

CURRICULUM VITA

PAULSEN, Vern Ival

November 2, 2019

Degrees:

BA, Western Michigan University, 1973

Ph.D., University of Michigan, 1977

Positions:

Instructor, University of Kansas, 1977-79

Assistant Professor, University of Houston, 1979-83

Visiting Assistant Professor, SUNY at Stony Brook, Spring 1983

Associate Professor, University of Houston, 1983-1987

Visiting Associate Professor, University of Indiana, 1985-86

Professor, University of Houston, 1987–2016

John and Rebecca Moores Professor, 1996–2016

Director of Graduate Studies, Mathematics, University of Houston January, 1998–August, 2000

Professor of Pure Mathematics, University of Waterloo, 2015–Present

Member, Institute for Quantum Computing, University of Waterloo, 2015–Present

Visiting Positions:

Visiting Assistant Professor, SUNY at Stony Brook, Spring 1983

Visiting Associate Professor, University of Indiana, 1985-86

Invited Participant, Programme on Operator Algebras,

Institut Henri Poincaré, Centre Emile Borel, Paris, France, January, 2000

Invited Participant, Quantum Information Theory Semester,

Mittag-Leffler Institute, Stockholm, Sweden, November 1–December 15, 2010

Invited Participant, Modern Methods of Time-Frequency Analysis,

Erwin Schrodinger Institute, University of Vienna, Vienna, Austria, November 11–24, 2012

Visiting Fellow, Isaac Newton Institute for the Mathematical Sciences,

University of Cambridge, Cambridge, England, November 3–December 20, 2013

Organizations:

American Mathematical Society

Mathematical Association of America

Research Interests:

Operator Theory, Operator Algebras, Frame Theory, C^* -Algebras, and Quantum Information Theory

Awards:

Research Excellence Award (Associate Professor level), University of Houston, 1988

John and Rebecca Moores Professor, University of Houston, 1996–2016

UH, College of Natural Sciences and Mathematics, Teaching Excellence Award, 1997

Distinguished Alumni Award in Mathematics, Western Michigan University, 2007

ΦBK Membership, 2007 (Selected for Retroactive Membership when

WMU Chapter Initiated)
University-wide Teaching Excellence Award, University of Houston, 2008

Professional Activities:

Invited and Plenary Addresses

University of Nebraska, at Lincoln, 1978
 Texas A&M, 1979
 C^* -Algebra Mini-Conference, Tulane, 1981
 Great Plains Operator Theory Seminar (GPOTS), Lawrence, Kansas, 1981
 AMS Annual Meeting, Denver, 1983
 Adelphi University, 1983
 Bard College, 1983
 SUNY at Buffalo, 1983
 University of Pennsylvania, 1983
 GPOTS, Boulder, Colorado, 1983
 Bradley University, 1985
 Purdue University, 1985
 Wabash Seminar, Wabash, Indiana, 1986
 C^* -Algebras and Single Operators Conference, Principal Speaker, Indiana, 1986
 Canadian Mathematical Society, Winter Meeting, Ottawa, 1986
 Symposium on Operator Algebras, Durham, England, 1987
 University of Georgia (3 lectures), 1987
 C^* -Algebra Conference, Oberwolfach, Germany, 1987
 University of Tübingen, 1987
 University of Cincinnati, 1987
 Wright State University, 1987
 University of Pennsylvania, 1988
 University of Iowa, 1988
 U.S.-Japan Operator Algebras Conference, Philadelphia, 1988
 Thirty-Sixth AMS Summer Research Institute, Durham, New Hampshire, 1988
 Fifth Southeastern Analysis Meeting, Principal Speaker, Athens, Georgia, 1989
 University of Toronto, 1989
 Distinguished Visiting Professor Series, Bucknell University, 1990
 Canadian Operator Theory Symposium, Principal Speaker, Dalhousie University, 1990
 Rice University, 1991
 Distinguished Visiting Professor Series, Bucknell University, 1991
 Summer Camp for Operator Algebraists, Lecturer; Copenhagen, Denmark, 1991
 Canadian operator Theory Symposium, Principal Speaker, Calgary, 1992
 LMS-SERC Durham Symposium, Durham, Principal Speaker, England, 1992
 250th Anniversary of the Royal Danish Academy of Sciences and Letters,
 Copenhagen, Denmark, 1992
 EMS St. Andrews Colloquium, 1992
 University of Waterloo, 1992
 Virginia Tech, 1993
 Texas A&M University, 1993
 AMS Regional Meeting, Manhattan, Kansas, 1994
 University of New Hampshire, 1994
 Quantum Groups and their connection with Quantized Functional Analysis,
 Fields Institute, Waterloo, Ontario, 1995
 Banach Algebras 95, Principal Speaker, Newcastle, England, 1995

