

## CURRICULUM VITA

**NAME:** Mourad E.H. Ismail

**AFFILIATION:** University of Central Florida and King Saud University and

**ADDRESS:** Department of Mathematics  
University of Central Florida  
4000 Central Florida Blvd. P.O. Box 161364 Orlando, FL 32816-1364, USA.  
Telephones: Cell (407) 770-9959.

**POSITION:** Research Professor at U of Central Florida

**PERSONAL DATA:** Born April 27, 1944, in Cairo, Egypt.  
Male. Married.  
Canadian and Egyptian citizen,  
Permanent resident in the United States.

**EDUCATION:** Ph.D. 1974 (Alberta), M.Sc. 1969 (Alberta), B.Sc. 1964 (Cairo).

### MATHEMATICAL GENEALOGY:

Source: The Mathematics Genealogy Project, <http://www.genealogy.ams.org>

- Yours truly, Ph. D. 1974, Advisor: Waleed Al-Salam.
- Waleed Al-Salam, Ph. D. 1958, Advisor: Leonard Carlitz.
- Leonard Carlitz, Ph. D. 1930, Advisor: Howard Mitchell.
- Howard Mitchell, Ph. D. 1910, Advisor: Oswald Veblen.
- Oswald Veblen, Ph. D. 1903, Advisor: Eliakim Hastings Moore.
- Eliakim Hastings Moore, Ph. D. 1885, Advisor: H. A. Newton.
- H. A. Newton, B. S. Yale 1850, Advisor: Michel Chasles.
- Michel Chasles, Ph. D. 1814, Advisor: Simeon Poisson.
- Simeon Poisson, Advisor: Joseph Lagrange.
- Joseph Lagrange, Ph. D. Advisor: Leonhard Euler.

## RESEARCH INTERESTS:

Approximation theory, asymptotics, combinatorics, integral transforms and operational calculus, mathematical physics, orthogonal polynomials and special functions.

## POSITIONS HELD:

2010–2012	Chair Professor, City University of Hong Kong
2003–2012 and 2013–present	Professor, University of Central Florida
2008–2016	Distinguished Research Scientist Fellow, King Saud University, Riyadh, Saudi Arabia
1987–2003	Professor, University of South Florida, tenured 1988
1982–1989	Professor with tenure, Arizona State University
1980–1982	Associate Professor, Arizona State University
1978–1980	Assistant Professor, Arizona State University
1979–1981	Associate Professor, McMaster University, tenured 1981
1976–1979	Assistant Professor, McMaster University
1964–1968	Instructor, Cairo University

## VISITING POSITIONS:

2013	Senior Researcher, City University of Hong Kong, one month
2012	Visiting Professor, City University of Hong Kong, one month
2009	Visiting memembr, The Isaac Newton Institute, University of Cambridge, UK
2008	Von Neumann Professor, the Technical University of Munich, Munich, Germany, June&July
2008	Visiting Scholar, Hong Kong U of Sc. and Tech., May & June
2006	Visiting Scholar, City University of Hong Kong, May & June
2002	Visiting Scholar, Hong Kong U of Sc. and Tech., May & June
2000–2001	Visiting university professor, City University of Hong Kong
1999	Visiting member, Math. Sc. Res. Inst., Berkeley, three months.
1996	Visiting Professor and Leverhulme research fellow, Imperial College, London
1990–1991	Adjunct Professor, University of Toronto
1990	Visiting Professor, University of Paris VII (10 weeks in the summer)
1988	Visiting Professor, National University of Colombia (1 month)
1987–1990	Adjunct Professor, York University
1987	Visiting Professor, University of Alberta (1 month in the summer)
1986	Visiting Professor, University of Paris VII (10 weeks in the summer)
1984–1985	Visiting Professor, University of Minnesota, Minneapolis

1982 Visiting Professor, Kuwait University  
(winter and summer semesters)

1976 Visiting Scholar, Mathematics Research Center  
University of Wisconsin, Madison

1975-1976 Visiting Lecturer and Research Associate, University of Toronto

1974-1975 Assistant Scientist, Department of Mathematics and Mathematics  
Research Center, University of Wisconsin, Madison

#### **SHORT VISITING APPOINTMENTS:**

1984 Visiting Professor, University of Paris 7,  
Laboratoire des Theoreque Physique et Haute Energies, one month

1990 Visiting Professor, University of Paris 7,  
Laboratoire des Theoreque Physique et Haute Energies, one month

2003 Visiting Professor, University of Lille,  
Laboratoire Paul Painleve, one month

2007 Visiting Professor, University of Lyon I, Institute Camille Jordan, one month.

**Erdős Number** 2, (four times) through J. Gillis, L. B. Richmond, M. V. Subbarao and S. Suen.  
**Einstein Number** 3 through J. Gillis.

#### **EDITORIAL BOARDS:**

1. Constructive Approximation, Published by Springer-Verlag, 1988-present.
2. Encyclopedia of Mathematics, Cambridge University Press, 1992-present.
3. Journal of Approximation Theory, formerly published by Academic Press and now by Elsevier, 2000-present.
4. Proceedings of the American Mathematical Society, 2016–2020.
5. Journal of Physics A: Mathematical and General, 2001-2004.
6. The Ramanujan Journal, formerly published by Kluwer and now by Springer-Verlag , 1996-present.
7. Integral Transforms and Special Functions, associate editor, 2012–present.
8. Methods and Applications of Analysis, Published by International Press, 1992-1999.
9. International Journal of Mathematics and Mathematical Sciences, 1993–2008.
10. Journal of Computational analysis and Applications, Published by Plenum, 1998–2008.
11. The Indian Journal of Mathematics. 1997-present.
12. Fractional Calculus & Applied Analysis, 1998-present.
13. The Egyptian Journal of Mathematics, 2003–present.

14. Arab Journal of Science and Engineering, Mathematics Section.
15. Member of the Advisory board of Journal of Advanced Research, the official Journal of Cairo University, 2009–present.
16. Member of the Advisory board of the Jordan Journal of Mathematics and Statistics.
17. Collaborating Problem Editor, American Mathematical Monthly, 1992-1997.

**RESEARCH AND CONFERENCE GRANTS:**

1. Science and Engineering Research Board of McMaster University, 1976-78.
2. National Research Council of Canada, 1977-1982.
3. National Science Foundation (NSF), USA, classical analysis, 1979-82, 1983-95, 1996-99, (79-82 joint with J. Bustoz, 1989-92 joint with E.B. Saff, 1992-95 joint with E.B. Saff and V. Totik). NSF analysis 1996-1999, 1999-2003.
4. CBMS Conference on q-series, Statistical Physics and Computer Algebra, joint with E. Ihrig, 1985.
5. International Division, National Science Foundation, USA, 1988-1991, collaboration with J. Charris, Colombia.
6. NATO A.S.I. on Orthogonal Polynomials and Their Applications, joint with P. Nevai and D. Stanton, 1989-1990.
7. NSF conference grant, a supplement to #6, joint with P. Nevai and D. Stanton, 1989-1990.
8. NSF grant, joint with E.B. Saff, from special projects for a special year in Approximation Theory (at USF) for 1989-1990.
9. NSF equipment grant for work stations and symbolic manipulations, joint with J. Pedersen, G. McColm, R. Stark and C. Williams.
10. NSF grant, joint with E.B. Saff, for collaborative research in classical analysis, 1989-91.
11. NSF grant, International Division, joint with M.Z. Nashed and A. Zayed, for a Conference in Cairo, Egypt, 1993-94.
12. NATO Collaborative research grant, joint with R. Askey and B. M. Brown, 1994-1997.
13. Research fellowship from the Leverhulme foundation, Britain, 1995-97.
14. EPSRC grant, with Y. Chen, fall of 1996.
15. NSF grant for the joint AMS-IMA-SIAM summer research conference on  $q$ -series, combinatorics, and computer algebra, joint with D. Stanton, June 1998.
16. NSF grant, International Division, for collaborative research with Britain, 1998-2000.
17. NSA grant, The Askey-Bateman Project, 1998-2000.

