, November, 2001.
83. “*Orthogonal polynomials and differential equations: the BKS(N, M) Problem*”, invited lecture, Carlos III University, Madrid, Spain, March, 2002.

84. *“Orthogonal polynomials and differential operators I: the GKN theory”*, invited lecture, Carlos III University, Madrid, Spain, March, 2002.
85. *“Orthogonal polynomials and differential operators II: the Littlejohn-Wellman left-definite theory”*, invited lecture, Carlos III University, Madrid, Spain, March, 2002.
86. *“An Example: Legendre’s differential equation and Legendre polynomials”*, invited lecture, Carlos III University, Madrid, Spain, March, 2002.
87. *“Left-definite Spectral Theory, Legendre Polynomials, and Legendre-Stirling Numbers”*, plenary lecture, Tunisian Mathematical Society, Mahdia, Tunisia, March 2002.
88. *“On the construction of weight distributions for polynomials in the $BKS(N, M)$ classes”*, colloquium lecture, University of Gabes, Gabes, Tunisia, March 2002.
89. *“Henry John Stephen Smith and Fermat’s Two Squares Theorem”*, colloquium lecture, University of Gabes, Gabes, Tunisia, March 2002.
90. *“Left-Definite Spectral Theory, Orthogonal Polynomials, and Generalized Stirling Numbers”*, colloquium lecture, Division of Applied Mathematics, KAIST, Daejeon, Korea, July, 2002.
91. *“Jacobi-Stirling numbers and the left-definite theory for the classical Jacobi differential equation”*, invited lecture, 22nd Southeastern Atlantic Regional Conference on Differential Equations, University of Tennessee, Knoxville, October, 2002.
92. *“General left-definite theory with applications to self-adjoint differential and difference operators”*, invited lecture, Bexbach Workshop 2002, Bexbach, Germany, October, 2002.
93. *“Orthogonal polynomials and differential equations: the $BKS(N, M)$ problem”*, colloquium lecture, The University of Saskatchewan, Saskatoon, Saskatchewan, Canada, February, 2003.
94. *“Left-definite operator theory with applications to special functions”*, colloquium lecture, The University of Saskatchewan, Saskatoon, Saskatchewan, Canada, February, 2003.
95. *“Right-definite differential operators: the Glazman-Krein-Naimark (GKN) theory”*, colloquium lecture, The University of Saskatchewan, Saskatoon, Saskatchewan, Canada, February, 2003.
96. *“General left-definite theory with applications to self-adjoint differential operators and orthogonal polynomials”*, colloquium lecture, Georgia Tech University, October, 2003.
97. *“Laguerre polynomials and self-adjoint operators”*, colloquium lecture, Georgia Tech University, October, 2003.

98. *“An introduction to left-definite theory”*, Workshop in Difference Equations and Special Functions, Invited Lecture, Otocec, Slovenia, October, 2003.
99. *“An integral inequality and Legendre’s differential equation”*, Workshop in Difference Equations and Special Functions, Invited Lecture, Otocec, Slovenia, October, 2003.
100. *“Laguerre polynomials and self-adjoint operators”*, colloquium lecture, Technical University of Munich, Germany, October, 2003.
101. *“Some applications of left-definite theory for positive self-adjoint operators”*, invited lecture, M-function and Related Topics Conference (in honor of W. N. Everitt), Cardiff, Wales, July, 2004.
102. *“Regular Right and Left Definite Boundary Value Problems with Applications to Fourier Analysis”*, ABiTUMath Workshop, Invited Lecture, Munich, Germany and Novacella, Italy, October, 2004.
103. *“Abstract Left-Definite Theory for Positive Self-Adjoint Operators”*, invited lecture, special session on Spectral Problems of Differential Operators, American Mathematical Society meeting, Northwestern University, Evanston, Illinois, October, 2004.
104. *“A Simple Proof of Fermat’s Theorem - No, Not That One!”*, invited lecture, AbiTUMath Workshop, Munich, Germany and Novacella, Italy, March/April, 2005.
105. *“An Introduction to Left-Definite Theory”*, invited lecture, Workshop on Sampling, Spectral Theory, and their Applications, University of West Georgia, April, 2005.
106. *“Applications of Left-Definite Theory to Classical Orthogonal Polynomials and Combinatorics”*, invited lecture, Workshop on Sampling, Spectral Theory, and their Applications, University of West Georgia, April, 2005.
107. *“Laguerre-Sobolev Polynomials: Their Orthogonality and Applications to Sampling Theory”*, invited lecture, Workshop on Sampling, Spectral Theory, and their Applications, University of West Georgia, April, 2005.
108. *“Left-definite operator theory with applications to orthogonal polynomials and combinatorics”*, colloquium lecture, Baylor University, April, 2005.
109. *“Left-definite theory with applications to orthogonal polynomials”*, colloquium lecture, University of Missouri-Rolla, May, 2005.
110. *“Lagrange-Sobolev adjoints and Lagrange-Sobolev symmetry of ordinary differential expressions”*, contributed talk, Southeastern Atlantic Regional Conference on Differential Equations, University of North Carolina - Greensboro, October, 2006.
111. *“Lagrange-Sobolev Adjoint, Symmetry, and Orthogonal Polynomials”*, colloquium talk, Baylor University, November, 2006.

