CURRICULUM VITAE

December 2023

Hugo J. Woerdeman
Professor

Academic employment:

2005– Department of Mathematics, Drexel University
Professor (December 2004 – Present)
Department Head (December 2004 – August 2014)

1989–2004 Department of Mathematics, College of William and Mary, Williamsburg, VA.
Margaret L. Hamilton Professor of Mathematics (August 2003 – December 2004)
Professor (July 2001 – December 2004)
Associate Professor (September 1995 – July 2001)
Assistant Professor (August 1989 – August 1995; on leave: '89/90)

2002-03 Department of Mathematics, K. U. Leuven, Belgium, **Visiting Professor**

Post-doctorate:

1989– 1990 University of California San Diego, Advisor: J. W. Helton.

Education:

Ph. D. degree in mathematics from Vrije Universiteit, Amsterdam, 1989.
Thesis: "Matrix and Operator Extensions". Advisor: M. A. Kaashoek. Co-advisor: I. Gohberg.

Doctoraal (equivalent of M. Sc.), Vrije Universiteit, Amsterdam, The Netherlands, 1985.
Thesis: "Resultant Operators and the Bezout Equation for Analytic Matrix Functions".
Advisor: L. Lerer

Current Research Interests:

Modern Analysis: Operator Theory, Matrix Analysis, Optimization, Signal and Image Processing, Control Theory, Quantum Information.

Editorship:

Editor-in-Chief of Operators and Matrices, 2020-present.
Associate Editor of Annals of Functional Analysis, 2016-present.
Associate Editor of Operators and Matrices, 2019-2020.
Associate Editor of Indagationes Mathematicae, 2014-2019.
Associate Editor of the SIAM Journal of Matrix Analysis and Applications, 2002-2010.
Associate Editor of the International J. for Information and Systems Sciences, 2008-2011.
Guest Editor for a Special Issue of Linear Algebra and its Applications, 2005.
Guest Editor for a Special Issue of Linear Algebra and its Applications, 2013.

Offices held in Professional Societies:

Vice President, International Workshop Operator Theory and its Applications (IWOTA) Steering Committee, 2014-present.

Past Vice President and Executive Board Member, International Linear Algebra Society (ILAS), 2022-2023.

Vice President, International Linear Algebra Society (ILAS), 2016-2022.

Chair of the Israel Gohberg ILAS-IWOTA 2020 Lecturer Selection Committee

Board Member of the International Research Center for Tensor and Matrix Theory of Shanghai University, 2017-present.

Member of the Nomination Committee, International Linear Algebra Society (ILAS), 2015.

Vice President, International Workshop Operator Theory and its Applications (IWOTA) Steering Committee, 2014-present.

Chair of the International Linear Algebra Society (ILAS) Institutional Membership Committee.

Member of the International Linear Algebra Society Nominating Committee, 2010.

Member of the Board of the International Linear Algebra Society, 2003-2006.

Member of the nomination committee for the LAA Lecturer of the International Linear Algebra Society (ILAS) Meeting in June 2001.

Awards:

2019	Outstanding STAR Mentor of the Year
2002	Margaret L. Hamilton Distinguished Chaired Professorship
1995	William and Mary Alumni Fellowship Award for Excellence in Teaching

Grants:

2020-2024	NSF Grant DMS-2000037 "Modern Aspects of Multivariable Operator Theory and Matrix Analysis."
2015-2022	Simons Foundation Collaboration Grant 355645 "The multivariable Schur class and determinantal representations."
2009-2015	NSF Grant DMS-0901628 "Decompositions for multivariable Schur-class functions, Christoffel-Darboux type formulas and related problems", jointly with CoPIs A. Grinshpan and D. S. Kalyuzhniy-Verbovetskyi.
2005–2009	NSF Grant DMS-0500678 "Collaborative Research: Multivariable Moments and Factorization and Other Problems in Analysis"
2000–2004	NSF Grant DMS-9988579 "Problems in Operator and Matrix Analysis", jointly with L. Rodman and I. M. Spitkovsky
2003–2005	Co-PI on joint Collaborative Linkage NATO Grant. PI: J. S. Geronimo
2001–2002	Faculty Research Assignment, College of William and Mary
2000	Summer research grant, College of William and Mary
1998–2000	NSF Grant DMS-9800704 "Almost Periodic and Multivariable Periodic Matrix Functions – Extensions, Factorizations and Applications", jointly with L. Rodman and I. M. Spitkovsky
1995–1998	NSF Grant DMS-9500924 "Problems in Linear Analysis", jointly with L. Rodman
1996–1997	Semester research grant, College of William and Mary
1995	Interpersonnel agreement, National Institutes of Health
1992–1995	Appeared as post-doc on NSF Grant DMS 9200899, PI: C. R. Johnson
1994	Summer research grant, College of William and Mary
1993	Summer research grant, College of William and Mary
1992	Funds for Excellence, College of William and Mary, jointly with C.K. Li.
1991–1992	NASA contract NAS1-18347, jointly with C. R. Johnson, G. T. Rublein.
1989–1990	Research Stipend, Netherlands Organization for Scientific Research (NWO).

Conference Organization:

Professional Meetings and Conferences:

Member of the International Program Committee, International Symposium on Mathematical Theory of Networks and System (MTNS 2024).