18. NSF grant, International Division, joint with S. Elaydi, A. El-Khadre, and M. Z. Nashed, for a conference of the Palestinian Math. Soc. held at Bir Zeit University, West Bank, 1998.
19. NSF grant, International Division, joint with C. Dunkl, for a conference in Hong Kong, 1998-99.
20. NSF conference grant from algebra-Number theory program, for a conference in Gainesville, joint with Frank Garvan, U of Florida, 1999.
21. Grant from the Number Theory Foundation for a conference in Gainesville, joint with Frank Garvan, U of Florida, 1999.
22. NSF conference grant from the Analysis program, for a conference in Tempe, Arizona, joint with Sergei Suslov, Arizona State University, 2000.
23. NSF conference grant from the Analysis program for a conference in Marseille, France.
24. Hong Kong research grant for 3 years 2010-2013.
25. Hong Kong research grant for 3 years 2011-2014

**AGENCIES REFEREED FOR:**

National Science Foundation (algebra and number theory, classical analysis, computers and computational mathematics, and modern analysis), City University of Hong Kong Research Committee, National Security Agency, Natural Sciences and Engineering Research Council of Canada, Soros program, and Kuwait Research Foundation.

**JOURNALS REFEREED FOR:**

Acta Mathematica, Advances in Applied Probability, Advances in Difference Equations, Advances in Mathematics, Aequationes Mathematicae, American Mathematical Monthly, Analysis, Annales des Sciences Mathematiques du Quebec, Annales Mathematicae Silesiana, Annals of Mathematics, Analysis, and Geometry, Applicable Analysis and Discrete Mathematics, Applied Math. Letters, Arab Gulf Journal Scientific Research, Arabian Journal Science and Engineering, Australian Journal of Mathematics, Bol. Soc. Mat. Mexicana, Canadian Journal of Chemical Engineering, Canadian Journal of Mathematics, Canadian Mathematical Bulletin, Central European Journal of Mathematics, Communications in Mathematical Physics, Communications in Applied Mathematics and Computational Science, Communications in Statistics, Complex Variables, Constructive Approximation, Cubo, Czechoslovak Mathematical Journal, Discrete Applications of Mathematics, Discrete Mathematics, Egyptian Mathematical Journal, Europhysics Letters, Fibonnaci Quarterly, Foundations of Computational Mathematics, Ganita, Glasgow Mathematical Journal, Houston Journal of Mathematics, IEEE Signal Processing Letters, Indagationes Mathematicae, Indian Journal of Mathematics, Indian Journal of Pure and Applied Mathematics, International Journal of Mathematics and Mathematical Sciences, International Mathematics Research Notes, Involve, a Journal of Mathematics, Journal of Applied Probability, Journal of Approximation Theory, Journal of Combinatorial Theory, Journal of Difference Equations, Journal of Differential Equations, Journal of Functional Analysis, Journal of the Egyptian Mathematical Society, Journal of Inequalities in Pure and Applied Mathematics, Journal of Linear Algebra and Applications, Journal of Linear and Multilinear Algebra, Journal of London Mathematical Society, Journal of Mathematical Analysis and Applications, Journal of Mathematical Physics,

Journal of nonlinear Mathematical Physics, Journal of the Mathematical Society of Japan, Journal of Physics A: Mathematical and General, Journal of Statistical Physics, Journal of the University of Kuwait (Science); Letters in Mathematical Physics, Mathematical Physics, Mathematics Magazine, Mathematische Nachrichten, Mathematische Zeitschrift, Mathematics of Computation, Mathematika, Monatsh für Mathematik, Nihonkai Mathematical Journal, Nonlinearity, Numerical Functional Analysis and Optimization, Proceedings of the American Mathematical Society, Physics Letters A, Physical Review, Proceedings of the Edinburgh Mathematical Society, Proceedings of the Mathematical and Physical Society of Egypt, Proceedings of the Royal Society of London, Punjab Journal of Mathematics, Pure and Applied Mathematics Quarterly, Radgovi Mathematicae, Rendiconti del Seminario Matematico di Padova, Rendiconti Circolo di Palermo, Results in Mathematics, Revista Colombiana de Matematicas, Revista Matematica Iberoamericana, Rocky Mountain Journal Mathematics, Serdica, Scientiae Mathematicae Japonicae, SIAM Journal of Applied Mathematics, SIAM Journal of Mathematical Analysis, SIAM Journal of Numerical Analysis, SIAM J. Scientific Computing, Southeast Asian Mathematics Buletin, Studia Sci. Math. Hungarica, Symmetry, Integrability and Geomtery: Methods and Applications, Transactions of the American Mathematical Society, Zeitschrift Anal. Anwendungen.

#### **HONORS AND AWARDS:**

- Undergraduate Merit Scholarship, Cairo University 1960-1964;
- Dissertation Fellowship, University of Alberta, 1973-1974;
- Theodore and Venette Askounes-Ashford Distinguished Scholar Award University of South Florida, 1992-1993.
- Leverhulme research fellow, Imperial College, London, 1996.
- University visiting research professorship, City University of Hong Kong, 2000-2001.
- USF Presidential Excellence Award (= 10 % raise), 2003.
- Listed among the highly cited on the first list (2005–2010).
- t Elected fellow of the Institute of Physics, December 2004.
- Elected fellow of the European Society of Computational Mathematics in Science and Engineering 2010.
- Elected fellow of the American Mathematical Society, September 2014.
- International Conference on Orthogonal Polynomials, Integrable Systems and Their Applications on the Occasion of my 70th Birthday (In China) (October 25-29, 2014).  
Website: <http://math.sjtu.edu.cn/conference/icopista/regis.html>
- Conference honoring my 70th birthday at U of Central Florida. Website:  
<https://sciences.ucf.edu/news/tag/dr-zuhair-nashed/>

**Citations of my work in non-mathematical Journals:** Ann. Physics New York, Aust. NZ J. Stat., Comm. Math. Physics, Czech J. Physics, Eur. J. Physics A, Fiz Nizk Temp, J. Phys. Condensed Matter, Int. J. Mod. Phys., IEEE Inform. Th., J. Math. Phys., J. Phys. A, J. Phys. B, J. Statistical Planning and Inference, Lecture Notes in Computer Sci., Lett. Math. Phys., Mod. Phys. Lett. A, Nuclear Physics B, Physica A, Phys. Rep., Phys. Rev. A, Phys. Rev. B, Phys. Rev. E, Phys. Rev. Lett., Phys. Atom. Nucl., Phys. Lett. A, Queueing Systems, Rep. Math Ohys., Rev. Mod. Physics, Sankhya, Skand. J. Statistics, Theor. Computer Science, Theor. Math. Phys. Wave Random Media, Z. Phys., B Cond. Matt.