112. “*Orthogonal polynomials and left-definite spectral theory*”, invited lecture, 1027th AMS Regional Meeting, Tucson, Arizona, April, 2007.
113. “*Lagrange-Sobolev adjoints and Lagrange-Sobolev symmetry of ordinary differential expressions*”, invited lecture, 1027th AMS Regional Meeting, Tucson, Arizona, April, 2007.
114. “*Left-Definite Spectral Theory with Applications to Orthogonal Polynomials*”, plenary lecture, Special Functions, Information Theory, and Mathematical Physics, An Interdisciplinary Conference to Honor Jesus Dehesa’s 60th birthday, Granada, Spain, September, 2007.
115. “*Left-Definite Operator Theory*”, plenary lecture, Palestinian Conference on Modern Trends in Mathematics and Physics, Birzeit University, Birzeit, Palestine, July, 2008.
116. “*Left-definite spectral theory with applications to combinatorics*”, colloquium lecture, Texas A&M University, October 2008.
117. “*Stieltjes ghost functions and the Bessel moment problem*”, colloquium lecture, Trinity University, January 2009.
118. “*Legendre-Stirling Numbers*”, contributed talk, 10th International Symposium on Orthogonal Polynomials, Special Functions, and their Applications, Leuven, Belgium, July, 2009.
119. “*The Influence of W. N. Everitt in Differential Operators and Orthogonal Polynomials*”, invited lecture, W. N. Everitt Retirement Conference, University of Birmingham, England, September, 2009.
120. “*Legendre polynomials, Legendre-Stirling numbers, and left-definite operator theory*”, Millican Lecture, University of North Texas, April, 2010.
121. “*Bessel’s equation and a generalization of Hardy’s inequality*”, Plenary Lecture, Functions and Operators 2010, Kraków, Poland, June, 2010.
122. “*Applications of left-definite operator theory to orthogonal polynomials and integral inequalities*”, colloquium talk, Texas A&M University, October 2010.
123. “*A generalization of Hardy’s inequality*”, colloquium lecture, University of Birmingham, Birmingham, England, June, 2011
124. “*The Legendre-Stirling Numbers*”, invited lecture, Workshop on Analytic and Computational Techniques in Spectral Theory and Related Topics, EPSRC Gregynog Workshop 2011, June, 2011.
125. “*A New Result in Old Mathematics: Variation of Parameters and Solutions of Linear Differential Equations*”, colloquium lecture, University of Trier, Germany, July, 2012.