Steering Committee Liaison, International Workshop on Operator Theory and its Applications (IWOTA 2025)

Steering Committee Liaison, International Workshop on Operator Theory and its Applications (IWOTA 2023)

Steering Committee Liaison, International Workshop on Operator Theory and its Applications

(IWOTA 2022)
Member of the International Program Committee, International Symposium on Mathematical Theory of Networks and System (MTNS 2020).
Member of the International Program Committee, International Symposium on Mathematical Theory of Networks and System (MTNS 2016).
Member of the Scientific Organizing Committee, 2016 International Linear Algebra Society (ILAS) meeting, held in Leuven, Belgium, July 2016
Member of the International Program Committee, International Symposium on Mathematical Theory of Networks and System (MTNS 2014).
Member of the Organizing Committee for the 2013 International Linear Algebra Society (ILAS) meeting, held in Providence, RI, June 2013.
Co-Organizer of the 2nd International Workshop on Matrix Analysis and Applications, held in Fort Lauderdale, FL, December 2006.
Co-organizer of the Workshop on the Teaching of Linear Algebra with Keynote speakers Peter Lax and Gilbert Strang, Drexel University, March 2006.
Member of the International Program Committee of the Sixteenth International Symposium on Mathematical Theory of Networks and Systems (MTNS) held in Leuven, Belgium, in July 2004.
Member of the organizing committee of the International Conference on Matrix Analysis and Applications held in Fort Lauderdale, December 2003.
Co-chair of the 2003 SIAM Meeting on Applied Linear Algebra held in Williamsburg, July 2003 (with Roy Mathias).
Minisymposia:
Special Session co-organizer, "Matrix Analysis and Applications", Joint Mathematics Meetings, January 2023, Boston, MA.
Special Session co-organizer, "The Interplay of Matrix Analysis and Operator Theory", Joint Mathematics Meetings, April 2022, virtual.
Organizer of the minisymposium "Matrix techniques in operator theory and operator algebras" at the International Linear Algebra Society (ILAS) meeting, Rio De Janeiro, Brazil, July 2019.
Special Session co-organizer, "Recent Progress in Multivariable Operator Theory", Joint Mathematics Meetings, January 2019, Baltimore, MD.
Special Session co-organizer, "Operator Theory and Quantum Information", International Workshop on Operator Theory and its Applications, July 2018, Shanghai, China.
Co-Organizer of the minisymposium "Matrix techniques in operator algebra theory" at the International Linear Algebra Society (ILAS) meeting, Ames, IA, July 2017.
Organizer of the minisymposium "Multivariable Operator Theory" at the International Workshop on Operator Theory and its Applications (IWOTA), St. Louis, July 2016.
Co-organizer of the minisymposium dedicated to Leonia Lerer at the 2013 International Linear Algebra Society (ILAS) meeting, Providence, RI, June 2013.
Co-organizer of the minisymposium dedicated to Mihály Bakonyi at the International Workshop on Operator Theory and its Applications (IWOTA), Seville, Spain, July 2011.
Organizer of the minisymposium "Moments, Completions and Factorizations" at the International Workshop on Operator Theory and its Applications (IWOTA), Williamsburg, VA, July 2008.
Organizer of the minisymposium "Interpolation and factorization in several variables" at the Conference on Mathematical Theory for Network and Systems (MTNS), Leuven, Belgium, July 2004.
Co-organizer of minisymposium "Quantum Information" at the Conference on Mathematical Theory for Network and Systems (MTNS), Leuven, Belgium, July 2004 (with L. Gurvits).
Co-organizer of minisymposium "Recent developments on interpolation and completion problems" at the Conference on Mathematical Theory for Network and Systems (MTNS), Notre Dame, Au-

gust 2002 (with J. A. Ball).
Co-organizer of minisymposium "Matrix Extensions and Interpolation Problems' ' at the International Linear Algebra Society Meeting, Auburn University, June 2002 (with L. Rodman).
Co-organizer of minisymposium "Interplay between Operator Theory and Control" at the 1997 CDC, San Diego (with S. I. Niculescu and L. Rodman).
Co-organizer of minisymposium "Completion Problems and Applications" at the MTNS 96, St. Louis (with C. R. Johnson and F. van Schagen);

Research:

Publications:
Co-authored a monograph (518+xii pages) which was published by Princeton University Press. Co-edited four books in the Operator Theory: Adv. Appl. series. Published more than 100 international peer-reviewed articles, 5 conference proceedings articles and 3 articles in books. The articles appear in the journals *Annals of Mathematics, Memoirs of the AMS, Transactions of the AMS, J. of Functional Analysis, Physical Review A, J. of Mathematical Analysis and Applications, J. of Operator Theory, J. of Fourier Analysis and Applications, J. of Approximation Theory, Integral Equations and Operator Theory, Linear Algebra and its Applications, SIAM J. of Matrix Analysis and its Applications, Signal Processing, IEEE Transactions on Circuits and Systems I, Linear and Multilinear Algebra, Operator Theory: Advances and Applications, etc.* In addition, Ph. D. Thesis has been published as a CWI (Center for Mathematics and Computer Science) tract. The complete list of publications follows below.

Presentations:
Presentations at international conferences, including International Workshop on Operator Theory and its Applications (IWOTA), the Great Plains Operator Theory Symposium (GPOTS), South Eastern Analysis Meeting (SEAM), International Symposium on Mathematical Theory of Network and Systems (MTNS), Society of Industrial and Applied Mathematics (SIAM) meetings, International Linear Algebra Society (ILAS) meetings, Workshop on Operator Theory and Complex Analysis (WOTCA), International Symposium on Optics, Imaging and Instrumentation (SPIE), and many others. The complete list of presentations, including colloquia and seminars, follows below.

Refereeing and Reviewing:
Reviewer: NSF (incl. panel reviewer), National Academy of Sciences (incl. panel reviewer), NSERC, Israel Science Foundation, Mathematical Reviews, SIAM Books, National Research Foundation of South Africa, Der Wissenschaftsfonds (FWF Austrian Science Fund), Research Council of the Catholic University Leuven (K.U. Leuven).
Refereed for Annals of Mathematics, Proceedings of the American Mathematical Society, Journal of Mathematical Analysis and Applications, American Journal of Mathematics, Journal of Fourier Analysis and Applications, Journal of Functional Analysis, Linear Algebra and its Applications, Linear and Multilinear Algebra, Integral Equations and Operator Theory, Operator Theory: Advances and Applications, Houston Journal of Mathematics, Signal Processing, IEEE Signal Processing Letters, Houston Journal of Mathematics, IEEE Transactions on Circuits and Systems, Automatica, Inverse Problems, IEEE Transactions on Signal Processing, Indiana University Math. J., Resultate der Mathematik, Annali di Matematica Pura ed Applicata, Discrete Mathematics, J. Number Theory, Numerical Linear Algebra with Applications, Optimization, Optimization Letters, Multidimensional Systems and Signal Processing, Computers and Mathematics with Applications, International Journal of Mathematics and Mathematical Sciences, Central European Journal of Mathematics, etc.