## **PUBLICATIONS:**

### **Books**

1. Mathematical Analysis, Wavelets, and Signal Processing, Proceedings of an International Conference on Mathematical Analysis and Signal Processing, coeditor with M. Z. Nashed, A. I. Zayed and A. F. Ghaleb, Contemporary Mathematics, volume 190, American Mathematical Society, Providence, 1995.
2. Special Functions,  $q$ -Series and Related Topics, coeditor with D. Masson and M. Rahman, Fields Institute Communications, volume 14, American Mathematical Society, Providence, 1997.
3. Q-Series from a Contemporary Perspective, coeditor with D. Stanton, Contemporary Mathematics, volume 254, American Mathematical Society, Providence, 2000.
4. Special Functions, coeditor with C. F. Dunkl and R. Wong, World Scientific, Singapore, 2000.
5. Special Functions 2000, Current Perspectives and Future Directions, coeditor with J. Bustoz, and S. K. Suslov, Kluwer, Dorchester, 2001.
6. Symbolic Computation, Number Theory, Special Functions, Physics and Combinatorics 2001, Coeditor with F. G. Garvan, Developments in Mathematics, Volume 4, Kluwer, Dorchester, 2001.
7. Theory and Applications of Special Functions: A volume dedicated to Mizan Rahman, Coeditor with H. Koelink, Developments in Mathematics, Springer+Business Media, New York, 2005.
8. Classical and Quantum Orthogonal Polynomials in one Variable, Cambridge University Press, 2005.
9. Classical and Quantum Orthogonal Polynomials in one Variable, paperback edition, Cambridge University Press, 2009.
10. Orthogonal Polynomials and Special Functions – Summer School 6, joint with Howard Cohl, Lecture Notes of the London Mathematical Society, London, 2018.

### **Special Issues**

1. Special Issue dedicated to R. Askey and F. W. J. Olver, coeditor with G. Andrews, G. Gasper, and P. Nevai, SIAM J. Math. Anal. volume 25, number 2, (1994), pp. 243–814

2. Special volume on  $q$ -series, coeditor with D. Masson, *J. Comp. Appl. Math.* 68 (1996), 339 pages.
3. Special Issues of Methods and Applications of Analysis, coeditor with D. Stanton, volume 5, 1999.
4. Special issue of the Rocky Mountain *J. Math.*, coeditor with J. Bustoz and S. Suslov, volume 32, number 2, (2002), 389–936.
5. Special issues of *Advances in Applied Mathematics*, coeditor with H. Koelink and V. Reiner, volume 46, 2011.

## Papers

1. On some conjectures of Askey concerning completely monotonic functions, with J. Fields, in “Spline Functions and Approximation Theory”, edited by A. Meir and A. Sharma, *International Series on Numerical Mathematics*, Vol. 21 (1973), Birkhauser Verlag, Basel, pp. 101–111.
2. On obtaining generating functions of Boas and Buck type for orthogonal polynomials, *SIAM J. Math. Anal.* 5 (1974), pp. 202–208.
3. On a generalization of Szász operators, *Mathematica (Cluj)* 16 (1974), pp. 259–267.
4. Orthogonal polynomials in a class of polynomials, *Bull. Polytech. 1st, Iasy, Sect. I: Math., Mech., Theor. Phys.* 20 (1974), pp. 45–50.
5. A sequence to function analogue of the Hausdorff means for double sequences: the  $[J, f(x, y)]$  means, *Proc. Amer. Math. Soc.* 48 (1975), pp. 403–408.
6. On the positivity of some  ${}_1F_2$ 's joint with J. Fields, *SIAM J. Math. Anal.* 6 (1975), pp. 551–559.
7. A positive sum from summability theory, joint with R. Askey and G. Gasper, *J. Approx. Theory* 13 (1975), pp. 413–420.
8. Dual and triple sequence equations involving orthogonal polynomials, *Indagationes Math.* 37 (1975), pp. 164–169.
9. Some operational formulas, joint with W. Al-Salam, *J. Math. Anal. Appl.* 51 (1975), pp. 208–218.
10. Polynomial expansions, joint with J. Fields, *Mathematics of Computation* 29 (1975), pp. 894–902.
11. The Bessel polynomials and the student  $t$ -distribution, joint with D. Kelker, *SIAM J. Math. Anal.* 7 (1976), pp. 82–91.
12. Polynomials orthogonal with respect to discrete convolution, joint with W. Al-Salam, *J. Math. Anal. Appl.* 55 (1976), pp. 125–139.



13. Permutation problems and special functions, joint with R. Askey, *Canadian J. Math.* 28 (1976), pp. 853–874.
14. Unitary analogue of Carmichael’s problem, joint with M.V. Subbarao, *Indian J. Math.* 18 (1976), pp. 49–55.
15. Connection relations and bilinear formulas for the classical orthogonal polynomials, *J. Math. Anal. Appl.* 57 (1977), pp. 487–496.
16. Polynomial expansions and generating functions, joint with T. Rashed, *J. Math. Anal. Appl.* 57 (1977), pp. 724–731.
17. A simple proof of Ramanujan’s  ${}_1\psi_1$  sum, *Proc. Amer. Math. Soc.* 63 (1977), pp. 185–186.
18. Bessel functions and the infinite divisibility of the student  $t$ -distribution, *Ann. Prob.* 5 (1977), pp. 582–585.
19. Integral representations and complete monotonicity of various quotients of Bessel functions, *Canadian J. Math.* 29 (1977), pp. 1198–1207.
20. Reproducing kernels for  $q$ -Jacobi polynomials, joint with W. Al-Salam, *Proc. Amer. Math. Soc.* 67 (1977), pp. 105–110.
21. Monotonicity of the zeros of a cross-product of Bessel functions, joint with M. Muldoon, *SIAM J. Math. Anal.* 9 (1978), pp. 759–767.
22. On solving differential and difference equations with variable coefficients, *J. Math. Anal. Appl.* 62 (1978), pp. 81–89.
23. On solving certain differential equations with variable coefficients, *Aequationes Mathematicae* 17 (1978), pp. 148–153.
24. On a family of approximation operators, joint with C.P. May, *J. Math. Anal. Appl.* 63 (1978), pp. 446–462.
25. Polynomials of binomial type and approximation theory, *J. Approx. Theory* 23 (1978), pp. 177–186.
26. A family of operational calculi, joint with W. Al-Salam, *Math. Japonica* 22 (1978), pp. 571–583.
27. Weighted permutation problems and Laguerre polynomials, joint with R. Askey and T. Koornwinder, *J. Combinatorial Theory (Ser. A)* 25 (1978), pp. 277–287.
28. A combinatorial approach to some positivity problems, joint with M.V. Tamhankar, *SIAM J. Math. Anal.* 10 (1979), pp. 478–485.
29. Special functions, Stieltjes transforms and infinite divisibility, joint with D. Kelker, *SIAM J. Math. Anal.* 10 (1979), pp. 884–901.
30. Special functions, infinite divisibility and solutions of certain transcendental equations, joint with C.P. May, *Math. Proc. Cambridge Philos. Soc.* 85 (1979), pp. 453–464.