126. “*Spectral Analysis of the X_1 –Laguerre Polynomials*”, invited lecture, International Conference on Differential Equations, Difference Equations, and Special Functions, Patras, Greece, September, 2012.
127. “*Legendre polynomials, Legendre-Stirling numbers, and left-definite operator theory*”, Colloquium Lecture, Texas Christian University, October, 2012.
128. “*Legendre polynomials and Legendre-Stirling Numbers*”, Workshop in Honor of David Borwein at 90, The IRMACS Centre, Simon Fraser University, April, 2014.
129. “*The spectral theory of some exceptional orthogonal polynomials*”, invited lecture, Spectral Analysis and Differential Equations A Memorial Meeting to Mark the Life and Work of Professor W. N. Everitt, Cardiff, Wales, May, 2014.
130. “*Exceptional orthogonal polynomials and spectral theory*”, plenary lecture, CRM-ICMAT Workshop on Exceptional Orthogonal Polynomials and Exact Solutions in Mathematical Physics, Segovia, Spain, September, 2014.
131. “*Laguerre polynomials and Sobolev Orthogonality*”, invited lecture, 13th International Symposium on Orthogonal Polynomials, Special Functions and Their Applications, National Institute of Standards and Technology, Gaithersburg, MD, June, 2015.
132. “*The Analysis of the Classical Legendre Differential Equation*”, colloquium talk, Department of Mathematics, Dalhousie University, Halifax, Nova Scotia, September 2015.
133. “*Glazman-Krein-Naimark Theory, Left-Definite Theory and the Square of the Legendre Polynomials Differential Operator*”, colloquium talk, Western University, London, Ontario, November 2015.
134. “*Glazman-Krein-Naimark Theory, Left-Definite Theory and the Square of the Legendre Polynomials Differential Operator*”, colloquium talk, University of Houston, November 2015.
135. “*Glazman-Krein-Naimark Theory, Left-Definite Theory and the Square of the Legendre Polynomials Differential Operator*”, colloquium talk, University of North Texas, February 2016.
136. “*Glazman-Krein-Naimark Theory, Left-Definite Theory and the Square of the Legendre Polynomials Differential Operator*” or “*Lance, where are your boundary conditions*”, invited talk, XII International Conference on Approximation and Optimization in the Caribbean, Havana, Cuba, June 2016.
137. “*Computing $\zeta(2n)$ via spectral theory and Green’s functions*”, contributed talk, Combinatory Analysis 2018: A Conference in Honor of George Andrews’ 80th Birthday, Penn State University, June 2018.

138. “*Two Applications of Green’s Functions*”, colloquium lecture, Colorado College, November 2018.
139. “*Problems On Density of Polynomials in Banach Spaces - Part I*, Andrei’s Informal Seminar, Baylor University, October 2019.
140. “*Problems On Density of Polynomials in Banach Spaces - Part II*, Andrei’s Informal Seminar, Baylor University, October 2019.

Graduate Students:

1. Susan Marie Loveland, *Spectral analysis of the Legendre Equations*, Ph.D., May, 1990, Utah State University.
2. Richard Wellman, *Self-adjoint representations of a certain sequence of spectral differential equations*, Ph.D., June, 1995, Utah State University.
3. Andrea Bruder, *Applied left-definite theory: the Jacobi polynomials, their Sobolev orthogonality, and self-adjoint operators*, Ph.D., May, 2009, Baylor University.
4. Davut Tuncer, *The left-definite spectral analysis of the Legendre type differential equation*, Ph.D., December, 2009, Baylor University.
5. Jessica Stewart, *Spectral Analysis of the Exceptional Laguerre and Jacobi Equations*, Ph.D., May, 2014, Baylor University.
6. Quinn Wicks, *Glazman-Krein-Naimark Theory, Left-Definite Theory, and the Square of the Legendre Polynomials Differential Operator*, Ph.D., (Joint with Constanze Liaw) May, 2016, Baylor University.
7. Katie Elliott, *The Sixth-Order Krall Differential Expression and Self-Adjoint Operators*, Ph.D. May, 2019, Baylor University.
8. Isaac Michael, *On Hardy-Birman-Rellich-type Inequalities*, Ph.D., (Joint with Fritz Gesztesy) August, 2019, Baylor University.

External Chairman for Foreign Ph.D. Students:

1. S. Mashike, South Africa, February, 1990, *Morse-Sturm Variational Theory for Systems of non-regular self-adjoint fourth-order differential equations*.
2. S. Belmehdi, France, September, 1990, *Formes lineaires et polynomes orthogonaux semi-classiques de classes $s = 1$. Description et classification*.

3. R. Koekoek, The Netherlands, November, 1990, *Generalizations of the classical Laguerre polynomials and some q-analogues*.
4. A. Kroopnick, South Africa, July, 1991, *Boundedness, oscillation, and stability theorems for certain classes of second order differential equations*.
5. Ana Martínez de los Ríos, Spain, September, 2014, “*Matrix Orthogonal Polynomials and Differential, Difference and q-Difference Matrix Operators*”.

