

## WILLIAM T. ROSS

### Contact

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### Personal

- Born: 1964 in New York City
- Raised in Bronx, NY and Yonkers, NY
- Attended Yonkers public and parochial schools
- Attended Stepinac High School, White Plains, NY

### Education

- Ph.D. (Mathematics) University of Virginia, 1991
- M.S. (Mathematics) University of Virginia, 1988
- B.S. (Mathematics) Fordham University ( $\Phi\beta\kappa$ ), 1986

### Professional Positions

- 2010 - present: Roger Francis and Mary Saunders Richardson Chair in Mathematics, University of Richmond
- 2012 - 2018: Chair, Department of Mathematics and Computer Science, University of Richmond
- 2005 - present: Professor of Mathematics, University of Richmond
- 1998 - 2005: Associate Professor of Mathematics, University of Richmond
- 1992 - 1998: Assistant Professor of Mathematics, University of Richmond
- 1991 - 1992: Visiting Assistant Professor of Mathematics, Lafayette College

### Books

- (with S. R. Garcia and J. Mashreghi) *Finite Blaschke products and their connections*, Monographs in Mathematics, Springer-Verlag, 2018.
- (with S. R. Garcia and J. Mashreghi) *Introduction to model spaces and their operators*, Advanced Studies in Mathematics, Cambridge University Press, 2016.
- (with A. Aleman and N. Feldman) *The Hardy space of a slit domain*, Frontiers in Mathematics, Birkhauser, 2009.
- (with J. A. Cima and A. Matheson) *The Cauchy transform*, Surveys and Monographs, Vol. 125, American Mathematical Society, 2006.

- (with H. S. Shapiro) *Generalized analytic continuation*, University Lecture Series, Vol. 25, American Mathematical Society, 2002.
- (with J. A. Cima) *The backward shift on the Hardy space*, Surveys and Monographs, Vol. 79, American Mathematical Society, 2000.

### Edited Volumes

- (with C. Bénéteau, A. Condori, C. Liaw, A. Sola). Some open problems in complex and harmonic analysis: report on problem session held during the conference Completeness Problems, Carleson Measures, and Spaces of Analytic Functions. Recent progress on operator theory and approximation in spaces of analytic functions, 207 - 217, *Contemp. Math.*, **679**, Amer. Math. Soc., Providence, RI, 2016.
- (with E. Fricain and J. Mashreghi) Invariant subspaces of the shift operator. Proceedings of the CRM Workshop held at the Université de Montréal, Montréal, QC, August 26-30, 2013. Edited by Javad Mashreghi, Emmanuel Fricain and William Ross. *Contemporary Mathematics*, **638**. Centre de Recherches Mathématiques Proceedings. American Mathematical Society, Providence, RI; Centre de Recherches Mathématiques, Montréal, QC, 2015. viii+317

### Research papers

- (with R. Cheng and J. Mashreghi) Inner functions and zero sets for  $\ell_A^p$ , to appear, *Transactions of the American Mathematical Society*.
- (with R. Cheng and J. Mashreghi) Optimal weak parallelogram constants for  $L^p$  spaces, to appear, *Mathematical Inequalities and Applications*.
- (with E. Fricain and A. Hartmann) Multipliers between range spaces of co-analytic Toeplitz operators, to appear, *Acta Scientiarum Mathematicarum*.
- (with I. Chalendar, P. Gorkin, J. Partington) Clark measures and a theorem of Ritt, *Mathematica Scandinavica*, **122** (2018), 277 – 298.
- (with T. Ferguson) The range and valence of a real Smirnov function, *Analysis and Mathematical Physics*, (2018), doi.org/10.1007/s13324-018-0212-1
- (with E. Fricain and A. Hartmann) Range spaces of co-analytic Toeplitz operators, *Canadian Journal of Mathematics*, (2018), doi.org/10.4153/CJM-2017-057-4
- (with E. Fricain and A. Hartmann) Multipliers between model spaces, *Studia Mathematica*, **24** (2018), no. 2, 177 - 191.
- (with S. Garcia and J. Mashreghi) Finite Blaschke products: A survey, *Proceedings of the conference on Harmonic Analysis, Function Theory, Operator Theory and Applications*, Bordeaux, June 1-6, 2015: Theta Foundation International Book Series of Mathematical Texts Volume: 22; 2018.
- (with E. Fricain and A. Hartmann), ‘A survey on reverse Carleson measures, *Proceedings of the conference on Harmonic Analysis, Function Theory, Operator Theory and Applications*, Bordeaux, June 1-6, 2015: Theta Foundation International Book Series of Mathematical Texts Volume: 22; 2018
- (with S. Garcia) Approaching Cauchy's theorem, *PRIMUS*, **27** (2017), 758–765.
- (with R. Cheng and J. Mashreghi) Multipliers of sequence spaces, *Concrete Operators*, **4** (2017), 76 - 108.