31. The very well-poised  ${}_6\psi_6$ , joint with R. Askey, Proc. Amer. Math. Soc. 77 (1979), pp. 218–222.
32. On an umbral calculus, joint with E. Ihrig, Proc. 10th Southeastern Conference on Combinatorics, Graph Theory and Computing, (1979), pp. 523–528.
33. The Rogers  $q$ -ultraspherical polynomials, joint with R. Askey, in “Approximation Theory III” edited by E. Cheney, Academic Press, New York, 1980, pp. 175–182.
34. Asymptotic and explicit formulas for a non-Markovian model with linear transition rule, joint with R. Theodorescu, Biometrical J. (formerly Biometrische Zeit.) 22 (1980), pp. 67–71.
35. The basic Bessel functions and polynomials, SIAM J. Math. Anal. 12 (1981), pp. 454–468.
36. A  $q$ -umbral calculus, joint with E. Ihrig, J. Math. Anal. Appl. 84 (1981), pp. 178–207.
37. The zeros of basic Bessel functions, the functions  $J_{\nu+ax}(x)$  and the associated orthogonal polynomials, J. Math. Anal. Appl. 86 (1982), pp. 1–19.
38. An infinitely divisible distribution involving modified Bessel functions, joint with K. Miller, Proc. Amer. Math. Soc. 85 (1982), pp. 233–238.
39. The associated classical orthogonal polynomials and their  $q$ -analogues, joint with J. Bustoz, Canadian J. Math. 34 (1982), pp. 718–736.
40. Asymptotic and generating relations for the  $q$ -Jacobi and  ${}_4\phi_3$  polynomials, joint with J. Wilson, J. Approx. Theory 36 (1982), pp. 43–54.
41. On Dumont polynomials, joint with D. Stewart, Discrete Mathematics 41 (1982), pp. 155–160.
42. Orthogonal polynomials suggested by a queuing model, joint with T. Chihara, Advances in Appl. Math. 3 (1982), pp. 441–462.
43. Coefficients in expansions of certain rational functions, joint with R. Evans and D. Stanton, Canadian J. Math. 34 (1982), pp. 1011–1024.
44. Orthogonal polynomials associated with the Rogers-Ramanujan continued fraction, joint with W. Al-Salam, Pacific J. Math. 104 (1983), pp. 269–283.
45. A generalization of the ultraspherical polynomials, joint with R. Askey, in “Studies in Pure Mathematics”, edited by P. Erdős, Birkhauser Verlag, Basel, 1983, pp. 55–78.
46. Turan type inequalities for ultraspherical and continuous  $q$ -ultraspherical polynomials, joint with J. Bustoz, SIAM J. Math. Anal. 14 (1983), pp. 807–819.
47. Recurrence relations, continued fractions and orthogonal polynomials, joint with R. Askey, Memoirs Amer. Math. Soc. 300 (1984), 112 pages.
48. A queuing model and a set of orthogonal polynomials, J. Math. Anal. and Appl. 108 (1985), pp. 575–594.
49. The attractive Coulomb potential polynomials, joint with E. Bank, Constructive Approximation 1 (1985), pp. 103–119.

50. On sieved orthogonal polynomials I: Symmetric Pollaczek analogues, *SIAM J. Math. Anal.* 16 (1985), pp. 1093–1113.
51. On sieved orthogonal polynomials II: Random walk polynomials, joint with J. Charris, *Canadian J. Math.* 38 (1986), pp. 397–414.
52. On sieved orthogonal polynomials III: Polynomials orthogonal on several intervals, *Transactions Amer. Math. Soc.* 294 (1986), pp. 89–111.
53. On sieved orthogonal polynomials IV: Generating functions, *J. Approximation Theory* 46 (1986), pp. 284–296.
54. Completely monotonic functions associated with the gamma function and its  $q$ -analogues, joint with L. Lorch and M. Muldoon, *J. Math. Anal. Appl.* 116 (1986), pp. 1–9.
55. Certain monotonicity properties of Bessel functions, joint with M. Muldoon, *J. Math. Anal. Appl.* 118 (1986), pp. 145–150.
56. Asymptotics of the Askey-Wilson and  $q$ -Jacobi polynomials, *SIAM J. Math. Anal.* 17 (1986), pp. 1475–1482.
57. On zeros of Bessel functions, *Applicable Analysis* 22 (1986), pp. 167–168.
58. On gamma function inequalities, joint with J. Bustoz, *Mathematics of Computation* 47 (1986), pp. 659–667.
59. The variation of zeros of certain orthogonal polynomials, *Advances in Appl. Math.* 8 (1987), pp. 111–118.
60. The generalized Chebyshev polynomials, joint with F. Mulla, *SIAM J. Math. Anal.* 18 (1987), pp. 243–258.
61. On sieved orthogonal polynomials V: Sieved Pollaczek polynomials, joint with J. Charris, *SIAM J. Math. Anal.* 18 (1987), pp. 1177–1218.
62. The combinatorics of  $q$ -Hermite polynomials and the Askey-Wilson integral, joint with D. Stanton and G. Viennot, *European J. Combinatorics* 8 (1987), pp. 379–392.
63. Linear birth and death models and associated Laguerre and Meixner polynomials, joint with J. Letessier and G. Valent, *J. Approx. Theory* 55 (1988), pp. 337–348.
64. On the Hellmann-Feynman theorem and the variation of zeros of special functions, joint with R. Zhang, *Advances in Appl. Math.* 9 (1988), pp. 439–446.
65. On the variation with respect to a parameter of zeros of Bessel functions and  $q$ -Bessel functions, joint with M. Muldoon, *J. Math. Anal. Appl.* 135 (1988), pp. 187–207.
66.  $q$ -Beta integrals and the  $q$ -Hermite polynomials, joint with W. Al-Salam, *Pacific J. Math.* 135 (1988), pp. 209–221.
67. Zeros of combinations of Bessel functions and their derivatives, joint with M. Muldoon, *Applicable Analysis* 31 (1988), pp. 73–90.