Grants:

- 1984 Utah State University Summer Research Grant (funded)
- 1985 Utah State University Summer Research Grant (funded)
- 1986 Utah State University Summer Research Grant (funded)
- 1989 Science and Engineering Research Council (England) Grant (funded)
- 1999 Ministry of Education (Spain) (funded; SAB-1998-0098)
- 1999 National Science Foundation (\$56K; funded; DMS-9970478)
- 2001 National Science Foundation (\$6K; funded; DMS-9970478)
- 2003 Banff International Research Station (\$15K; for conference in March 2004)

Awards and Honors:

- 1973 University of Western Ontario (UWO) Statistics Scholarship
- 1975 Annie R. Kingston Gold Medal for Mathematics (UWO)
- 1976-1979 National Research Council Postgraduate Scholarship
- 1980-1981 National Science and Engineering Research Council Scholarship
- 1981 Hoover Teaching Award, The Pennsylvania State University
- 1990 College of Science Teacher of the Year (Utah State University)
- 1992 International Professor of the Year (Utah State University)
- 1994 MAA Intermountain Section Distinguished Teaching Award
- 2005 Mortar Board Top Professor Award

Professional Memberships:

- Canadian Mathematical Society
- Mathematical Association of America
- Society for Industrial and Applied Mathematics
- American Mathematical Society
- London Mathematical Society
- South African Mathematical Society
- Korean Mathematical Society

Other Professional Activities:

Editorial Board: Advances in Dynamical Systems and Applications, Abstract and Applied Analysis, Journal of Functional Analysis and Approximation Theory, Complex Analysis and Operator Theory (no editorial boards currently)

Reviewer: Mathematical Reviews, Zentralblatt

Referee: Abstract and Applied Analysis, Advances in Dynamical Systems and Applications, Quaestiones Mathematicae, Journal of Constructive Approximation, SIAM Journal of Mathematical Analysis, Results in Mathematics, Applicable Analysis, Proceedings of London Mathematical Society, Journal of Mathematical Analysis and Applications, Proceedings of Royal Society of Edinburgh, Journal of Approximation Theory, The American Mathematical Monthly, Journal of Computational and Applied Mathematics, Transactions of the American Mathematical Society, Rocky Mountain Journal of Mathematics, Applied Numerical Mathematics, Annals of Numerical Mathematics, National Science Foundation, Proceedings of the American Mathematical Society, Studia Mathematica, Applied Mathematics Letters, Methods and Applications of Analysis

Guest Editor: Rocky Mountain Journal of Mathematics, Journal of Computational and Applied Mathematics

Board of Directors: Canadian Mathematical Society (1993-1997)

Chairman: Intermountain Section of the MAA (1996-1998)

American Mathematical Society: Professional Ethics Subcommittee (2007-2009), Committee on Academic Freedom, Tenure, and Employment (2011-2013)

Seminars Taught:

Approximation Theory (UTSA and USU)

Banach Algebras (USU)

Orthogonal Polynomials (USU)

Unbounded Operators (USU)

Singular differential operators (USU)

Spectral Theory and Orthogonal Polynomials (University of Wales)

Spectral Theory of Differential Operators with Applications to

Orthogonal Polynomials (Carlos III University, Spain)

Courses Taught:

Undergraduate: college algebra, precalculus, trigonometry, calculus, multivariable calculus, linear algebra, differential equations, partial differential equations, engineering analysis, topology, complex variables, modern algebra, numerical analysis, real analysis, number theory, cryptography

Graduate: ordinary differential equations, linear algebra, real variables, measure theory, Fourier analysis, orthogonal polynomials, topology, functional analysis, numerical analysis, approximation theory, special functions, Banach algebras, modern algebra.