- (with R. Cheng and J. Mashreghi) Birkhoff-James orthogonality and the zeros of an analytic function, *Computational Methods and Function Theory*, **17** (2017), no. 3, 499-523.
- (with C. Bénéteau, A. Condori, C. Liaw, A. Sola), Some open problems in complex and harmonic analysis: report on the problem session held at the conference Completeness Problems, Carleson measures, and spaces of analytic functions, *Contemporary Mathematics*, **679** (2016), 207 - 217.
- (with S. Garcia and J. Mashreghi), Real complex functions, *Contemporary Mathematics*, **679** (2016), 91 - 128. (with S. Garcia and R. T. W. Martin), 'Partial orders on partial isometries, *Journal of Operator Theory*, **75** (2016), 409 - 442.
- (with E. Fricain and A. Hartmann), Concrete examples of  $\mathcal{H}_b$  spaces, *Computational Methods and Function Theory*, **16** (2016), 287 - 306.
- (with R. Cheng) An inner-outer factorization in  $\ell^p$  with applications to ARMA processes, *Journal of Mathematical Analysis and Applications*, **437** (2016), 396 - 418.
- (with I. Chalendar, S. R. Garcia, and D. Timotin), An extremal problem for characteristic functions, *Transactions of the American Mathematical Society*, **368** (2016), 4115 - 4135.
- (with A. Blandigneres, E. Fricain, A. Blandigneres, F. Gaunard, and A. Hartmann), Direct and reverse Carleson embeddings for  $\mathcal{H}_b$  spaces, *Indiana University Mathematics Journal* **64** (2015), 1027 - 1057.
- (with R. Cheng), Weak parallelogram laws in Banach spaces and applications to prediction theory, *Periodica Mathematica Hungaria*, **71** (2015), 45 - 58.
- (with S. Garcia), Model spaces: a survey, *Contemporary Mathematics*, **638** (2015), 197 - 245.
- (with A. Hartmann), Bad boundary behavior in star invariant subspaces I, *Arkiv for Matematik*, **52** (2014), 113 - 134.
- (with S. Garcia and W. Wogen),  $C^*$ -algebras generated by truncated Toeplitz operators, *Concrete operators, spectral theory, operators in harmonic analysis and approximation*, 181 - 192, *Oper. Theory Adv. Appl.*, **236**, Birkhäuser/Springer, Basel, 2014.
- (with A. Blandigneres, E. Fricain, F. Gaunard, and A. Hartmann), Reverse Carleson embeddings for model spaces, *Journal of the London Mathematical Society*, **88** (2013), 437 - 464.
- (with A. Aleman and R. T. W. Martin), On Livsic's theorem, *Journal of Functional Analysis*, **264** (2013), 999 - 1048.
- (with A. Hartmann), Truncated Toeplitz operators and boundary values in nearly invariant subspaces, *Complex Analysis and Operator Theory*, **7** (2013), 261 - 273.
- (with S. Garcia), Recent progress in truncated Toeplitz operators, Blaschke products and their applications, *Fields Institute Communications*, **65** (2013), 275 - 319.
- (with A. Hartmann), Bad boundary behavior in star invariant subspaces II, *Annales Academiæ Scientiarum Fennicæ Mathematica*, **37** (2012), 467 - 478.
- (with A. Hartmann), Boundary values in range spaces of co-analytic truncated Toeplitz operators, *Publicacions Matemàtiques*, **56** (2012), 191 - 223.
- (with S. Garcia and D. Poore), Unitary equivalence to a truncated Toeplitz operator: analytic symbols, *Proceedings of the American Mathematical Society*, **140** (2012), 1281 - 1295.