Long term visits: Long term visits (ranging from 3 months to one year) were spent at the National Institutes of Health, Ecole Nationale Supérieure des Techniques Avancees, George Washington University, the University of New Mexico, Katholieke Universiteit Leuven (Department of Electrical Engineering), Katholieke Universiteit Leuven (Department of Mathematics), Université Catholique de Louvain, Princeton University, and the University of Waterloo.

Other Research Activities:
Spent summer 1995 at the Division of Computer Research and Technology at the National Institutes of Health on an image processing project involving 3D reconstruction of virus capsids. This project was instrumental for gaining understanding in computational issues.

Teaching:

Ph. D. students:

- David P. Kimsey defended his Ph. thesis "Matrix valued moment problems" in June 2011. He won Drexel's Outstanding Dissertation Award in Mathematical Sciences and Engineering. He was a postdoctoral fellow at the Ben-Gurion University of the Negev, Israel, and he currently holds a Lecturer position at Newcastle University, United Kingdom.
- Selcuk Koyuncu defended his Ph. D. thesis "The Inverse of Two-level Toeplitz Operator Matrix" in May 2012. He currently holds a tenure-track position at the University of North Georgia, GA.
- Lei Cao defended his Ph. D. thesis "A New Formulation and Uniqueness of Solutions to A. Horn's Problem" in June 2012. He currently holds a tenure-track position at Nova Southeastern University, FL.
- Chung Wong defended his Ph. D. thesis "Spectral Density Function and its Applications" in June 2016. He currently holds a tenure-track position at County College of Morris.
- Benjamin Grossmann defended his Ph. D. thesis "Rank in Matrix Analysis: on the Preservers of Maximally Entangled States and Fractional Minimal Rank" in June 2019. He subsequently held a post-doc position at the Vrije Universiteit Brussel, and is currently a Research Scientist at UES, Inc.
- Joshua Jackson defended his Ph. D. thesis "Minimal Realizations and Determinantal Representations in the Indefinite Setting" in June 2020. He currently holds a position at Comcast.
- Kennett Dela Rosa defended his Ph. D. thesis "Ritz Values and the Free Joint Numerical Radius" in May 2021. He currently holds a position at the University of the Philippines Diliman.
- Yaqi Zhang defended her Ph. D. thesis "Upper Bounds for PSD Propagation Time and Zero Forsing in Shadow Graphs". She currently holds a position at Peking University.
- Currently I am advising graduate student Sarah Gift, and co-advising Abdellah Islam.

Courses: I have taught a wide variety of undergraduate and graduate courses ranging from freshmen Calculus to special topics graduate courses. I receive on a consistent basis above average departmental ratings for teaching. Detailed students evaluations are available upon request. My teaching was recognized by the University wide Alumni Fellowship Award for Excellence in Teaching at the

College of William and Mary. I developed Matlab (most recently), Maple and Mathematica exercises for various courses. I taught Harvard Calculus using Texas Instruments Graphing Calculator. I initiated and pursued, together with Chi-Kwong Li, a substantial undergraduate mathematics curriculum reform at William and Mary. Under my leadership substantial curriculum reform took place at Drexel University, both at the undergraduate and the graduate level. In addition, in the fall semester of 2002 I taught a second year undergraduate Analysis course in the Department of Mathematics, K. U. Leuven, Belgium.

I acted as doctoraal (equivalent of M.Sc.) thesis advisor for J. Kos, which resulted in a joint publication. I participated three times in an NSF sponsored REU summer program at William and Mary, resulting in a joint publications with undergraduate students B. I. Wainberg, A. A. Bostian and J. W. McLean. I directed the honors thesis of undergraduate student Y. Horiguchi. I have been a committee member of several Ph. D. Thesis committee in different fields, including Mathematics, Physics, Decision Sciences, and Electrical Engineering.

At Drexel University, I have supervised and supported undergraduate students David Kimsey (summer 2006) and Dan Freeman (summer 2007) in two separate REU projects. In addition, I have advised undergraduate students Mr. Andrew Eshelman (summer 2008) and Ms. Fan Fei (summer 2010) who were supported by Drexel's STAR program, a program established to support research experiences for rising sophomores. Kimsey's project has resulted in a joint publication. In 2012 I supervised and supported a 6 month research co-op with undergraduate student Ryan Wasson, This project resulted in a joint publication. In 2013 I advised undergraduate student Faith Hutchinson. In 2019 I advised undergraduate students Jeff Winchell and Micah Quillen, who was supported by Drexel's STAR program. In 2021 I advised undergraduate students Michael Becht and Pedro Frahao, funded for a research coop by my NSF grant. In 2023 I advised undergraduate student Osamah Alhendi, funded for a research coop by my NSF grant.

Administrative Duties:
I was Department Head of the Department of Mathematics at Drexel University during the period December 2004 through August 2014. In that period we made numerous improvements to the department, including the following:

- We hired 11 Assistant Professors and 3 Associate Professors. With three retirements during the same period, the number of tenure-track/tenured faculty members almost doubled during my tenure as Department Head.

- We converted all freshman classes from lecture/recitation format to small lecture format, resulting in better student performance and increased retention. The teaching faculty (full time teaching positions) went up from 10 to 22.

- We revised the graduate program and have increased the number of Teaching Assistants from 12 to 26.

- We have revised the undergraduate curriculum, improving the core content requirements and introducing additional elective courses.