Workshop on Cohomology of Operator Algebras, Principal Speaker, Newcastle, England, 1995
 GPOTS, Principal Speaker, Tempe, Arizona, 1996
 Aegean Conference on Operator Algebras and Applications, Principal Speaker, Samos, Greece, 1996
 SEAM, Principal Speaker, Gainesville, Florida, 1997
 Canadian Operator Theory Symposium, Invited Speaker, Edmonton, 1998
 GPOTS, Principal Speaker, Manhattan, Kansas, 1998
 University of Waterloo, 1998
 University of Houston-Downtown, Graduate Recruiting, 1998
 AMS Special Session, Annual Meeting, San Antonio, 1999
 Invited Speaker, Conference on Operator Spaces, University of Illinois, 1999
 University of Athens, Athens, Greece, 1999
 Visiting Scholar, Institut Henri Poincaré, Centre Emile Borel, Paris, France, 2000
 East Carolina University(3 lectures), 2000
 Rice University(2 lectures), 2000
 Organizing Committee, Free Probability and Non-commutative Banach Spaces,
 Mathematical Sciences Research Institute, Berkeley, California, 2001
 Invited Speaker, ICBACN, Newcastle, England, July, 2001
 AMS Special Session, Regional Meeting, Irvine CA, November, 2001
 Principal Speaker, SEAM, Chapel Hill, NC, March 2002
 Principal Speaker, GPOTS, Charlotte, NC, May 2002
 Invited Speaker, CIRM, Luminy, France, July 2003
 Frontiers Lecture Series, Texas A&M University, College Station, TX, March 2004.
 Principal Speaker, IWOTA, Newcastle, England, July 2004
 University of Athens, Athens, Greece, 2 lectures, May 2005
 Invited Speaker, SUMRIFAS, College Station, TX, August 2005
 Invited Special Session Speaker, AMS Annual Meeting, San Antonio, TX, January 2006
 Invited Speaker, Coarsely Quantized Redundant Representations of Signals,
 Banff International Research Station, March 2006
 Principal Speaker, GPOTS, Iowa City, Iowa, May 2006
 Principal Speaker, COTS, Calgary, Alberta, May 2006
 Trinity College, Dublin, Ireland, 3 lectures, June 2006
 Invited Speaker, Workshop on the Kadison-Singer Problem, American Institute of Mathematics,
 ARCC, Palo Alto, California, September 2006
 Invited Speaker, Operator Structures in Quantum Information Theory,
 Banff International Research Station, Banff, Alberta, February 2007
 Invited Speaker, COSY, Guelph, Ontario, June 2007
 Invited Speaker, Operator Spaces, non-commutative L_p -spaces and applications,
 CIRM, Luminy, France, June 2007
 Invited Speaker, Operator Spaces and Group Algebras,
 Banff International Research Station, Banff, Alberta, August 2007
 Principal Speaker, Virginia Operator Theory and Complex Analysis Meeting,
 Richmond, Virginia, November 2007
 Colloquium Speaker, Western Michigan University, Kalamazoo, Michigan, November 2007.
 AIM SQUARE participant, Palo Alto, California, April 2008.
 Plenary Speaker, GPOTS, Cincinnati, Ohio, June 2008.
 AIM SQUARE participant, Palo Alto, California, May 2009.
 Plenary Speaker, COSY, Regina, Saskatchewan, May 2009.
 Invited Speaker, CIRM, Luminy, France, June 2009.

Research Collaborator, Queen's University, Belfast, Ireland, June 2009.
 Plenary Speaker, SEAM, Atlanta, Georgia, March 2010
 AIM SQUARE participant, Palo Alto, California, May 2010
 Plenary Speaker, From Banach spaces to frame theory and applications,
 Norbert Weiner Center, College Park, Maryland, May 2010
 Plenary Speaker, GPOTS, Denver, Colorado, June 2010
 Invited Speaker, Noncommutative L_p spaces, operator spaces and applications,
 Banff International Research Station, Banff, Alberta, June 2010
 Invited Speaker, Multivariate operator theory,
 Banff International Research Station, Banff, Alberta, August 2010
 Invited Speaker, Quantum Information Theory Semester,
 Institut Mittag-Leffler, Stockholm, Sweden, Fall 2010
 Plenary Speaker, Operator Theory and Its Applications, Gothenburg, Sweden, April 2011
 Colloquium talk, Texas A & M University, Fall 2011
 Lecture Series, Instructional Workshop on the Functional Analysis of Quantum Information Theory,
 Institute of Mathematical Sciences, Chennai, India, January 2012
 Colloquium talk, St. Stephen's College, University of Delhi, Delhi, India, January 2012
 Invited Speaker, Operator Structures in Quantum Information Theory,
 Banff International Research Station, Banff, Alberta, February 2012
 PIMS Distinguished Lecture, University of Regina, March 2012
 Invited Speaker, Descriptive Set Theory and Functional Analysis,
 Banff International Research Station, Banff, Alberta, June 2012
 Plenary Speaker, Frame Theory and Maps Between Operator Algebras,
 Texas A & M University, July 2012
 Colloquium Speaker, Queen's University Belfast, October 2012
 Colloquium Speaker, Trinity University, Dublin, October 2012
 Colloquium Speaker, University of Glasgow, October 2012
 Invited Speaker, Modern Methods in Time-Frequency Analysis, Erwin Schrodinger International
 Institute for Mathematical Physics, Vienna
 Plenary Speaker, GPOTS, Berkeley, CA, May 2013
 Plenary Speaker, Sz.-Nagy Centennial Conference, Szeged, Hungary, June 2013
 Plenary Speaker, Banach Algebras, Gothenburg, Sweden, August 2013
 Invited Speaker, Northern Britain Functional Analysis Seminar(NBFAS), Belfast, November 2013
 Invited Speaker, Isaac Newton Institute, Cambridge University, UK, November 2013
 Invited Speaker, Instructional Conference on Capacity of Communication, Queen's University,
 Belfast, March 2014
 Invited Speaker, SUMRFAS, Texas A & M, July 2014
 Invited Speaker, IQC, University of Waterloo, September 2014
 Invited Speaker, Pure Maths, University of Waterloo, September 2014
 Invited Speaker, University College London, Centre for Computational Statistics and Machine
 Learning, February 2015
 Invited Speaker, University College London, Department of Computer Science, February 2015
 Invited Speaker, Erikfest, University of Copenhagen, May 2015
 Invited Speaker, COSY, University of Waterloo, June 2015
 Organizer, From Commutators to BCP Operators, Texas A & M, July 2015
 Colloquium Speaker, Universite Laval, Quebec City, March 2016
 Plenary Speaker, GPOTS, University of Illinois, May 2016
 Plenary Speaker, Workshop on Representation Theory in Quantum Information, University of