- (with F. Ross), The Jordan curve theorem is non-trivial, *Journal of Mathematics and the Arts*, **5** (4) (2011), 213 - 219.
- (with S. Garcia and W. Wogen), Spatial isomorphisms of algebras of truncated Toeplitz operators, *Indiana University Mathematics Journal*, **59** (2010), 1971 - 2000.
- (with J. Cima, S. Garcia, and W. Wogen), Truncated Toeplitz operators: spatial isomorphism, unitary equivalence, and similarity, *Indiana University Mathematics Journal*, **59**, 2010, 595 - 620.
- (with S. Garcia), The norm of a truncated Toeplitz operator, *CRM Proceedings and Monographs*, **51**, 2010, 59 - 64.
- (with W. Wogen), Common cyclic vectors for unitary operators, *Journal of Operator Theory*, **62** (2009), 65 - 81.
- (with S. Garcia), A non-linear extremal problem on the Hardy space, *Computational Methods and Function Theory*, **9** (2009), 485 - 524.
- (with J. Cima and W. Wogen), Truncated Toeplitz operators on finite dimensional spaces, *Operators and Matrices*, **3** (2008), 357 - 369.
- Indestructible Blaschke products, *Contemporary Mathematics*, **454** (2008), 119-133.
- (with A. Matheson), An observation about Frostman shifts, *Computational Methods and Function Theory*, **7** (2007), 111 - 126.
- The classical Dirichlet space, *Contemporary Mathematics*, **393** (2006), 171 - 197.
- The backward shift on  $H^p$ , *Operator Theory, Advances and Applications*, **158** (2005), 191 - 211.
- (with J. A. Cima and A. Matheson), The Cauchy transform, *Operator Theory: Advances and Applications*, **156** (2005), 79 - 111.
- (with S. Richter and C. Sundberg) Zeros of functions with finite Dirichlet integral, *Proceedings of the American Mathematical Society*, **132** (2004), 2361 - 2365.
- (with W. R. Wogen), Common cyclic vectors for normal operators, *Indiana University Mathematics Journal*, **53** (2004), 1537 - 1550.
- (with J. A. Cima and A. Matheson) The backward shift on the space of Cauchy transforms, *Proceedings of the American Mathematical Society*, **132** (2004), 745 - 754.
- (with H. S. Shapiro) Prolongations and cyclic vectors, *Computational Methods and Function Theory*, **3** (2003), 453 - 483.
- (with A. Aleman and S. Richter) Pseudo-continuations and the backward shift, *Indiana University Mathematics Journal*, **47** (1998), 223 - 276.
- (with A. Aleman) The backward shift on weighted Bergman spaces, *Michigan Mathematics Journal*, **43** (1996), 291 - 319.
- (with A. Aleman and S. Richter) Bergman spaces on disconnected domains, *Canadian Journal of Mathematics*, **48** (1996), 225 - 243.
- Invariant subspaces of the harmonic Dirichlet space with large codimension, *Proceedings of the American Mathematical Society*, **124** (1996), 1841 - 1846.
- Invariant subspaces of Bergman spaces on slit domains, *Bulletin of the London Mathematical Society*, **26** (1994), 472 - 482.
- Analytic Besov spaces and invariant subspaces of Bergman spaces, *Indiana University Mathematics Journal*, **43** (1994), 1297 - 1319.
- An invariant subspace problem for  $p = 1$  Bergman spaces on slit domains, *Integral Equations and Operator Theory*, **20** (1994), 243 - 248.

- (with S. Richter and C. Sundberg) Hyperinvariant subspaces of the harmonic Dirichlet space, *Journal für die reine und angewandte Mathematik*, **448** (1994), 1 - 26.
- (with J. A. Ball) Weak-star limits of polynomials and their derivatives, *Contributions to Operator Theory and its Applications*, (I. Gohberg et al eds.), *Operator Theory: Advances and Applications*, **62**, Birkhauser-Verlag, Basel, 1993, 165 - 176.
- The commutant of a certain compression, *Proceedings of the American Mathematical Society*, **118** (1993), 831 - 837.
- Analytic continuation in Bergman spaces and the compression of certain Toeplitz operators, *Indiana University Mathematics Journal*, **40** (1991), 1363 - 1386.