- We have had many well known mathematicians speak at Drexel (including Gilbert Strang (MIT), Peter Lax (NYU), Ingrid Daubechies (Princeton), Yakov Sinai (Princeton), George Andrews (Penn State), Richard Stanley (MIT), Douglas Arnold (U. of Minnesota), Bernd Sturmfels (Berkely), and Alan Edelman (MIT). In addition, we currently have a well advertised and colloquium series, five regularly meeting research oriented seminar series, and a graduate student seminar series (sponsored by SIAM). I have instituted and run the Analysis

Seminar from 2005 to 2009, and am still an active participant and during some terms the organizer.

- We have instituted an Annual Report, which documents the departmental achievements and is also used as a fundraising tool.

In addition to my Department Head duties I have been a committee member of a Department Head Review Committee, a Department Head Recruitment Committee, an internal Grant Proposal Review Committee, the Dinner and Discussion at Drexel Committee (a College of Arts and Sciences series of events for students and faculty), the Faculty Senate Nominations Committee, several third year review committees in other departments, and numerous candidacy and thesis committees in other departments. In addition, I served as an Alternate Senator and as a Senator in the Faculty Senate. Currently, as a regular department member, I serve each year on several departmental committees in the department, sometimes as chair.

In 2011 I was one of three external reviewers for the Department of Mathematics at Bucknell University.

At the College of William and Mary I have had a variety of duties both on Departmental Committees and on University Committees. Among others, I served several times on the two elected departmental committees: Merit Evaluation Committee and Personnel Committee. I founded the local Math Club, which has run successfully since 1990, and initiated the departmental study group which has run successfully since 1991. A full list of administrative duties at the College of William and Mary can be found at the end of this CV.

At the Vrije University, during graduate studies, I was a student representative at the Faculty Council of the Department of Mathematics and Natural Sciences, at a departmental hiring committee, and was involved with the introduction of freshmen.

Hugo J. Woerdeman's bibliography

Authored books:

1. Hugo J. Woerdeman, "Linear Algebra: What you Need to Know", 259 + xxi pages, CRC Press, 2021.

2. Hugo J. Woerdeman, "Advanced Linear Algebra", 327 + xxi pages, CRC Press, 2016.

3. Mihaly Bakonyi and Hugo J. Woerdeman, "Matrix Completions, Moments, and Sums of Hermitian Squares", 518 + xii pages, Princeton University Press, 2011.

4. Hugo J. Woerdeman, "Matrix and Operator Extensions", *CWI Tract* **68**, *Centre for Mathematics and Computer Science*, Amsterdam, The Netherlands, 1989 (158 pages). (*published Ph.D. Thesis*)

Edited books:

1. Marek Ptak, Hugo J. Woerdeman and Michał Wojtylak (Eds.), *Operator and Matrix Theory, Function Spaces, and Applications*, Operator Theory: Advances and Applications **295** (2024).

2. Richard M. Aron, Mohammad Sal Moslehian, Ilya M. Spitkovsky, Hugo J. Woerdeman (Eds.), *Operator and Norm Inequalities and Related Topics*, in: Trends in Mathematics, Birkhäuser, Springer Nature Switzerland AG, xiii+822 pages, 2022.

3. Harm Bart, Sanne ter Horst, André C. M. Ran and Hugo J. Woerdeman (Eds.), *Operator theory, analysis and the state space approach*. In honor of Rien Kaashoek. Operator Theory: Advances and Applications **271** (2018).

4. M. A. Kaashoek, L. Rodman, and H. J. Woerdeman (Eds.), *Structures Matrices and Operators, Analytic Matrix functions, and Related Topics*, Operator Theory: Advances and Applications **237** (2013).

International peer-reviewed articles:[1]

1. Sarah Gift and Hugo J. Woerdeman, Real factorization of positive semidefinite matrix polynomials, *Linear Algebra Appl.* **683** (2024), 125–150.

2. Jeffrey S. Geronimo, Hugo J. Woerdeman, Chung Wong, The autoregressive filter problem for multivariable degree one symmetric polynomials, *Acta Sci. Math. Szeged* **89** (2023), 509–532.

3. Kennett L. Dela Rosa and Hugo J. Woerdeman, Completing an Operator Matrix and the Free Joint Numerical Radius, *Complex Anal. Oper. Theory* **16**, 114 (2022).

4. Edward Poon, Ilya M. Spitkovksy and Hugo J. Woerdeman, Factorization of singular matrix polynomials and matrices with circular higher rank numerical, *SIAM J. Matrix Anal. Appl.* **43** (2022), no. 3, 1423–1439.

5. Joshua D. Jackson and Hugo J. Woerdeman, Minimal realizations and determinantal representations in the indefinite setting, *Integral Equations Operator Theory* **94** (2022), 18.

6. Edward Poon and Hugo J. Woerdeman, Isospectrality and matrices with concentric circular higher rank numerical ranges, *Linear Algebra Appl.* **631** (2021), 174-180.

7. Jeffrey S. Geronimo, Hugo J. Woerdeman, Chung Wong, Spectral density functions of bivariable stable polynomials, *Ramanujan J.* **56** (2021), 265–295.

8. Kennett L. Dela Rosa and Hugo J. Woerdeman, Continuity of submatrices and Ritz sets associated to a point in the numerical range, *Linear Algebra Appl.* **624** (2021), 1–13.

9. Stefan Sremac, Hugo J. Woerdeman, Henry Wolkowicz, Error Bounds and Singularity Degree in Semidefinite Programming, *SIAM J. Optim.* **31** (2021), 812–836.

10. Ben Grossmann and Hugo J. Woerdeman, Fractional minimal rank, *Linear and Multilinear Algebra* **69** (2021), 19–39.

11. Kennett L. Dela Rosa and Hugo J. Woerdeman, Location of Ritz values in the numerical range of normal matrices, *Linear and Multilinear Algebra* (2020), DOI: 10.1080/03081087.2020.1761280

12. Dongxiu Xie, Hugo J. Woerdeman, and An-Bao Xu, Parametrized quasi-soft thresholding operator for compressed sensing and matrix completion, *Computational and Applied Mathematics* **39** (2020), 149. DOI: 10.1007/s40314-020-01176-w

13. Benjamin W. Grossmann and Hugo J. Woerdeman, On the Preservers of Maximally Entangled States, *Linear Algebra Appl.* **583** (2019), 171–194.