68. On the Askey-Wilson and Rogers polynomials, joint with D. Stanton, *Canadian J. Math.* 40 (1988), pp. 1025–1045.
69. A positive trigonometric sum, joint with J. Bustoz, *SIAM J. Math. Anal.* 20 (1989), pp. 176–181.
70. Quadratic birth and death processes and associated continuous dual Hahn polynomials, joint with J. Letessier and G. Valent, *SIAM J. Math. Anal.* 20 (1989), pp. 727–737.  
Announced as Associated dual Hahn polynomials. Orthogonal polynomials and their applications, joint with J. Letessier, and G. Valent, (Segovia, 1986), in “*Orthogonal polynomials and their applications.* ”, M. Alfaro, J. S. Dehesa, F. J. Marcelln, J. L. Rubio de Francia and J. Vinuesa, editors, *Lecture Notes in Math.*, 1329, Springer, Berlin, 1988, pp. 251–254.
71. The Hellmann-Feynman theorem and zeros of special functions, joint with R. Zhang, Invited Address, in “Ramanujan International Symposium on Analysis”, edited by N.K. Thakare, *McMillan of India*, Delhi, 1989, pp. 151–183.
72. Contiguous relations, basic hypergeometric functions and orthogonal polynomials I, joint with C. Libis, *J. Math. Anal. Appl.* 141 (1989), pp. 349–372.
73. Monotonicity of zeros of orthogonal polynomials, Invited Address, in “*q-Series and Partitions*”, edited by D. Stanton, *IMA Volumes in Mathematics and Its Applications*, Vol. 18, Springer-Verlag, New York, 1989, pp. 177–190.
74. Complete monotonicity of modified Bessel functions, *Proc. Amer. Math. Soc.* 108 (1990), pp. 353–361.
75. An asymptotic problem in derangement theory, joint with J. Gillis and T. Offer, *SIAM J. Math. Anal.* 21 (1990), pp. 262–255.
76. Birth and death processes and orthogonal polynomials, joint with J. Letessier, D. Masson, and G. Valent, in “Orthogonal Polynomials: Theory and Practice”, edited by P. Nevai, *Proc. NATO ASI on Orthogonal Polynomials and Their Applications*, Kluwer Academic Publishers, 1990, pp. 229–259.
77. On sieved orthogonal polynomials VI: Differential equations, joint with J. Bustoz and J. Wimp, *Differential and Integral Equations* 3 (1990), pp. 757–766.
78. A generalization of starlike functions, joint with E. Merkes and D. Styer, *Complex Variables* 14 (1990), pp. 77–84.
79. Two families of associated Wilson polynomials, joint with J. Letessier, G. Valent and J. Wimp, *Canadian J. Math.* 42 (1990), pp. 659–695.
80. A discrete approach to monotonicity of zeros of orthogonal polynomials, joint with M. Muldoon, *Transactions Amer. Math. Soc.* 323 (1991), pp. 65–78.
81. Two families of orthogonal polynomials related to Jacobi polynomials, joint with D. Masson, *Rocky Mountain J. Math.* 21 (1991), pp. 359–375.

82. On asymptotics of Jacobi polynomials, joint with L. Chen, *SIAM J. Math. Anal.* 22 (1991), pp. 1442–1449.
83. Associated Askey-Wilson polynomials, joint with M. Rahman, *Transactions Amer. Math. Soc.* 328 (1991), pp. 201–239.
84. Some results on associated Wilson polynomials, joint with J. Letessier, G. Valent, and J. Wimp, in “Orthogonal Polynomials and Their Applications”, edited by C. Brezinski, L. Gori and A. Ronveaux, J.C. Baltzer Ag, Basel (1991), pp. 293–298.
85. A minimal solution approach to polynomial asymptotics, joint with D. Masson and E. Saff, in “Orthogonal Polynomials and Their Applications”, edited by C. Brezinski, L. Gori and A. Ronveaux, J.C. Baltzer Ag, Basel (1991), pp. 299–303.
86. Associated continuous Hahn polynomials, joint with D.P. Gupta and D. Masson, *Canadian J. Math* 43 (1991), pp. 1263–1280.
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264. On certain dual  $q$ -integral equations, joint with O. A. Ashour and Z. S. Mansour, *Pacific J. Math.* 275 (2015), pp. 63–102.
265. Quantum mechanics without potential function, joint with A. A. Al-haidari, *J. Math. Phys.* 56 (2015), 072107 ; doi: 10.1063/1.4927262.

266. In Memoriam: Mizan Rahman, joint with E. Koelink, *J. Approx. Theory* 201 (2016), pp. 87–97.
267. Analytic properties of the complex Hermite polynomials, *Trans. Amer. Math. Soc.* 368 (2016), pp. 1189–1210.
268. Formulas and identities for the Askey–Wilson operator, joint with P. Simeonov, *Adv. Appl. Math.* 76 (2016), pp. 68–96.
269. Classes of bivariate orthogonal polynomials, joint with R. Zhang, *SIGMA* 12 (2016), 021, 37 pages.
270. Kibble-Slepian formula and generating functions for  $2D$  polynomials, joint with R. Zhang, *Adv. Appl. Math.* 80 (2016), pp. 70 - 92.
271. Tridiagonalization of the hypergeometric operator and the Racah–Wilson algebra, joint with V. X. Genest, L. Vinet, and A. Zhedanov, *Proc. Amer. Math. Soc.* 144 (2016), pp. 4441–4454.
272. Dual and triple equations and  $q$ -orthogonal polynomials, joint with O. Ashour and Z. Mansour, *J. Difference Equations and Applications* 22 (2016), pp. 973–988.
273. Diophantine properties of orthogonal polynomials and rational functions, joint with Mizan Rahman, *Proc. Amer. Math. Soc.* 145 (2017), pp. 2417–1440.
274. Combinatorial and Analytic Properties of the  $n$ -Dimensional Hermite Polynomials, joint with P. Simeonov, *J. Math. Anal. Appl.* 449 (2017), pp. 368–381.
275. A Review of multivariate orthogonal polynomials, joint with R. Zhang, *J. Egyptian Math. Soc.* 25 (2017), pp. 91–110.
276. Integral and series representations of  $q$ -polynomials and functions: Part II Schur polynomials and the Rogers-Ramanujan identities, joint with R. Zhang, *Proc. Amer. Math. Soc.* 145 (2017), pp. 3717–3733.
277. Inequalities for gamma and  $q$ -gamma functions of complex arguments, *Analysis and Applications* 15 (2017), pp. 641–651.
278. On some  $2D$  orthogonal  $q$ -polynomials, joint with R. Zhang, *Trans. Amer. Math. Soc.*, 369 (2017), pp. 6779–6821.
279. Integrals and series representations of  $q$ -polynomials and functions: Part I, joint with Ruiming Zhang, *Analysis and Applications* 16 (2018), 209–281.
280. Generalized Burchnell-type identities for orthogonal polynomials and expansions, joint with E. Koelink, and Román, *SIGMA* 14 (2018), 072, 24 pages.
281.  $q$ -Bessel functions and Rogers-Ramanujan type identities, joint with R. Zhang, *Proc. Amer. Math. Soc.* 146 (2018), pp. 3633–3646.
282. A brief review of  $q$ -series, in “Orthogonal Polynomials and Special Functions–Summer School 6”, H. Cohl and M. E.H. Ismail, eds, *Lecture Notes of the London Math. Soc.*, London, 2019, pp.