### Book reviews

- *Creating symmetry: the artful mathematics of wallpaper patterns* (by F. Farris), Princeton University Press, review in *Journal of Mathematics and the Arts*, **12** (2018), 1 - 4.
- *A comprehensive course in Analysis* (by B. Simon), American Mathematical Society, review to appear in *Notices of the AMS*.

### Editor positions

- Editor-in-chief: *Concrete Operators*

### International Presentations

- Aristotle University (Thessaloniki)
- Centre de Recherches Mathématiques (Montreal)
- Centre International de Rencontres Mathématiques (Marseille)
- El Escorial (Spain)
- Erwin Schrodinger Institute (Vienna)
- FernUniversität in Hagen (Germany)
- Gargnano (Italy)
- Instituto Superior Tecnico (Lisbon)
- Jagiellonian University (Krakow)
- Laval University (Quebec City)
- Lund University (Sweden)
- Mathematisches Forschungsinstitut Oberwolfach (Germany)
- Mittag-Leffler Institute (Stockholm)
- Norwegian University of Science and Technology
- Peoples Friendship University (Moscow)
- Polish Academy of Sciences (Krakow)
- Trinity College (Dublin)
- University of Bordeaux (France)
- University of Helsinki
- University of Lens (France)
- University of Lille (France)
- University of Lyon (France)
- University of Minho (Portugal)
- University of Montréal

- University of Southern Denmark
- University of Toronto
- West University of Timisoara (Romania)

### **Domestic presentations**

- Bucknell University
- Christopher Newport University
- Clemson University
- College of William and Mary
- East Carolina University
- Fordham University
- Furman University
- George Mason University
- George Washington University
- Georgia Tech
- Kansas State University
- Memphis State University
- Mount Holyoke College
- Naval Academy
- Old Dominion University
- Pomona College
- SUNY Albany
- University of Alabama
- UC-Santa Barbara
- University of Delaware
- University of Florida
- University of Georgia
- University of New Hampshire
- University of North Carolina
- University of South Alabama
- University of South Florida
- University of Tennessee
- University of Virginia
- Vanderbilt University
- Virginia Tech
- Washington and Lee
- Washington University, St. Louis

### **Conferences and sessions organized**

- Special Session on Operators, function spaces, and models (with A. Condori), at the American Mathematical Society meeting in Atlanta, January 2017.
- Special Session on Operators, function spaces, and models (with A. Condori), at the American Mathematical Society meeting in Seattle, January 2016

- Completeness problems, Carleson measures and spaces of analytic functions (with C Beneteau, A. Condiri, C. Liaw, A. Sola), Mittag-Leffler Institute, Stockholm, Sweden, June 2015.
- Special Session on Invariant Subspaces of Function Spaces (with C. Beneteau, A. Condiri, and C. Liaw), University of Tennessee, Knoxville, TN, March 2014.
- CRM conference on Model Spaces (with E. Fricain and J. Mashreghi), Montreal, Canada, August 2013.
- Special Session (with S. Kouchejian) in Complex Analysis and Operator Theory, at the American Mathematical Society meeting at the University of South Florida, Fall 2011
- Special Session (with S. Richter) in Operator Theory, at the American Mathematical Society meeting in Richmond, Virginia, Fall 2010.
- Special session (with J. B. Conway and S. Kouchejian) in Function theoretic operator theory, at the American Mathematical Society meeting in Washington DC, Jan. 2009.
- Southeastern Analysis Meeting: University of Richmond, March 2007.
- Special session (with R. Mortini and E. Albrecht) in Function spaces and their operators, at a joint meeting of the American, German, and Austrian mathematical societies, Mainz, Germany, June 2005.
- Special Session (with Nathan Feldman) in Linear operators on function spaces, at an American Mathematical Society meeting at the University of North Carolina, Chapel Hill, October 2003.
- VOTCAM (Virginia Operator Theory and Complex Analysis Meeting): A regularly running (since 1992) conference held at various Virginia universities for mathematicians and graduate students interested in operator theory/complex analysis. Supported by NSF (2001–2007).
- Southeastern Analysis Meeting: University of Richmond, March 1996.
- Special Session (with Paul Bourdon) in Operators on Banach spaces of analytic functions, at an American Mathematical Society meeting at the University of Richmond, November 1994.