Guelph, August 2016
 Lecture Series, "Noncommutative Order in Quantum Games", LMS Research School:
 Combinatorics and Operators in Quantum Information Theory, Queen's University, Belfast,
 September 2016(5 lectures)
 Invited Speaker, QMath13, Georgia Tech, Atlanta, October 2016
 PIMS Colloquium, University of Winnipeg, March 2017
 Plenary Speaker, Algorithms and Geometry, Simons Foundation, New York, April 2017
 Plenary Speaker, COSY, Lakehead University, Thunderbay, May 2017
 Plenary Speaker, International Linear Algebra Society, Ames, Iowa, July 2017
 Plenary Speaker, Workshop on Operator systems in Quantum Information, Guelph, August 2017
 Plenary Speaker, Operator algebras and Quantum Information Theory, Institut Henri Poincare,
 Paris, September 2017
 Short Course(4 lectures), Institut Henri Poincare, Paris, September 2017
 Invited Speaker, Shanks Workshop: Free Probability and Applications, Vanderbilt University,
 September 2018
 Invited Lecture Series, Winter School on Connes' Embedding Problem and Quantum Information
 Theory, University of Oslo, Oslo, January 2019
 Lecture Series, Operator Algebras, Groups and Applications to Quantum Information, ICMAT,
 University of Madrid, May 2019
 Plenary Speaker, COSY, University of Regina, June 2019
 Invited Speaker, CMS Summer Meeting, University of Regina(2 talks)
 Organizer, The Many Faceted Connes' Embedding Problem, BIRS, Banff, July 2019
 Invited Speaker, Quantum Resource Theory, BIRS, Banff, July 2019
 Invited Speaker, C^* -algebras, Oberwolfach, August 2019
 Invited Speaker, Analytical and combinatorial aspects of quantum information theory,
 Edinburgh, Scotland, September 2019
 Invited Speaker, Workshop on Noncommutative Analysis, Computational Complexity,
 and Quantum Information, Center of Mathematical Sciences and Applications,
 Harvard University, October 2019

Grants & Awards:

- PI, NSF Grant to University of Kansas, "Operators and $*$ -Algebras of Operators on Hilbert Space",
 1978-80, \$83,447.
- PI, NSF Grant to University of Houston, "Operators and $*$ -Algebras of Operators on Hilbert Space",
 1980-82, \$14,999.
- Research Initiation Grant, " C^* -Convexity and Metrical Invariants for Operators" Summer 1980 (de-
 clined), \$4,056.
- PI, NSF Grant to University of Houston, "Completely Bounded Maps Between C^* -Algebras", 1983-85,
 \$23,500.
- PI, NSF Grant to University of Houston, "Completely Bounded Maps on Operator Algebras", 1985-87,
 \$29,500.
- PI, NSF Grant to University of Houston, "Joint K -spectral Sets and Subnormal Operators", 1987-89,
 \$32,800.

- PI, NSF Grant to University of Houston, “Operator Algebras”, co-PI: D. Blecher, 1989-1991, \$68,892.
- PI, NSF Grant, “Operator Algebras and Reproducing Kernel Hilbert Spaces”, co-PI: D. Blecher, 1991-1993, \$82,785.
- PI, NSF Grant, “Operator Algebras and Reproducing Kernel Hilbert Spaces”, co-PI: D. Blecher, 1993-1996, \$144,000.
- PI, NSF Grant, “Operator Algebras, Modules and Completely Bounded Maps”, co-PI: D. Blecher, 1997-2000, \$213,758.
- PI, NSF Grant, “Operator Algebras, Operator Spaces, Frames and Applications”, co-PI’s D. Blecher and M. Papadakis, 2000-2003, \$241,470.
- PI, NSF Grant, “Operator Algebras, Interpolation and Frames”, 2003-2006, \$115,000.
- PI, NSF Grant, “Frames, Interpolation and Injective Envelopes”, 2006-2009, \$145,598
- PI, NSF Grant, “Collaborative Research: GPOTS 2011 & 2012”, 2011-2012, co-PI’s: D. Blecher, B. Bodmann, M. Tomforde, \$25,000
- PI, NSF Grant, “Tensor Products of Operator Systems and the Kadison-Singer Problem”, 2011-2014, \$211,417
- IMA Grant to support GPOTS 2012, \$3,500
- EPSRC grant, “Zero-error quantum information and operator theory: emerging links”, 2014-2015, PI: A. Winter, £ 32,861
- Royal Society grant, “Operator systems from discrete groups”, 2015-2016, PI: I. Todorov, £ 4,200
- NSERC Discovery Grant, 2016-2021, \$ 25,000 per year

Editorial Boards:

- Houston Journal of Mathematics, Managing Editor, 1990-1993
- Houston Journal of Mathematics, Editor, 1993-2012
- Positivity in Analysis, Kluwer, Editor, 1997-2009
- Journal of Geometric Analysis, Associate Editor, 2009-2011
- Operator Theory: Advances and Applications, Birkhauser, Associate Editor, 2010-Present
- Journal of Operator Theory, Associate Editor, 2011-Present