- 283.  $q$ -analogues of Lindstone expansion theorem, Taylor two point expansion theorem, and Bernoulli polynomials, joint with Z. Mansour, Analysis and Applications (2019), to appear.
- 284. Doubly infinite Jacobi matrices revisited: resolvent and spectral measure, joint with D. Dai and X.S. Wong, Adv in Math. 343 (2019), pp. 157–192.
- 285. Asymptotics of partition functions in a Fermionic matrix model and of related  $q$ -polynomials, joint with D. Dai and X.S Wang, Studies in Applied Math 142 (2019), pp. 91–105.
- 286. Spectral analysis of some doubly infinite Jacobi matrices, joint with F. Stampach, J. Functional Analysis 276 (2019), pp. 1681–1716.
- 287. Multivariate complex Hermite polynomials, joint with P. Simeonov, submitted.
- 288. A  $q$ -translation approach to Liu’s calculus, joint with H. Aslan, submitted.
- 289. Solutions of the Al-Salam–Chihara and allied moment problems, Analysis and Applications (2019), to appear.
- 290. Quasi-orthogonal polynomials, their differential equations, discriminants and electrostatics, joint with X. S. Wang, submitted. J. Math. Anal. Appl. (2019), to appear.
- 291.  $R_{II}$  type recurrence, generalized eigenvalue problem and orthogonal polynomials on the unit circle, joint with S. Ranga, J. Linear Algebra 562 (2019), pp. 63–90.
- 292. Matrix valued Hermite polynomials Matrix valued Hermite polynomials, Burchnell formulas and non-abelian Toda lattice, joint with E. Koelink and P. Roman, submitted.
- 293. Orthogonality of very well poised series, joint with E. M. Rains and D. W. Stanton, submitted.
- 294. Orthogonal polynomials of Askey–Wilson type, joint with R. Zhang, in preparation.
- 295. Inequalities for modulus of Bessel and confluent hypergeometric functions, in preparation
- 296. Completely monotonic Fredholm determinants, joint with Ruiming Zhang, in preparation.

**INVITED PAPERS:**

Papers #33, 71, 73, 76, 81, 88, 109, 116, 118, 124, 126, 130, 134, 138, 144, 145, 151, 155, 158, 162, 168, 169. 174, 196, 197, 200, and 226 are invited papers and addresses. Papers #76 and 171 were lecture notes for a three-hour special presentation at a NATO Advanced Study Institute. Paper #226 was a series of lectures at a summer school program at CRM, U of Montreal.

## ADDITIONAL PUBLICATIONS:

1. Preface (Dedication) to the Askey-Olver special issue of SIAM Journal on Mathematical Analysis, joint with G. Andrews, G. Gasper, and P. Nevai, SIAM J. Math. Anal. volume 25, number 2, (1994), pp. vii–ix.
2. Preface to Mathematical Analysis, Wavelets, and Signal Processing, joint with M. Z. Nashed, A. Zayed, and A. F. Ghaleb, Contemporary Mathematics, volume 190, American Mathematical Society, Providence, 1995, ix–x.
3. Preface to Special Functions,  $q$ -Series and Related Topics, joint with D. R. Masson and M. Rahman, Fields Institute Communications, volume 14, American Mathematical Society, Providence, 1997.
4. Preface to a special issue on  $q$ -series, Journal of Computational And Applied Mathematics, joint with D. R. Masson, J. Comp. Appl. Math. 68 (1996), 1–2.
5. Dedication for Special Issues (dedicated to Richard Askey), joint with D. Stanton, Methods and Applications of Analysis 6, 1999, pp. 1-2.
6. Waleed Al-Salam, 1926–1996, in “Algebraic Methods and  $q$ -Special Functions”, P. Van Diejen and L. Vinet, eds., American Mathematical Society, Providence 1999, pp. ix–xi.
7. Preface to  $q$ -Series from a Contemporary Perspective, Contemporary Mathematics, American Mathematical Society, Providence, 2000, pp. ix–x.
8. Preface to Special Functions 2000, Current Perspectives and Future Directions, Kluwer, Dorchester, 2001, p. vii..
9. Preface to Symbolic Computation, Number Theory, Special Functions, Physics and Combinatorics 2001, Developments in Mathematics, Volume 4, Kluwer, Dorchester, 2001, pp. vii-viii.
10. Preface to Orthogonal Polynomials and Special Functions – Summer School 6, joint with Howard Cohl, Lecture Notes of the London Math. Soc., London, 2018.

## SOLUTIONS TO PROBLEMS:

1. Solution to Problem 75-3, SIAM Rev. 18 (1976), 302.
2. Solution to Problem 77-2, SIAM Rev. 20 (1978), 187–188.
3. Solution to Problem 95-7, SIAM Rev. 38 (1996), 324.

## BOOK REVIEWS:

1. The Bessel Polynomials, by E. Grosswald, in: Mathematical Reviews 80 (1980) 80i:33013.

2. The  $H$ -Function with Applications in Statistics and Other Disciplines, by A.M. Mathai and R.K. Saxena, in: Canadian J. Statistics 8 (1980), pp. 143-145.
3. Special Functions in Queuing Theory, by H.M. Srivastava and R.K. Kashyap, in: SIAM Review 25 (1983), pp. 582-585.
4.  $q$ -Hypergeometric Functions and Applications, by H. Exton, in: SIAM Review 27 (1985), pp. 279-281.
5. Generalized Associated Legendre Functions and Their Applications, by N. Virchenko and I. Fedotova, SIAM Rev. 44 (2003), 288-291.
6. Number Theory in the Spirit of Ramanujan, Journal of Approximation Theory 154 (2008), pp. 67-68.

#### **Unpublished Technical Reports:**

1. On some  $r$ -semiorthogonal polynomials, MRC technical Summary Report 1487, November 1974, 7 pages.
2. A derangement problem, MRC technical Summary Report 1522, June 1975, 11 pages.
3. A combinatorial sum, joint with R. Askey, MRC technical Summary Report 1557, July 1975, 10 pages.

#### **MASTER'S STUDENTS:**

1. Richard Ruedemann, Arizona State University, August 1987.  
Thesis title: "Positivity Results in Combinatorics".
2. Ruiming Zhang, Arizona State University, August 1987.  
Thesis title: "The Hellmann-Feynman Theorem and Zeros of Special Functions".
3. David Milligan, University of South Florida, December 1997,  
Thesis title: "How Mathematics Aids Engineering and Engineering stimulates Mathematics and an Example Involving Fuel Spray".
4. David Wallace, University of Central Florida, July 2005,  
Thesis title: "The Hellmann-Feynman Theorem".

#### **DOCTORAL STUDENTS:**

1. Edward Bank, Arizona State University, April 1984.  
Dissertation title: "Pollaczek Polynomials and Functions".
2. Jairo Charris, Arizona State University, August 1984.  
Dissertation title: "Sieved Pollaczek and Random Walk Polynomials".