### **Courses taught**

- First Year Seminar
- Calculus I
- Calculus II
- Multivariable Calculus
- Advanced Topics in Multivariable Calculus
- Linear Algebra
- Fundamentals of Abstract Mathematics
- Abstract Algebra
- Real Analysis
- Complex Analysis
- Special Topics
  - Operator Theory
  - Probability
  - Wavelets
  - Harmonic Analysis

- Linear Algebra
- Complex Analysis

### Teaching recognition

- 2005 - Nominated for SCHEV Teaching Award
- 2004 - Nominated for the Outstanding Mentor Award
- 2001 - Nominated for the SCHEV Teaching Award
- 1998 - Distinguished Educator Award, University of Richmond
- 1993 - Nominated by the University of Richmond to Project Kaleidoscope
- 1991 - Award for excellence in teaching mathematics (University of Virginia)

### Honors thesis students

- Jocelyn Xue (2014) - *Algebras of Toeplitz matrices*
- Jeff Zheng (2011) - *Rank-one perturbations of self-adjoint operators*
- Tim Ferguson (2006) - *Boundary values of Laplace transforms*
- Radek Stefanski (2004) - *Factorization of polynomials in several variables*
- Ron Walker (1998) - *Two problems in harmonic function theory*
- Andrew Pitts (1998) - *The Dirichlet problem and its physical applications*
- Michael Nimchek (1996) - *Banach spaces of analytic functions*
- Konstantin Kulev (1996) - *Ideals of the Lipschitz classes*

### Professional service

- Reviewer for *Mathematical Reviews* (over 160 reviews written)
- Panel reviewer for the National Science Foundation
- Editor In Chief (since May 2018) *Concrete Operators*
- Referee for
  - *Annales Academiae Scientiarum Fennicae Mathematica*
  - *Annals of Functional Analysis*
  - *Analysis Mathematica*
  - *Arkiv der Mathematik*
  - *Asian Journal of Mathematics*
  - *Australian Journal of Mathematics*
  - *Banach Journal of Mathematics*
  - *Bulletin of the Korean Mathematical Society*
  - *Bulletin of the London Mathematical Society*
  - *Collectanea Mathematica*
  - *Complex Analysis and Operator Theory*
  - *Complex Analysis and its Synergies*
  - *Computational Methods and Function Theory*
  - *Concrete Operators*
  - *Contemporary Mathematics*
  - *Czechoslovak Mathematics Journal*
  - *Extracta Mathematica*
  - *Houston Journal of Mathematics*

- Integral Equations and Operator Theory
- Journal of Approximation Theory
- Journal of Contemporary Mathematical Analysis
- Journal of Functional Analysis
- Journal of the London Mathematical Society
- Journal of Mathematical Analysis and Applications
- Journal of Mathematics and the Arts
- Journal of Operator Theory
- Mathematische Annalen
- Mathematical Proceedings of the Cambridge Mathematical Society
- Mediterranean Journal of Mathematics
- Memoirs of the American Mathematical Society
- Operators and Matrices
- Proceedings of the American Mathematical Society
- Questiones Mathematicae
- Rocky Mountain Journal of Mathematics
- Taiwanese Journal of Mathematics
- Transactions of the American Mathematical Society
- Vietnam Journal of Mathematics

### **University Service**

- Department Chair
- Mathematics Coordinator
- Hiring Committee Chair
- Nominating Committee
- Undergraduate Student Symposium Coordinator
- University Faculty Council
- Faculty Senate of Virginia
- University Scholars
- Colloquium Chair
- Calculus text review committee
- Goldwater Scholarship representative
- Phi-Beta-Kappa selection committee
- Distinguished Educator Award selection committee
- First-year and major advising
- Library Committee