Scholarly Review Panels:

- Presidential Faculty Fellowships, NSF, 1995
- Faculty Early Career Development (CAREER), NSF, 1995, 2014
- Review Panel for Program in Operator Algebras, NSF, 1996, 1999, 2004, 2008, 2011

Referee/Reviewer:

- National Science Foundation
- NSERC of Canada
- National Security Agency, Mathematical Sciences Program
- Houston Journal of Mathematics
- Journal of Operator Theory

Mathematical Reviews
 Michigan Mathematical Journal
 Proceedings of the AMS
 Indiana University Mathematics Journal
 Journal of Functional Analysis
 Transactions of the AMS
 Pacific Journal of Mathematics
 Quarterly Journal of Mathematics
 Proceedings of the Edinburgh Mathematical Society
 Iranian Journal of Science & Technology
 Canadian Journal of Mathematics
 Journal of Mathematical Analysis and Applications
 Linear Algebra and Applications
 Journal of Integral Equations and Operator Theory
 Rocky Mountain Journal of Mathematics
 Illinois Journal of Mathematics
 Journal of the Mathematical Society of Japan
 Journal of the American Mathematical Society
 Mathematica Scandanavica
 American Journal of Mathematics
 Canadian Mathematical Bulletin
 Semigroup Forum
 Bulletin of the London Mathematical Society
 Journal fur die Reine und Angewandte Mathematik(Crelle's Journal)
 Communications in Mathematical Physics
 Studia Mathematica
 Mathematisches Annalen
 Advances in Computational Mathematics
 Proceedings of the Indian Academy of Science
 Duke Mathematical Journal
 Glasgow Mathematical Journal

Theses and Dissertations Supervised:

Suen, C.Y.	“The Representation Theory of Completely Bounded Maps on C^* -Algebras”	PhD	1983
Tiballi, Terry	“Symmetric Orthogonalization of Vectors in Hilbert Space”	PhD	1991
Chu, Peter (Che-Chen)	“Finite Dimensional Representations of Function Algebras”	PhD	1992
Zhang, Shuang	“Representation and Geometry of Operator Spaces”	PhD	1995
Ferguson, Sarah	“Ext, Analytic Kernels and Operator Ranges”	PhD	1996
Khoury, Raja	”Closest Matrices in the Space of Doubly	PhD	1997

	Stochastic Matrices”		
Solazzo, James	”Interpolation and Computability”	PhD	2000
Holmes, Roderick B.	”Optimal Frames”	PhD	2003
Kaneda, Masayoshi	”Multipliers and Algebrizations of Operator Spaces”	PhD	2003
Kalra, Deepti	”Equiangular Cyclic Frames”	PhD	2006
Abdulbaki, Soha	”Generalized Sigma-Delta Quantization”	PhD	2006
Raghupathi, Mrinal	”Constrained Nevanlinna-Pick Interpolation”	PhD	2008
Xhabli, Blerina	”Universal operator system structures on ordered spaces and their applications”	PhD	2009
Mittal, Meghna	”Function Theory on the quantum analysis and other domains”	PhD	2010
Singh, Preeti	”Applications of finite groups to Parseval frames”	PhD	2010
Lata, Sneha	”The Feichtinger conjecture and reproducing kernel Hilbert spaces”	PhD	2010
Kavruk, Ali	”Tensor Products of Operator Systems and Applications”	PhD	2011
Ortiz, Carlos Morrero	”Graph Parameters via Operator Systems”	PhD	2015
Zheng, Da	”The Operator System Generated by Cuntz Isometries and Its Applications”	PhD	2016
Ng, Wai Hin	”Tensor Products of Operator Systems via Factorization”	PhD	2016
Leonhard, Nicole	”Correlation Minimizing Frames”	PhD	2016
Prakash, Jitendra	”Tsirelson’s Problems and Entanglement Breaking Rank”	PhD	July, 2018
Pandey, Satish	”Symmetrically Normed Ideals and Characterizations of Absolutely Norming Operators”	PhD	July, 2018
Harris, Samuel J.	”Unitary Correlation Sets and Their Applications”	PhD	July, 2019

Publications: *—indicates a primarily expository article.