[1] In mathematics journals the authors are typically listed alphabetically.

14. Miao-Jung Yvonne Ou and Hugo J. Woerdeman, On the augmented Biot-JKD equations with Pole-Residue representation of the dynamic tortuosity, *Operator Theory: Adv. Appl.* **272** (2019), 307–328.

15. Anatolii Grinshpan and Hugo J. Woerdeman, A linear algebraic proof of Hilbert's ternary quartic theorem, *American Mathematical Monthly* **126** (2019), 620–627.

16. Stefan Sremac, Henry Wolkowicz, and Hugo J. Woerdeman, Maximum determinant positive definite Toeplitz completions. *Operator Theory: Adv. Appl.* **271** (2018), 421–441.

17. Lei Cao and Hugo J. Woerdeman, Real zero polynomials and A. Horn's problem, *Linear Algebra Appl.* **552** (2018), 147–158.

18. Vern I. Paulsen, and Hugo J. Woerdeman. Reverse Cholesky factorization and tensor products of nest algebras. *Proc. Amer. Math. Soc.*, **146** (2018), 1693–1698.

19. K. R. Davidson, Vern I. Paulsen, and Hugo J. Woerdeman. Complete spectral sets and numerical range. *Proc. Amer. Math. Soc.* **146** (2018), 1189–1195.

20. A. Grinshpan, D. S. Kaliuzhnyi-Verbovetskyi, V. Vinnikov, and H. J. Woerdeman. Rational inner functions on a square-matrix polyball. in 'Harmonic analysis, partial differential equations, Banach spaces, and operator theory. Vol. 2" (Editors: M. C. Pereyra, S. Marcantognini, A. Stokolos, W. Urbina), Assoc. Women Math. Ser. 5, Springer Verlag, 2017, pp. 267–277.

21. A. Grinshpan, D. S. Kaliuzhnyi-Verbovetskyi, V. Vinnikov, and H. J. Woerdeman. Contractive determinantal representations of stable polynomials on a matrix polyball. *Math. Z.* **283** (2016), 25–37.

22. A. Grinshpan, D. S. Kaliuzhnyi-Verbovetskyi, V. Vinnikov, and H. J. Woerdeman. Matrix-valued Hermitian Positivstellensatz, lurking contractions, and contractive determinantal representations of stable polynomials. *Oper. Theory Adv. Appl.* **255** (2016), 123–136

23. A. Grinshpan, D. S. Kaliuzhnyi-Verbovetskyi, V. Vinnikov, and H. J. Woerdeman, Stable and Real Zero Polynomials in Two Variables, *Multidimens. Syst. Signal Process.* **27** (2016), no. 1, 1–26.

24. Lei Cao and Hugo J. Woerdeman, A normal variation of the Horn problem: the rank 1 case. *Ann. Funct. Anal.* **5** (2014), no. 2, 138–146.

25. David P. Kimsey and Hugo J. Woerdeman, The multivariable matrix valued K-moment problem on $\mathbb{R}^d, \mathbb{C}^d$ and $\mathbb{T}^d$, *Trans. Amer. Math. Soc.* **365** (2013), no. 10, 5393–5430.

26. Hugo J. Woerdeman, Determinantal representations of stable polynomials, *Operator Theory: Adv. Appl.* **237** (2013), 241–246.

27. Ryan Wasson and Hugo J. Woerdeman, The normal defect of some classes of matrices, *Linear Algebra Appl.* **438** (2013), 3530–3546.

28. A. Grinshpan, D. S. Kalyuzhniy-Verbovetskyi, H. J. Woerdeman, Norm-constrained determinantal representations of multivariable polynomials, *Complex Anal. Oper. Theory* **7** (2013), no. 3, 635–654.

29. Sergey Voronin and Hugo J. Woerdeman, A new iterative firm-thresholding algorithm for inverse problems with sparsity constraints, *Appl. Comput. Harmon. Anal.* **35** (2013), no. 1, 151–164.

30. Selcuk Koyuncu and Hugo J. Woerdeman, The inverse of a nonsymmetric two-level Toeplitz operator matrix, *Linear Algebra Appl.* **437** (2012), 2142–2158.

31. Leiba Rodman and Hugo J. Woerdeman, Positive completion problems over C^*-algebras, in "Mathematical methods in systems, optimization, and control", *Operator Theory: Adv. Appl.* **222** (2012), 279–293.

32. Selcuk Koyuncu and Hugo J. Woerdeman, The inverse of positive definite two-level Toeplitz operator matrices, in "A panorama of modern operator theory and related topics", *Operator Theory: Adv. Appl.* **218** (2012), 387–401.

33. Hugo J. Woerdeman, A general Christoffel-Darboux type formula, *Integral Equations Operator Theory* **67** (2010), 203–213.

34. D. S. Kalyuznyi-Verbovetsky, I. M. Spitkovsky, and H. J. Woerdeman, Matrices with normal defect one, *Operators and Matrices* **3** (2009), 401–438.

35. D. Chu, Y.S. Hung, and H. J. Woerdeman, Inertia and rank characterizations of some matrix expressions, *SIAM J. Matrix Anal.* **31** (2009), 1187-1226.

36. A. Grinshpan, D. S. Kaliuzhnyi-Verbovetskyi, V. Vinnikov, and H. J. Woerdeman, Classes of tuples of commuting contractions satisfying the multivariable von Neumann inequality, *J. Funct. Anal.* **256** (2009), 3035-3054.

37. Hugo J. Woerdeman, Estimates of inverses of multivariable Toeplitz matrices, *Operators and Matrices* **2** (2008), 507-515.

38. Hugo J. Woerdeman, The higher rank numerical range is convex, *Linear and Multilinear Algebra* **56** (2008), 65–67.

39. David P. Kimsey and Hugo J. Woerdeman, Minimal normal and commuting completions, In: Special issue 'Matrix Analysis and Applications' of the *International J. of Information & Systems Sciences* **4** (2008), 50–59.