University Service:

1981-1982 (University of Texas at San Antonio)

Undergraduate Advising Committee
Undergraduate Textbook Committee Chairman
Undergraduate Course Development Committee

1982-1983 (University of Texas at San Antonio)

University Assembly
Undergraduate Catalog Committee
Undergraduate Advising Committee
Undergraduate Textbook Committee Chairman

1983-1984

Undergraduate Advising Committee
Summer Mini-Conference co-organizer
Summer Science Lecture Series Committee
Graduate Committee
Graduate School Liason

1985-1986

Summer Science Lecture Series Committee
Graduate Committee
Graduate School Liason
Sterling Scholar Judge

1986-1987

Summer Science Lecture Series Committee
Graduate Committee
Graduate School Liason
University Awards and Honors Committee

1987-1988

Graduate Committee
Colloquium Chairman
LASP Board of Governors
Search Committee member
Graduate School Liason
Math Education Committee
Tenure Subcommittee member
Summer Science Lecture Series Committee

1988-1989

Graduate Committee
Colloquium Chairman
Search Committee member
Graduate School Liason
Tenure Subcommittee member
LASP Board of Governors

1989-1990

MAA representative
Colloquium Chairman
Search Committee member
Graduate School Liason
Tenure Subcommittee member
LASP Board of Governors

1990-1991

On sabbatical leave to University of Wales, Cardiff

1991-1992

Tenure Subcommittee member
LASP Board of Governors
USU Faculty Senate
Dean's Undergraduate Advisory Committee
Mathematics Undergraduate Advisory Committee

1992-1993

Tenure Subcommittee member
LASP Board of Governors
USU Faculty Senate
Dean's Undergraduate Advisory Committee

1993-1994

Tenure Subcommittee member/chair
LASP Board of Governors
USU Faculty Senate
Dean's Undergraduate Advisory Committee
Search Committee Chairman
USU Athletic Council
Athletic Council -University Relations Subcommittee

1994-1995

Tenure Subcommittee member/chair
Promotion Committee Chair
LAS Board of Governors
USU Faculty Senate
Dean's Undergraduate Advisory Committee
USU Athletic Council
Academic and Athletic Eligibility Requirements Committee
Departmental Graduate Committee

1995-1996

Tenure Subcommittee member/chair
LAS Board of Governors
USU Faculty Senate
Executive Committee of Faculty Senate
Dean's Undergraduate Advisory Committee
USU Athletic Council
Budget Subcommittee of Athletic Council
Departmental Graduate Committee

1996-1997

Tenure Subcommittee member/chair
LAS Board of Governors
USU Faculty Senate
Executive Committee of Faculty Senate
Dean's Undergraduate Advisory Committee
Departmental Graduate Committee
Department Search Committee Chair
MAA Intermountain Section Chair
MAA conference organizer

1997-1998

Tenure Subcommittee member (E. Stone, D. Wilczynski, M. Fels)
Tenure Subcommittee chair (J. Zheng)
Promotion committee member (Z.Q. Wang)
MAA Intermountain Section Chair
Dean's Undergraduate Advisory Committee
University Athletic Council
Athletic Council - University Relations Subcommittee
President's NCAA Representative Search Committee
Department Search Committee member

1998-1999

Tenure Subcommittee member (D. Wilczynski, M. Fels)
Dean's Undergraduate Advisory Committee
University Athletic Council
Athletic Council - Student Academic and Athletic Eligibility Committee
Chair - Putnam Exam Team
Co-organizer of Fifth International Symposium on Orthogonal Polynomials
and their Applications (Patras, Greece)

1999-2000

On sabbatical leave to Carlos III University, Madrid, Spain

2000-2001

Board of Regents Presidential Selection Committee
Tenure Subcommittee member (M. Fels)

2001-2002

Chair, Dan Nakano Promotion Committee
MSRI Representative

2003-2004

USU Athletic Council
Co-Organizer PIMS-BIRS Workshop: Orthogonal Polynomials;
Interdisciplinary Aspects
Putnam Coach

2004-2005

USU Faculty Senate
USU Calendar Committee
USU Honorary Awards and Degrees Committee
Tenure Committee Chair (D. Brown)
Tenure Committee Member (Computer Science)
Putnam Coach

2005-2006

USU Faculty Senate
USU Calendar Committee
USU Honorary Awards and Degrees Committee
College of Science Ombudsman
Tenure Committee Chair (D. Brown)
Tenure Committee Member (Computer Science)
Promotion Committee Member (Physics)
Putnam Coach

2006 - December 2006

USU Calendar Committee
College of Science Ombudsman
Tenure Committee Chair (D. Brown)
Putnam Coach

January 2007 - August 2019

Chairman, Department of Mathematics, Baylor University

September 2012 - August 2016

Associate Dean for Research, Graduate School, Baylor University

August 1, 2019 - present

Professor of Mathematics

Last updated: **January 9, 2020**