1. “Continuous canonical forms for matrices under unitary equivalence”, *Pacific Journal of Mathematics* **76** (1978), 129-142.
2. “Weak compalence invariants for essentially n -normal operators”, *American Journal of Mathematics* **101** (1979), 979-1006.
3. “Two examples of non-trivial essentially n -normal operators,” (with N. Salinas), *Indiana University Mathematics Journal* **28** (1979), No. 5, 711-724.
4. “A classification theorem for essentially binormal operators”, (with R. McGovern and N. Salinas), *Journal of Functional Analysis* **41** (1981), 213-235.
5. “Some remarks on C^* -convexity,” (with R. Leobl), *Linear Algebras and Applications* **35** (1981), 63-78.
6. “The group of invertible elements in a Banach algebra,” *Colloquium Mathematicum* **47** (1982), 97-100.
7. “ C^* -extreme points,” (with A. Hopenwasser and R.L. Moore), *Transactions of the American Mathematical Society* **266** (1981), 291-307.
8. “A covariant version of Ext.,” *Michigan Mathematical Journal*, **29** (1982), 131-142.
9. “Completely bounded maps on C^* -algebras and invariant operator ranges,” *Proceedings of the American Mathematical Society* (1) **86**
10. “Preservation of essential matrix ranges by compact perturbations,” *Journal of Operator Theory* **8** (1982), 297-313.
11. “Every completely polynomially bounded operator is similar to a contraction,” *Journal of Functional Analysis*, **55** (1984), 1-17.
12. “Commutant representations of completely bounded maps,” (with C.Y. Suen), *Journal of Operator Theory*, **13** (1985), 87-101.
13. “Completely bounded maps and hypo-Dirichlet algebras,” (with R. Douglas) *Acta Mathematica*, **50** (1986), 143-157.
14. “Completely bounded homomorphism,” *Proceedings of the American Mathematical Society*, **92** (1984), 225-228.
15. “ K -spectral values for some finite matrices,” *Journal of Operator Theory* **18** (1987), 249-263.
16. “Multilinear maps and tensor norms on operator systems,” (with R. Smith), *Journal of Functional Analysis*, **73** (1987), 258-276.
17. “Universal compressions of representations of $H(G)$,” (with G. Bercovici and C. Hernandez-Garcia), *Mathematische Annalen*, **281** (1988), 177-191.
- *18. “Toward a theory of K -Spectral sets,” *Surveys of Some Recent Results in Operator Theory, Volume I*, Pitman Press, vol. 171, (1988), 221-240.

19. "Semi-discreteness and dilation theory for nest algebras," (with S. Power and J. Ward), *Journal of Functional Analysis*, **80** (1988), 76-87.
20. "Lifting theorems for nest algebras," (with S. Power), *J. Operator Theory*, **20** (1988), 311-317.
21. "Schur products and matrix completions," (with S. Power and R. Smith), *Journal of Functional Analysis*, **85** (1989), 151-178.
22. "Tensor products of nonselfadjoint operator algebras," (with S. Power), *Rocky Mountain Journal of Mathematics*, **20** (1990), 1-19.
23. "A note on joint hyponormality," (with S. McCullough), *Proceedings of the American Mathematical Society*, **107** (1989), 187-195.
24. "Operator Theory and Algebraic Geometry," (with R. Douglas and K. Yan), *Bulletin of the American Mathematical Society*, **20** (1989), 67-72.
25. "Three Tensor Norms for Operator Spaces,". Mappings of Operator Algebras: Proceedings of the 1988 Japan-US Joint Seminar in Honor of Professor Sakai, Birkhauser, Boston.
26. "Rigidity Theorems in Spaces of Analytic Functions," Proceedings of Symposia in Pure Mathematics Operator Theory/Operator Algebras and their Applications, eds. William B. Arveson and Ronald G. Douglas.
27. "Positive Completions of Matrices Over C^* -algebras," (with L. Rodman), *Journal of Operator Theory*, **25** (1991), 237-253.
28. "Tensor Products of Operator Spaces" (with D. Blecher), *Journal of Functional Analysis*, **99** (1991), 262-292.
29. "Representations of Function Algebras, Abstract Operator Spaces, and Banach Space Geometry," *Journal of Functional Analysis*, **109** (1992), 113-129.
30. "Explicit Construction of Universal Operator Algebras and Applications to Polynomial Factorization," (with D. Blecher), *Proceedings of the American Mathematical Society*, **109** (1992), 113-129.
31. "Analytic Reproducing Kernels and Multiplication Operators" (with G. Adams and P. McGuire), *Illinois Journal of Mathematics* **36** (1992), 404-419.
32. " K -hyponormality of Weighted Shifts" (with S. McCullough), *Proceedings of the American Mathematical Society*, **116** (1992), 165-169.
33. "Tree Algebras, Semidiscreteness, and Dilation Theory" (with K. Davidson and S.C. Power), *Proceedings of the LMS*, **(3)68** (1994), 178-202.
34. "Algebraic Reduction and Rigidity for Hilbert Modules" (with R.G. Douglas, C.H. Sah, and K. Yan), *American Journal of Mathematics*, **117** (1995), 75-92.
35. "On Centered and Weakly Centered Operators" (with C. Pearcy and S. Petrovic), *Journal of Functional Analysis*, **128** (1995), 87-101.
36. "Operator Ideals and Operator Spaces" (with D. B. Mathes), *Proceedings of the AMS*, **123** (1995), 1763-1772.