40. Jeffrey S. Geronimo and Hugo J. Woerdeman, Two variable orthogonal polynomials on the Bi-Circle and Structured matrices, *SIAM J. Matrix Anal.* **29** (2007), 796–825.

41. Yvan Hachez and Hugo J. Woerdeman, The Fischer-Frobenius transformation and outer factorization, In: "Operator Theory, Structured Matrices and Dilation" (Eds: M. Bakonyi, A. Gheondea, M. Putinar and J. Rovnyak, Theta Series in Advanced Mathematics, Bucharest, 2007, pp. 181-203.

42. Shaun M. Fallat and Hugo J. Woerdeman, Refinements on the Interlacing of Eigenvalues of Certain Totally Nonnegative Matrices, *Operators and Matrices* **1**, (2007), 271–281

43. Hugo J. Woerdeman, A matrix and its inverse: Revisiting minimal rank completions, *Operator Theory: Advances and Applications* **179** (2007), 329–338

44. Hugo J. Woerdeman, Interlacing properties or roots of certain biorthogonal polynomials, *J. Approximation Theory* **143** (2006), 150–158.

45. Jeffrey S. Geronimo and Hugo J. Woerdeman, Two Variable Polynomials: Intersecting Zeros and Stability, *IEEE Transactions on CAS I* **53** (2006), no. 5, 1130–1139.

46. Jeffrey S. Geronimo and Hugo J. Woerdeman, The Operator Valued Autoregressive Filter Problem and the Suboptimal Nehari Problem in Two Variables, *Integral Equations and Operator Theory* **53** (2005), no. 3, 343–361.

47. Chi-Kwong Li and Hugo J. Woerdeman, A lower bound on the C-numerical radius of nilpotent matrices appearing in coherent spectroscopy, *SIAM J. Matrix Anal. Appl.* **27** (2005), 793–800.

48. Yvan Hachez and Hugo J. Woerdeman, Approximating Sums of Squares with a Single Square, *Linear Algebra Appl.* **339** (2005) 187–201.

49. Michael Dritschel and Hugo J. Woerdeman, Outer factorizations in one and several variables, *Trans. Amer. Math. Soc.*, **357** (2005) 4661–4679.

50. Jeffrey S. Geronimo and Hugo J. Woerdeman, Positive Extensions, Fejér-Riesz Factorization and Autoregressive Filters in Two Variables, *Annals of Mathematics* **160** (2004), no. 3, 839–906.

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56. Hugo J. Woerdeman, The Carathéodory-Toeplitz Problem With Partial Data, to appear in *Linear Algebra Appl.* **342** (2002), 149–161.

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International Conference Proceedings/Announcement Articles:

1. Kennett L. Dela Rosa and Hugo J. Woerdeman, Completing an Operator Matrix and the Free Joint Numerical Radius, *Proceedings of the 25th International Symposium on Mathematical Theory of Networks and Systems*, 2022, Bayreuth, Germany, to appear. (Refereed Extended Abstract)

2. Chen Greif, Panayiotis J. Psarrakos, and Hugo J. Woerdeman, Preface to the 18th ILAS Conference Proceedings, Providence, 2013, Linear Algebra and its Applications 468 (2015), 1–2.

3. Hugo J. Woerdeman, The autoregressive filter problem for two variables, and related problems, in: Mathematisches Forschungsinstitut Oberwolfach Report No. 17/2014 Real Algebraic Geometry With A View Toward Systems Control and Free Positivity Organized by Didier Henrion, Salma Kuhlmann, Victor Vinnikov. DOI: 10.4171/OWR/2014/17

4. A. Grinshpan, D. S. Kaliuzhnyi-Verbovetskyi, and H. J. Woerdeman. The Schwarz Lemma and the Schur-Agler Class. *Proceedings of the 21st International Symposium on Mathematical Theory of Networks and Systems*, 2014, Groningen, The Netherlands, pp. 1834-1836. ISBN: 978-90-367-6321-9 (Refereed Extended Abstract)

5. V. Ionescu, S. I. Niculescu and Hugo J. Woerdeman, On $\mathcal{L}_2$ Memoryless Control of Time-Delay Systems, *Proc. of the 36th Conference on Decision and Control (CDC)* (1997), San Diego, California, pp 4414–4419.

6. A. Aldroubi and Hugo J. Woerdeman, Extrapolation in Multiresolutions, in "Mathematical Imaging: Wavelet Applications in Signal and Image Processing", (A.F. Laine and M. A. Unser, Eds.), *Proceedings SPIE* **2303** 1994, 120–128.

Contributions to books:

1. I. Gohberg, M.A. Kaashoek and Hugo J. Woerdeman, Entry "Partially specified matrices, completion of" in *Encyclopedia of Mathematics* (Editor: M. Hazewinkel), Kluwer Academic Publ., 1997.

2. I. Gohberg, M.A. Kaashoek and Hugo J. Woerdeman, Time Variant Extension Problems of Nehari Type and the Band Method, in "H_∞-Control Theory", (Eds. C. Foias, et al.), *Lecture Notes in Mathematics* **1496** 1991, pp. 309–323.

3. I. Gohberg, M.A. Kaashoek and Hugo J. Woerdeman, The Band Method for Extension Problems and Maximum Entropy, in "Signal Processing; Part I" (Eds. L. Auslander, T. Kailath, S. Mitter), *The IMA Volumes in Mathematics and its Applications* **22** Springer Verlag, New York, 1990, pp. 75–94.