3. Li-Chen Chen, University of South Florida, August 1989.  
Dissertation title: “On Asymptotics of Certain Hypergeometric Functions and  $6 - j$  Symbols”.
4. Richard Ruedemann, University of South Florida, August 1992.  
Dissertation title: “Relation Between Polynomials Orthogonal on the Unit Circle With Respect to Different Weights”.
5. Ruiming Zhang, University of South Florida, April 1993.  
Dissertation title: “Some Formulas of W. Gosper and Spectral Properties of Certain Operators in Weighted Spaces”.
6. Jifeng Ma, University of South Florida, May 1997.  
Dissertation title: “Spectrum of Some Integral Operators”
7. Zeinab Mansour, Co-supervisor with Mahmoud Annaby, Cairo University, January 2006  
Dissertation title: “ $q$ -Difference Equations,”
8. Jemal Gishe, University of South Florida, July 2006.  
Dissertation title: “A Finite Family of  $q$ -Orthogonal Polynomials and Resultants of Chebyshev Polynomials”.
9. Daniel J. Gallifa, University of Central Florida, May 2009.  
Dissertation title: “The Sheffer B-Type 1 Orthogonal Polynomial Sequences”

**INVITED ADDRESSES:**

1. Mathematical Analysis and Its Applications, an international conference, Kuwait, March 1985, 1 hour.
2. Orthogonal Polynomials and Applications, an international conference, Segovia (Spain), September 1986, 1 hour.
3. Colombian Mathematical Society, Bogota, July 1987, 45 minutes.
4. Ramanujan Birth Centenary Year International Symposium on Analysis, Pune (India), December 1987, 1 hour.
5. Symposium on  $q$ -series, Institute of Mathematics and Its Applications, University of Minnesota, March 1988, 1 hour.
6. The joint U.S.–Norway conference on continued fractions, University of Colorado, Boulder, June 1988, 1/2 hour.
7. The NATO ASI on orthogonal polynomials and their applications, Ohio State University, Columbus, May 1989, a 3-hour slot.
8. The Latin American Colloquium in Mathematics, Bogota, Colombia, November 1992, 1 hour.

9. Analytic and computational problems in spectral theory of differential operators, Gregynog, Wales, July 1993, 1/2 hour.
10. The Waleed Al-Salam Day, University of Alberta, September 1993, 45 minutes.
11. Special Functions Day, Catholic University of Louvain, Belgium, October 1993, 1 hour.
12. The First Stieltjes Colloquium, Free University of Amsterdam, November 1993, 1 hour.
13. Approximation Theory Day, Cambridge University, England, November 1993, 1 hour.
14. Conference on Signal Processing and Analysis, Cairo, Egypt, January 1994, 1 hour.
15. Conference on Functional Differential Equations, Cairo, Egypt, January 1995, two 45 minute talks.
16. The Lorch Symposium, York University, June 1995, 1/2 hour.
17. The Rotafest, a conference at the M.I.T., April 1996, 1/2 hour.
18. Workshop on group theoretic methods in the theory of special functions, CRM, Montreal, June 1996, 1 hour.
19. The annual meeting of the Danish Mathematical Society, Copenhagen, June, 1996, 1 hour.
20. Analytic and computational problems in spectral theory of differential operators, Gregynog, Wales, July 1996, 1/2 hour.
21. Congress on Computational and Applied Mathematics, Louvain, Belgium, July 1996, 1 hour.
22. British function theory meeting, Imperial College, London, September 1996, 1 hour.
23. Continued fractions and geometric function theory, Trondheim, Norway, June 1997, 1 hour talk.
24. Third International Symposium on difference equations and their applications, Taipei, Taiwan, September 1997, 1 hour talk.
25. Southwest Mathematical Physics Meeting, California Institute of Technology, Pasadena, February 1998, 1 hour talk.
26. Fourier Analysis and Application, Kuwait University, Kuwait, May 1998, 1 hour talk.
27. The third conference on Symmetries and Integrability of Difference Equations (SIDE III), Sabudia, Italy, May 1998, 1 hour talk.
28. Continued Fractions, University of Missouri at Columbia, Columbia, May 1998, 1 hour talk.
29. Second Meeting of the Palestinian Mathematical Society, Birzeit, West Bank, August 1998 1 hour talk.
30. MSRI workshop on Random Matrices, Statistical Mechanics, and Integrable Systems, February 1999, 1 hour talk (available on tape from MSRI).
31. Renaissance of Combinatorics 99, October 1999, Nankai University, China, 45 minute talk.

32. Workshop on orthogonal Polynomials, April 2000, 1 hour talk, Inzell, Germany.
33. The annual meeting of the Tunisian Mathematical Society, March 2001, 1 hour talk, Hammam, Tunisia.
34. Special functions in the digital age, Institute for Mathematics and Its Applications, University of Minnesota, July 2002, one hour talk.
35. Foundations of Computational Mathematics 2002, a semi-plenary lecture (45 minutes), Institute for Mathematics and Its Applications, University of Minnesota, August 2002.
36. The 10th anniversary of the Journal of the Egyptian Mathematical Society, Cairo, Egypt, December 2002.
37. The Seventh International Symposium on Orthogonal Polynomials and Special Functions, Copenhagen, August 2003, one hour talk.
38. An conference in honor of Koornwinder's sixtieth birth day, Amsterdam, August 2003, one hour address.
39. The six conference on Symmetries and Integrability of Difference Equations (SIDE VI), Helsinki, Finland, June 2004, 1 hour talk.
40. Aspects algébriques et Analytiques des Equations aux  $q$ -différences, Lille, France, September 2004, one hour.
41. The Eighth International Symposium on Orthogonal Polynomials and Special Functions, Munich, July 2005, one hour talk.
42. The Conference on analysis and its applications, Assiut, Egypt, the opening lecture, January 2006.
43. United Arab Emirates Mathematics Day, University of Sharjah, April 2006, one hour.
44. A special Applied Mathematics Day, King Abdul Aziz City for Science and Technology, April 2006, one hour.
45. Recent trends in constructive approximation, A satellite conference for ICM, Madrid, August 2006, one hour.
46. International conference of numerical analysis and applied mathematics, Crete, September 2006, one hour.
47. The third Southern Florida Analysis seminar, FAU, Fort Lauderdale, FL, in honor of Daniel Waterman, March 2007.
48. Theoretical Physics Day, King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia, May 2007, 1 hour.
49. The Ninth International Symposium on Orthogonal Polynomials and Special Functions, Marseille, France, July 2007, one hour talk.

50. Mathematics in Biosciences, HelmholtzZentrum Munich, Munich, July 2008, one hour talk.
51. The Jairo Charris Memorial Seminar in Analysis, Bogota, Colombia, August 2008, one hour talk.
52. Workshop on Random Matrices, Centre de Recherche Mathematique, U of Montreal, August 2008, one hour.
53. A Talk at the Special Session on Continued Fractions, American Mathematical Society Annual meeting, New Orleans, 2011, one hour talk.
54. A plenary talk at International Symposium on Orthogonal Polynomials and Special Functions a Complex Analytic Perspective, Copenhagen, June 2012.
55. Workshop on Potential Theory and Applications, Szeged, Hungary, 40 minutes, May 2012.
56. A plenary talk at the Combinatorics of q-Series and Partitions, Nankai University, Tianjin, China, August 2013.
57. A plenary talk at the NIMS 2013 Combinatorics Workshop, Daejeon, S. Korea, August 2013.
58. A plenary talk at the conference on Special Functions and Orthogonal Polynomials, King Saud University, Riyadh, Saudi Arabia, February 2013.
59. A plenary talk at the Iliev Centenary, Bulgarian Academy of Sciences, Sofia, 2013.
60. An invited talk at Exact Solvability and Symmetry Avatars, CRM, U of Montreal, August 2014.
61. A plenary talk at Orthogonal Polynomials Special Functions and Applications, held at NIST, Gaithersburg Maryland, 2015.
62. A plenary talk at "Number Theory Downunder", University of Newcastle, Australia, September 2015.
63. A plenary talk at the International Conference on Analysis, Applications and Computations: In Memory of Lee Lorch, 1915–2014, Fields Institute, Toronto, September, 2015.
64. An invited 45 minute talk at the International Conference on Combinatorics, Academia Sinica, Taipei, May 2017.
65. Plenary speaker at a combinatorics conference at East China Normal University, Shanghai, September, 2017.
66. Plenary address at the 25th anniversary of the Egyptian Math. Soc. Meeting, Cairo, Egypt, December 2017.
67. Plenary speaker at the 3rd International Conference on computational Mathematics and Engineering, Cyprus, May 04-06, 2018.
- 68.
69. Six invited one-hour talks at Oberwolfach meetings.