37. "Analytic Reproducing Kernels and Factorization" (with G. Adams, J. Froelich, and P. McGuire), *Indiana University Mathematics Journal*, **43** (1994), 839-856.
38. "Categories of Operator Modules-Morita Equivalence and Projective Modules" (with D. Blecher and P. Muhly), **Memoirs of the AMS**, **143**, Number 681, January 2000, 94 pages.
39. "The Maximal Operator Space of a Normed Space", *Proceedings of the Edinburgh Math. Soc.* (1996) **39**, 309-323.
40. "Resolutions of Hilbert Modules", *Rocky Mountain J. of Math.*, (1997) **27**, 271-297.
41. "Relative Yoneda Cohomology for Operator Spaces", *Journal Functional Anal.* **157** (1998), 358-393.
42. "Polynomially Bounded Operators" (with K. Davidson), *J. reine angew. Math.* **487**(1997), 153-170.
- *43. "Relative Yoneda Cohomology for Operator Spaces—An Overview", in **Operator Algebras and Applications, NATO ASI Series**, Vol. 495, Aristides Katavolos, Editor, Kluwer Academic Publishers, 1997, 389-402.
44. "Matrix-valued Interpolation and Hyperconvex Sets", *Integral Equations and operator Theory* **41**(2001), 38-62.
45. "Operator Algebras of Idempotents", *Journal of Functional Analysis* **181**(2001), 209-226.
46. "Symmetric Approximation of Frames and Bases in Hilbert Space" (with M. Frank and T. R. Tiballi), *Transactions of the AMS* **354**(2001), 777-793.
47. "A Helson-Lowdenslager-DeBranges Theorem in L^2 " (with D. Singh), *Proceedings of the AMS* **129**(2000), 1097-1103.
48. "Injective Envelopes of C^* -algebras as Operator Modules" (with M. Frank), *Pacific J. of Math.* **212**(2003), 57-69.
49. "Multipliers of Operator Spaces and the Injective Envelope" (with D. Blecher), *Pacific J. Of Math.* **200**(2001), 1-17.
50. "Characterizations of essential ideals as operator modules over C^* -algebras" (with M. Kaneda), *J. Operator Theory* **49**(2003), 245-262.
51. "On Bohr's Inequality" (with G. Popescu and D. Singh), *Proc. London Math. Soc.*, (3) **85**(2002), 493-512.
52. "Schur multipliers and operator-valued Foguel-Hankel operators" (with C. Badea), *Indiana University Math. J.* **50**(2001), 1509-1522.
53. "Diagonals in tensor products of operator algebras" (with R. Smith), *Proceedings of the Edinburgh Mathematical Society* **45**(2002), 1-6.
54. " C^* -envelopes and interpolation theory" (with S. McCullough), *Indiana University Math. J.* **51**(2002), 479-505.
55. "Diffusing with Stefan and Maxwell" (with N. Amundson and T.-W. Pan), *AIChE J.* **49**(2003), 813-830.

56. "Optimal Frames for Erasures"(with R.B. Holmes), *Lin. Alg. and Appl.* 377(2004), 31-51.
57. "Two reformulations of Kadison's similarity problem"(with D. Hadwin), *J. Operator Theory*, 55:1(2006), 3-16.
58. "On ranges of bimodule projections"(with A. Katavolos), *Canadian Mathematical Bulletin* 48(1), 2005, 97-111.
59. "Bohr's inequality for uniform algebras"(with D. Singh), *Proceedings of the AMS* 132(12), 2004, 3577-3579.
60. "Lie ideals in operator algebras"(with A. Hopenwasser), *J. Operator Theory* 52(2004), 325-340.
61. "Quasimultipliers of operator spaces"(with M. Kaneda), *Journal of Functional Analysis* 217(2004), 347-365.
62. "Extensions of Bohr's inequality"(with D. Singh), *Bull. London Math. Soc.* 38(2006), 991-999.
63. "Frames, Graphs and Erasures"(with B. Bodmann), *Linear Algebra and its Applications* 404(2005), 118-146.
64. "Modules over subalgebras of the disk algebra"(with D. Singh), *Indiana University Math. J.*, 55, No. 5(2006), 1751-1766.
- *65. "Loss-Insensitive Vector Encoding with Two-Uniform Frames"(with B. Bodmann), in *Wavelets XI, Proceedings of the SPIE*, vol. 5914, M. Papdakis, A. F. Laine, M. A. Unser (Eds.), pp. 591403-1-12, 2005.
66. "Frame Paths and Error Bounds for Sigma-Delta Quantization"(with B. Bodmann), *Applied and Computational Harmonic Analysis*, 22(2007), no. 2, 176-197.
67. "Equivariant Maps and Bimodule Projections", *Journal of Functional Analysis*, 240(2006), 495-507
- *68. "A Simple Proof of Bohr's Inequality"(with D. Singh), Conference Proceedings, to appear.
69. "Smooth Frame-Path Termination for Higher Order Sigma-Delta Quantization"(with B. Bodmann and S. Abdalbaki), *J. Fourier Anal. and Appl.*, Vol. 13, Issue 3(2007), 285-307.
70. "Interpolation and Balls in \mathbb{C}^k "(with J. Solazzo), *Journal of Operator Theory*, 60:2(2008), 379-398.
71. "Decoherence-insensitive quantum communication by optimal C^* -encoding"(with B. Bodmann and D. Kribs), *IEEE Trans. on Information Thy.*, Vol 53, Number 12, December 2007, 4738-4749.
72. "Injective and projective Hilbert C^* -modules"(with M. Frank), preprint.
73. "Projections and the Kadison-Singer Problem"(with P. Casazza, D. Edidin, and D. Kalra), *Matrices and Operators*, 1(2007), no. 3, 391-408.
- *74. "Three Approaches to the Kadison-Singer Problem", AIM ARCC Workshop on the Kadison-Singer Problem.