Presentations:

Invited principal talks at conferences:

1. International Workshop Operator Theory and its Applications (IWOTA), Kraków, Poland, September 2022.

2. Workshop on Distance Geometry, Semidefinite Programming and Applications, The Fields Institute, May 2021

3. Operator Theory with its Applications (OTWIA), online conference, August 2020.

4. International Workshop Operator Theory and its Applications (IWOTA), St. Louis, July 2016.

5. International Workshop Operator Theory and its Applications (IWOTA), Amsterdam, July 2014.

6. Fourth International Conference on Matrix Analysis and Applications, Konya, Turkey, July 2013.

7. Structured Linear Algebra Problems: Analysis Algorithms and Applications, Cortona, Italy, September 15-19, 2008.

8. Characteristic Functions and Transfer Functions in Operator Theory and System Theory, Conference in honor of Moshe Livsic and Paul Fuhrmann, Beersheva, July 2007. (Invited one hour presentation supported by the Visiting Fellowship Program at the Faculty of Natural Sciences of Ben-Gurion University of the Negev.)

9. International Linear Algebra Society Meeting, Amsterdam, July 2006

10. International Workshop on Operator Theory and its Applications, Storrs, CT, July 2005.

11. Sixteenth International Symposium on Mathematical Theory of Networks and Systems, Leuven, Belgium, July 2004.

12. Sixth SIAM Conference on Applied Linear Algebra, Raleigh, October 2000.

13. International Workshop on Operator Theory and its Applications, Groningen, July 1998.

14. International Workshop Operator Theory and Analysis, Amsterdam, November 1997.

15. Haifa Matrix Theory Conference, Haifa, May 1995.

16. International Linear Algebra Meeting, Rotterdam, August 1994.

17. Inaugural Conference of the International Linear Algebra Society, Provo, August 1989.

Other invited talks at conferences:

1. International Workshop Operator Theory and its Applications (IWOTA), Helsinki, Finland, August 2023.

2. 2023 SIAM Conference on Applied Algebraic Geometry, Eindhoven, The Netherlands, July, 2023.

3. BIRS-JP Workshop: Differential-Algebraic Equations and Operator Pencils, Banff, Canada, April 2023.

4. Mathematical Theory of Networks and Systems, Bayreuth, Germany, September 2022.

5. 2022 International Linear Algebra Society Meeting (ILAS 2022), Galway, Ireland, June 2022.

6. 2021 Joint Meetings of the American Mathematical Society and the Mathematical Association of America, online conference, January 2021.
7. Operator Theory and Matrix Analysis (OTMA), online conference, November 2020.
8. 2020 Joint Meetings of the American Mathematical Society and the Mathematical Association of America, Denver, January 2020.
9. 2019 AMS Sectional Meeting at the University of Florida in Gainesville, November 2019.
10. 2019 International Linear Algebra Society Meeting (ILAS 2019), Rio de Janeiro, July 2019.
11. International Workshop on Matrices and Operators (MOA), Shanghai, July 2018.
12. 2018 February Fourier Talks (FFT2018) at the Norbert Wiener Center for Harmonic Analysis and Applications, University of Maryland, College Park, February 2018.
13. 2017 International Linear Algebra Society (ILAS) meeting, Ames, IA, July 2017.
14. 5th International Conference on Matrix Analysis and Applications (ICMAA), Nova Southeastern University, Ft Lauderdale, Florida, USA, December 18-20, 2015.
15. SIAM Conference on Applied Linear Algebra, Atlanta, October 2015.
16. The International Symposium on the Mathematical Theory of Networks and Systems (MTNS), Groningen, July 2014
17. Workshop on Real Algebraic Geometry With A View Toward Systems Control and Free Positivity, Oberwolfach, April 2014
18. 2014 Joint Mathematics Meetings, Baltimore, January 2014
19. International Linear Algebra Society Meeting, Providence, June 2013 (two presentations)
20. 2013 Joint Mathematics Meetings, San Diego, January 2013
21. Workshop on Structured Numerical Linear and Multilinear Algebra Problems: Analysis, Algorithms, and Applications, Leuven, Belgium, September 2012.
22. International Congress for Industrial and Applied Mathematics (ICIAM), Vancouver, July 2011.
23. International Workshop on Operator Theory and its Applications, Sevilla, Spain, July 2010 (two invited minisymposium presentations).
24. Workshop on Control, Optimization, and Functional Analysis: Synergies and Perspectives, San Diego, October 2010.
25. Workshop on Multivariate Operator Theory, Fields Institute, Toronto, August 2009.
26. International Workshop on Operator Theory and its Applications, Williamsburg, July 2008 (two invited minisymposium presentations).
27. Workshop on Theory and Algorithms of Linear Matrix Inequalities, Palo Alto, CA, August 2005.

28. Virginia Operator Theory and Complex Analysis Meeting, Richmond, VA, February 2004.
29. International Conference on Matrix Analysis and Applications, Fort Lauderdale, December 2003.
30. Workshop on J-spectral factorization, Groningen, November 2002.
31. Mathematical Theory of Network and Systems, South Bend, August 2002.
32. SIAM Conference on Linear Algebra in Signals, Systems, and Control, Boston, August 2001.
33. Workshop on Operator Theory, San Diego, July 2001.
34. SIAM Control Conference, San Diego, July 2001.
35. Joint Mathematics Meetings, Washington, DC, January 2000.
36. SIAM Annual Meeting, Atlanta, May 1999.
37. AMS Sectional Meeting, Gainesville, March 1999.
38. AMS Sectional Meeting, Winston-Salem, October 1998.
39. Workshop on Operator Theory and Complex Analysis, Bloomington, July 1996.
40. Mathematical Theory of Network and Systems, St. Louis, July 1996.
41. AMS Regional Meeting, Richmond, November 1994.
42. Operator Theory Days, Amsterdam, August 1994.
43. AMS Annual Meeting, Cincinnati, January 1994.
44. SIAM Meeting on Linear Algebra, Signals, Systems and Control, Seattle, August 1993.
45. Workshop on Operator Theory and Boundary Value Problems, Vienna, July 1993.
46. AMS Regional Meeting, Washington D.C., April 1993.
47. The Southern California Linear Algebra Meeting, San Diego, November 1992.
48. Fourth SIAM Conference on Optimization, Chicago, May 1992.
49. Fourth SIAM Conference on Applied Linear Algebra, Minneapolis, September 1991.
50. A One Day Operator and Matrix Theory Symposium, Amsterdam, July 1991.
51. The International Symposium on the Mathematical Theory of Networks and Systems (MTNS), Kobe, June 1991.
52. Workshop on Operator Theory and Complex Analysis (WOTCA), Sapporo, June 1991.
53. Matrix Theory Mini-Conference, Hong Kong, June 1991.
54. Second SIAM Conference on Linear Algebra, Signals, Systems, and Control, San Francisco, November 1990.