70. Several half-hour talks at special sessions of the American and Canadian Mathematical Societies and SIAM. Also a half hour talk at the Centenary celebration of the first Ph D in Mathematics at the University of Wisconsin, 1997.
71. Many 1-hour Colloquium and Seminar talks at various universities.

**SERIES OF LECTURES:**

1. Distinguished Visitors Program to Colombia (ICFES), Lectures at the National University of Colombia, 10 lectures on Orthogonal Polynomials and Applications, 1989.
2. Distinguished Visitors Program to Colombia (ICFES), Lectures at the National University of Colombia, 10 lectures on  $q$ -series, 1991.
3. Distinguished lecture series "Frontiers in Mathematics", Texas A & M University, March 1995, 3 lectures.
4. Distinguished visitors program University of Zulia, Zulia, Venezuela, Two lectures, July 1997.
5. NATO Advanced Study Institute, a series of three lectures on  $q$ -orthogonal polynomials, May-June 2000, Tempe, Arizona.
6. A series of two talks on differential equations and orthogonal polynomials, Academia Sinica, Taipei, February 2001.
7. A series of 3 two-hour talks at the University of Gabes, Gabes, Tunisia, March 2001.
8. Distinguished visitors program, Nagoya University, a series of three lectures, May 2001.
9. A series of two talks on orthogonal polynomials, summer school/summer seminar on Applied Analysis, City University of Hong Kong, Hong Kong, July 2001.
10. A series of five lectures on orthogonal polynomials in "Differential Equations and Asymptotic Theory in Mathematical Physics" held in Wuhan, China, October, 2003.
11. A series of two lectures at the American University of Sharjah, UAE, April 2006.
12. A series of 10 lectures as part of the workshop on random matrices and orthogonal polynomials, City University of Hong Kong, May-June 2006.
13. A series of 6 lectures on orthogonal polynomials, joint activity of Mathematics and Physics departments at King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia, May 2007.
14. A series of 5 lectures on orthogonal polynomials and difference equations, Summer School of the Centre de Recherche Mathematique, University of Montreal, June 2008,
15. A series of 6 lectures on random matrices and orthogonal polynomials, Hong Kong University of Science and Technology, May-June 2008.
16. A series of 12 lectures on orthogonal polynomials and their applications, the Von Neumann lecture series, the Technical University of Munich, June-July 2008.



17. A series of 3 lectures on orthogonal polynomials, King Saud University, Riyadh, Saudi Arabia, March 2009.
18. A series of 3 lectures on orthogonal polynomials, Academia Sinica, Taipei, Taiwan, May 2009.
19. A series of 3 hours on orthogonal polynomials at Texas A&M University in Qatar, September 2012.
20. A series of 3 lectures, Academia Sinica, Taipei, 2012.
21. A series of 10 lectures on q-series at the Hong Kong University of Science and Technology, November 2017.

## ADMINISTRATIVE EXPERIENCE:

1. Served on the graduate committee for several years at University of South Florida and Arizona State University, and was in charge of recruiting graduate students and teaching assistants at Arizona State University. Also served on the personnel committee at Arizona State University and the advisory committee at University of South Florida.
2. Served on various committees at McMaster University, Arizona State University, and the University of South Florida.
3. Organized a special session on spectral properties of Jacobi matrices and orthogonal polynomials at the summer meeting of the Canadian Mathematical Society in Edmonton, 1984.
4. Co-principal investigator and organizer of a CBMS conference held at Arizona State University in May 1985. The principal speaker was George Andrews who lectured on “ $q$ -Series, Mathematical Physics and Computer Algebra”.
5. Co-principal investigator and organizer of a NATO Advanced Study Institute, Columbus, Ohio, May 1989. The topic is “Orthogonal polynomials”.
6. Co-principal investigator of an NSF grant for a special year in Approximation Theory, University of South Florida, Tampa, FL, 1989-90. Chair of the local organizing committee.
7. Organized a special session on classical analysis at the winter meeting of the Canadian Mathematical Society in Victoria, 1991.
8. Organized a mini symposium (special session) on special functions and their applications at the summer meeting of SIAM in Los Angeles, 1992.
9. Co-organizer of a meeting on Mathematical Analysis, Wavelets, and Signal Processing, Cairo University, Egypt, January 1994.
10. Guest editor of a special issue of SIAM J. Math. Anal. **25** (1994), 480 pages.
11. Guest editor of a special issue of Journal of Computational and Applied Mathematics, **68** (1996), 330 pages.
12. Co-organizer (co chair) of the Fields Institute workshop on Special Functions and  $q$ -series, University of Toronto, Toronto, Canada, 2 weeks in June 1995.
13. Co-organizer (co Chair) of the American Mathematical Society Summer Conference on  $q$ -series, Combinatorics and Computer Algebra, Mount Holyoke College, June 1998.
14. Co-organizer of the second meeting of the Palestinian Mathematical Society, Birzeit, West Bank, August 1998.
15. Co-organizer of an International Workshop on Special Functions, Asymptotics, Harmonic Analysis, and Mathematical Physics, City University of Hong Kong, Hong Kong, June 1999.
16. Co-organizer of a conference on Symbolic Computation, Number Theory, Special Functions, Physics and Combinatorics, the University of Florida, Gainesville 1999,

17. Co-organizer of a NATO ASI on Special Functions, Tempe, Arizona, May-June 2000.
18. Co-organizer of an NSF sponsored conference on Special Functions, Tempe, Arizona, May-June 2000
19. Co-organizer of a Summer School/Summer Seminar on Applied Analysis, City University of Hong Kong, Hong Kong, July 2001.
20. Co-organizer of an International conference on special functions in Chennai (Madras), India, September 2002.
21. Co-organizer of the 8th meeting on Orthogonal Polynomials and Special Functions, Copenhagen, August 2003.
22. Organized a special session on special functions and  $q$ -series at the Annual meeting of the American Mathematical Society in Baltimore, January 2003.

#### **REFERENCES:**

1. **George Andrews**, Department of Mathematics, Pennsylvania State University, University Park, Pennsylvania, 16802.
2. **Richard Askey**, Department of Mathematics, University of Wisconsin, Madison, Wisconsin 53706.
3. **Persi Diaconis**, Department of Statistics, Stanford University, Stanford, California 94305
4. **Alberto Grunbaum**, Department of Mathematics, University of California-Berkeley. Berkeley, California 94720.
5. **Dennis Stanton**, School of Mathematics, University of Minnesota, Minneapolis, Minnesota 55455.