- *75. “State Extensions and the Kadison-Singer Problem” (with C. Akemann), American Institute of Mathematics, ARCC Workshop on the Kadison-Singer Problem,
<http://www.aimath.org/WWN/kadisonsinger/ARCC-ap.pdf>
- *76. “Paving and the Kadison-Singer Problem” (with P. Casazza and G. Weiss), American Institute of Mathematics, ARCC Workshop on the Kadison-Singer Problem,
<http://www.aimath.org/WWN/kadisonsinger/Pavingtext.pdf>
- *77. “A Survey of Completely Bounded Maps”, Banff International Research Station, Workshop on Operator Structures in Quantum Information Theory,
<http://birs.pims.math.ca/07w5119/Paulsen.pdf>
- 78. “A dynamical systems approach to the Kadison-Singer problem”, *Journal of Functional Analysis*, **255**(2008), 120-132.
- 79. “Some new equivalences of Anderson’s paving conjectures” (with M. Raghupathi), *Proceedings American Math. Soc.*, Volume 136, Number 12, December 2008, 4275–4282.
- 80. “Injectivity and projectivity in analysis and topology” (with D. Hadwin), *Sci. China Math.*, 54 (2011), no. 11, 23472359
- 81. “Stably Isomorphic Dual Operator Algebras” (with G.K. Eleftherakis), *Math Ann.*, (2008)341:99-112.
- 82. “Computing stabilized norms for quantum operations via the theory of completely bounded maps” (with N. Johnston and D. Kribs), *Quantum Information & Computation*, 9(2009), no. 1-2, 16-35.
- 83. “A Constrained Nevanlinna-Pick Interpolation Problem” (with K. Davidson, M. Raghupathi and D. Singh), *Indiana University Math. J.*, Vol. 58, No. 2(2009), 709–732.
- 84. “Vector spaces with an order unit” (with M. Tomforde), *Indiana University Math. J.*, 58(2009), no. 3, 1319-1359.
- 85. “Equiangular tight frames from complex Seidel matrices containing cube roots of unity” (with B. Bodmann and M. Tomforde), *Linear Algebra and Its Applications*, 430(2009), 396–417.
- 86. “Representations of logmodular algebras” (with M. Raghupathi), *Transactions Amer. Math. Soc.*, Vol. 263, Number 5, May 2011, 2627-2640.
- 87. “An operator algebra proof of Agler’s factorization theorem” (with S. Lata and M. Mittal), *Proceedings Amer. Math. Soc.*, 137(2009), no. 11, 3741-3748.
- 88. “Weak expectations and injective envelopes”, *Transactions of the Amer. Math. Soc.*, 363 (2011), no. 9, 47354755.
- 89. “Stable isomorphism of dual operator spaces” (with G. Eleftherakis and I. Todorov), *Journal of Functional Analysis*, 258(2010), 260-278.
- 90. “Operator System Structures on Ordered Spaces” (with I. Todorov and M. Tomforde), *Proceedings of the London Math. Soc.*, **102**(1)(2011), 25-49.

91. “Operator algebras of functions”(with M. Mittal), *Journal of Functional Analysis*, 258(2010), 3195-3225.
92. “Tensor products of operator systems”(with A. Kavruk, I. Todorov, and M. Tomforde), *Journal of Functional Analysis*, 261(2011), 267-299. doi: 10.1016/j.jfa.2011.03.014.
93. “Syndetic sets, paving and the Feichtinger conjecture”, *Proceedings of the Amer. Math. Soc.*, 139(2011), 1115-1120.
94. “Syndetic sets and amenability”, *Proceedings of the Amer. Math. Soc.*, Volume 140, Number 6, June 2012, 1997–2001.
95. “Spanning and independence properties of frame partitions”(with B. Bodmann, P. Casazza, and D. Speegle), *Proceedings of the Amer. Math. Soc.*, Volume 140, Number 7, July 2012, 2193-2207.
96. “Reproducing kernel Hilbert spaces and the Feichtinger conjecture”(with S. Lata), *Indiana Univ. Math. J.*, Vol. 60, Number 4, 2011, 1303–1318.
97. “Quotients, exactness and nuclearity in the operator system category”(with A. Kavruk, I. Todorov and M. Tomforde), *Advance in Mathematics*, Vol. 235, 1 March 2013, 321–360.
98. “An approximation theorem for nuclear operator systems”(with K.H. Han), *Journal of Functional Analysis*, Vol. 261, 2011, 999-1009.
99. “Minimal and Maximal Operator Spaces and Operator Systems in Entanglement Theory”(with D. Kribs, N. Johnston and R. Pereira), *Journal of Functional Analysis*, Vol. 260, Issue 8, 2011, 2407-2423.
100. “Operator system quotients of matrix algebras and their tensor products”(with D. Farenick), *Mathematica Scandinavica*, Vol. 111, 2012, 210–243.
101. “C*-algebras with the weak expectation property and a multivariable analogue of Ando’s theorem on the numerical radius”(with D. Farenick and A. Kavruk), *J. Operator Theory*, 70 (2013), no. 2, 573590
102. “Operator Systems from Discrete Groups”(with D. Farenick, A. Kavruk and I. Todorov), *Communications in Mathematical Physics*, 2014, DOI 10.1007/s00220-014-2037-6
103. “Complete positivity of the map from a basis to its dual basis”(with F. Shultz), *Journal of Mathematical Physics* 54 072201 (2013); <http://dx.doi.org/10.1063/1.4812329> (12 pages).
104. ”The isomorphism relation for separable C*-algebras”(with G.A. Elliott, I. Farah, C. Rosendal, A.S. Toms, and A. Tornquist), *Mathematical Research Letters*, 20 (2013), no. 6, 10711080.
105. “Characterisations of WEP”(with D. Farenick, A.S. Kavruk, and I. Todorov), *New York Journal of Mathematics*, Volume 24a (2018), 107-135 Special Volume Dedicated to W.B. Arveson.
106. ”Quantum chromatic numbers via operator systems”(with I. Todorov), *Quarterly Journal of Math.*, 66(2015), no. 2, 677-692.
107. “Estimating quantum chromatic numbers”(with S. Severini, D. Stahlke, I. Todorov, and A. Winter), *J. Functional Analysis*, Vol. 270(2016), no. 6, pp 2188-2222.