55. Southern California Conference on Linear Algebra, La Jolla, November 1989.
56. Workshop on Matrix and Operator Theory, Rotterdam, July 1989.
57. International Symposium on the Mathematical Theory of Network and Systems (MTNS), Amsterdam, July 1989.
58. Conference on Operator Theory: Advances and Applications, Calgary, August 1988.
59. Summer School on Signal Processing, Minneapolis, July 1988.
60. International Symposium on the Mathematical Theory of Network and Systems (MTNS), Phoenix, July 1987.
61. Conference on Operator Theory and Functional Analysis, Tempe, July 1987.
62. Workshop Linear Analysis and Operators, Groningen, June 1987.

Contributed talks:

1. 2017 Northeastern Analysis Meeting, University at Albany, SUNY, October 13-15, 2017.
2. Canadian Operator Symposium (COSy) 2015, June 15–19, University of Waterloo in Waterloo, Ontario, Canada.
3. SIAM Annual Meeting, Pittsburgh, PA, July 2010
4. Integrable Systems, Random Matrices, and Applications (ISRMA) (Conference in honor of Percy Deift's 60th birthday), New York, NY, May 2006
5. Householder meeting, Seven Springs, PA May 2005
6. International Linear Algebra Society Meeting, Barcelona, July 1999.
7. South Eastern Analysis Meeting, Richmond, March 1996.
8. 1995 SIAM Annual Meeting, Charlotte, NC, October 1995.
9. International Symposium on Optics, Imaging and Instrumentation, San Diego, July 1994.
10. Third International Linear Algebra Conference, Pensacola, March 1993.
11. The Second Meeting of the Linear Algebra Society, Lisbon, August 1992.
12. 1992 Great Plains Operator Theory Symposium (GPOTS), Iowa City, May 1992.
13. Canadian Operator Symposium 1991, Montreal, May 1991.
14. 1991 Great Plains Operator Theory Symposium (GPOTS), College Station, May 1991.
15. WABASH Extramural Modern Analysis Miniconference, Indianapolis, April 1991.
16. Seventh Annual South Eastern Analysis Meeting (SEAM VII), Charlotte, April 1991.
17. Directions in Matrix Theory, Auburn, March 1990.
18. International Conference on Linear Algebra and Applications, Valencia, September 1987.

Colloquia and seminar talks:

1. North-West University, Potchefstroom, South Africa, Colloquium, November 2023
2. Online Seminar Linear Algebra and Operator Theory (Oselot), online, November 2022
3. University of Nevada, Reno, Colloquium, April 2021
4. Online Seminar Linear Algebra and Operator Theory (Oselot), online, January 2021
5. Drexel University, Colloquium, December 2020.
6. University of Delaware, Inverse Problem and Analysis Seminar, February 2019.
7. University of Delaware, Inverse Problem and Analysis Seminar, May 2017.
8. University of Waterloo, Optimization Seminar, January 2017.
9. University of Guelph, Quantum Information and Geometric Statistics (QuIGS) Seminar, January 2017.
10. University of Waterloo, Quantum Information and Computation Theory Seminar, Institute for Quantum Computing, December 2016.
11. University of Waterloo, Analysis Seminar, September 2016.
12. Shanghai University, Seminar, August 2015.
13. Chongqing University, Seminar, August 2015.
14. Inaugural Lecture in the Lecture Series Dedicated to the memory of Mihály Bakonyi, Georgia State University, September 2012
15. Temple University, Colloquium, May 2011
16. Drexel University (Dean's seminar), June 2006
17. University of Newcastle (colloquium), February 2003
18. Université Catholique de Louvain, Louvain-la-Neuve (seminar), December 2002.
19. Nova University, Fort Lauderdale (seminar), June 2002.
20. Universidad Carlos III de Madrid, Leganes (seminar), May 2002.
21. Università di Cagliari, Cagliari (seminar), March 2002.
22. Université Catholique de Louvain, Louvain-la-Neuve (seminar), February 2002.
23. Katholieke Universiteit Leuven, Leuven, Belgium (colloquium in the Mathematics Department), November 2001.
24. Katholieke Universiteit Leuven, Leuven, Belgium (colloquium in the Electrical Engineering Department), October 2001.
25. University of Virginia, Charlottesville, VA (seminar), April 2001.

26. Virginia Tech, Blacksburg, VA (colloquium), November 2000.
27. University of New Mexico, Albuquerque, NM (colloquium), August 2000.
28. Hampton University, Hampton, VA (seminar), December 1998.
29. Georgia Tech, Atlanta, GA (colloquium), January 1998.
30. Universite Paris-Sud, Orsay (seminar), October 1996.
31. Ecole National Supérieure de Techniques Avancees, Paris (seminar), September 1996.
32. AT&T, Murray Hill, NJ (seminar), July 1994.
33. Naval Research Laboratory, Washington DC (colloquium), November 1993.
34. University of Maryland, College Park (seminar), October 1993.
35. George Washington University, Washington D.C. (colloquium), September 1993.
36. Brigham Young University, Provo (colloquium), November 1992.
37. University of Maryland, College Park (seminar), October 1992.
38. University of Maryland, College Park (seminar), March 1990.
39. Virginia Tech., Blacksburg (seminar), March 1990.
40. San Diego State University, San Diego (colloquium), February 1990.
41. Rijks Universiteit Utrecht, The Netherlands (colloquium), May 1989.
42. University of California San Diego (seminar), July 1987.