108. “Lovasz theta type norms and Operator Systems”(Carlos M. Ortiz), *Linear Alg. and Appl.*, Vol. 477, 15 July 2015, 128-147.
109. “A Spectral Characterization of AN Operators”(with Satish K. Pandey), *Journal of the Australian Math. Soc.*, 102(2017), no. 3, 369-391.
110. “Extensions of the Inequalities of Hardy and Hilbert”(with D. Singh), preprint.
111. “Synchronous correlation matrices and Connes’ embedding conjecture”(with K. Dykema), *Journal of Mathematical Physics*, 57, 015215 <http://dx.doi.org/10.1063/1.4936751>
112. “Correlation Minimizing Frames in Small Dimensions”(with G. Getzelmann and N. Leonhard), submitted.
113. “The Functional Analysis of Quantum Information”, Lectures at the Institute for Mathematical Sciences, Chennai(edited by Ved Prakash Gupta, Prabha Mandayama, V.S. Sunder), chapter.
114. “Quantum Graph Homomorphisms via Operator Systems”(with Carlos M. Ortiz), *Linear Algebra and its Applications*, Vol. 497, 15 May 2016, 23-43.
115. “Tensor Products of the Operator System Generated by the Cuntz Isometries”(with Da Zheng), *J. Operator Theory*, 76:1(2016), 67-91. doi: 10.7900/jot.2015aug04.2093
116. “The SOH operator system”(with W. Ng), *J. Operator Theory*, 76:2(2016), 285-305.
117. “Perfect Embezzlement of Entanglement”(with R. Cleve and L. Liu), *J. Math. Phys.*, **58**, 012204 (2017); <http://doi.org/10.1063/1.4974818>
118. “Unitary Correlation Sets”(with S. Harris), *Integral Equations and Operator Theory*, 89(2017), no. 1, 125–149.
119. “Complete spectral sets and numerical range”(with K.R. Davidson and H.J. Woerdeman), *Proceedings of the American Mathematical Society*, 146(2018), no. 3, 1189–1195.
120. “Algebras, synchronous games and chromatic numbers of graphs”(with J.W. Helton, K.P. Meyer, and M. Satriano), *New York J. Math* 25(2019), 328-361.
121. “Reverse Cholesky factorization and tensor products of nest algebras”(with H.J. Woerdeman), *Proceedings of the American Mathematical Society*, 146(2018), 1693–1698.
122. “A synchronous game for binary constraint systems”(with Se-Jin Kim and Christopher Schafhauser), *Journal of Mathematical Physics*, 59, 032201(2018); doi: 10.1063/1.4996867.
123. “The Delta Game”(with K. Dykema and J. Prakash), *Quantum Information and Computation*, 18 (2018), no. 7-8, 599-616.
124. “Non-closure of the set of quantum correlations via graphs”(with K. Dykema and J. Prakash), *Communications in Mathematical Physics* (2019), doi: 10.1007/s00220-019-03301-1
125. “Complexity and capacity bounds for quantum channels”(with R. Levene and I. Todorov), *IEEE Transactions on Information Theory*, Vol. 64, No. 10, October 2018, 6917–6928.
126. “Composition of PPT maps”(with M. Kennedy and N. Manor), *Quantum Information and Computation*, Vol. 18, No. 5 & 6(2018) 0472–0480.

127. “Eventually entanglement breaking maps”(with S. Jaques and M. Rahaman), *J. Math. Phys.* 59 (2018), no. 6, 062201, 11 pp.
128. “Perfect strategies for non-signalling games”(with M. Lupini, L. Mancinska, D.E. Roberson, G. Scarpa, S. Severini, I.G. Todorov, and A. Winter), submitted.
129. “Entanglement breaking rank”(with S. Pandey, J. Prakash, and M. Rahaman), submitted.
130. “Preservation of the joint essential matricial range”(with C.-K. Li and Y.-T. Poon), *Bull. London Math. Soc.* (2019), 1–9; doi:10.1112/blms.12279
131. “Schur multipliers and mixed unitary maps”(with Samuel J. Harris, Rupert H. Levene, Sarah Plosker, and Mizanur Rahaman), *Journal of Mathematical Physics* 59, 112201 (2018), 11 pp.
132. “Constant gap between conventional strategies and those based on C*-dynamics for self-embezzlement”(with Richard Cleve, Benoit Collins, Li Liu), submitted.
133. “Bigalois extensions and the graph isomorphism game” (with Michael Brannan, Alexandru Chirvasitu, Kari Eifler, Samuel Harris, Xiaoyu Su, Mateusz Wasilewski), *Comm. Math. Phys.*, to appear.
134. “Bisynchronous Games and Factorizable Maps”(with Mizanur Rahaman)

Books:

Completely Bounded Maps and Dilations, Pitman Research Notes in Mathematics Vol. 146 (1986) New York.

Hilbert Modules over Function Algebras, (with R. Douglas), Pitman Research Notes in Mathematics Series, Vol. 217 (1989), Longman Scientific & Technical, Harlow, Essex, UK.

Completely Bounded Maps and Operator Algebras, Cambridge Studies in Advanced Mathematics, vol. 78(2002), Cambridge University Press.

An Introduction to the Theory of Reproducing Kernel Hilbert Spaces(with M. Raghupathi), Cambridge Studies in Advanced Mathematics, vol. 78(2016), Cambridge University Press.