

# Curriculum Vitae

John Edward McCarthy

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Saint Louis, Missouri 63130-4899

March 29, 2007

## Professional Information

- *Academic Positions Held:*

Washington University, Professor, 1999-present

Washington University, Associate Professor, 1994-1999

Washington University, Assistant Professor, 1991-1994

Indiana University, Visiting Assistant Professor, 1989-1991

U.C. San Diego, Visiting Professor, 1996

Mathematical Sciences Research Institute, Member, 1995-1996

- *Education:*

Ph.D. in Mathematics, University of California, Berkeley, 1989

M.Sc. in Mathematics, Dublin University, 1987

B.A., Mod. in Mathematical Sciences, First Class Honours, Dublin University, 1983

## Books

3. *Transition to Higher Mathematics: Structure and Proof*, with Bob Dumas, McGraw-Hill, 2006.
2. *Pick Interpolation and Hilbert Function Spaces*, with Jim Agler, American Mathematical Society Graduate Studies in Mathematics, Providence, 2002.
1. *Holomorphic Spaces*, ed. S. Axler, J.E. McCarthy, D. Sarason. Cambridge University Press, 1998.

## Papers

44. *Properties of an Entropy-based Signal Receiver with an Application to Ultrasonic Molecular Imaging* (with M.S. Hughes, J.N. Marsh, J.M. Arbeit, R.G. Neumann, R.W. Fuhrhop, K.D. Wallace, D.R. Znidarsic, B.N. Maurizi, S.L. Baldwin, G.M. Lanza, and S.A. Wickline) (to appear in Journal of the American Acoustical Society)
43. *Toral algebraic sets and function theory on polydisks* (with Jim Alger and Mark Stankus) Journal of Geometric Analysis Vol. 16, No. 4 [2006] 551-562
42. *Parametrizing Distinguished Varieties* (with Jim Agler) Proceedings of the Conference on Recent Advances in Operator-Related Function Theory, Edited by: A. Matheson, M. Stessin, and R. Timoney [2006] 29-34
41. *Distinguished Varieties* (with Jim Agler) Acta Mathematica Vol. 194 [2005] 133-153
40. *Geometric Characterizations of Centroids of Simplices* (with Steven G. Krantz and Harold Parks) Journal of Mathematical Analysis and Applications Vol. 316 No. 1 [2006] 87-109
39. *Enhanced Cosmetic Outcome with Running Horizontal Mattress Sutures* (with Brent Moody, George Hruza and Jennifer Linder) Dermatologic Surgery Vol. 31 No. 10 [2005] 1313-1316
38. *Positivity aspects of the Fantappiè transform* (with Mihai Putinar) Journal d'Analyse Vol. 97 [2005] 57-82
37. *Hilbert spaces of Dirichlet series and their Multipliers* Transactions of the American Mathematical Society, Vol. 356 No. 3 [2004] 881-893
36. *Collagen Remodeling after 585-nm pulsed dye laser irradiation: an ultrasonographic analysis* (with Brent Moody and George Hruza) Dermatologic Surgery, Vol. 29 [2003] 997-1000
35. *Norm preserving extensions of holomorphic functions from subvarieties of the bidisk* (with Jim Agler) Annals of Mathematics, Vol. 157 No.1 [2003] 289-312
34. *Pick's Theorem - What's the big deal?* American Mathematical Monthly, Vol. 110 No.1 [2002] 36-45
33. *Interpolating sequences on the bidisk* (with Jim Agler) International Journal of Mathematics, Vol. 12 No. 9 [2001] 1103-1114
32. *The apical angle: A mathematical analysis of the ellipse* (with Brent Moody and Rebecca Sengelmann) Dermatologic Surgery, Vol. 27 [2001] 61-63
31. *The three point Pick problem on the bidisk* (with Jim Agler) New York Journal of Mathematics, Vol. 6 [2000] 227-236
30. *Complete Nevanlinna-Pick kernels* (with Jim Agler), Journal of Functional Analysis, Vol. 175 No. 1 [2000] 111-124
29. *Best approximation in the mean by analytic and harmonic functions* (with Dmitry Khavinson and Harold Shapiro) Indiana University Mathematics Journal, Vol. 49 [2000] 1481-1513

28. *Nevanlinna-Pick Kernels and Localization* (with Jim Agler) in Operator Theoretical Methods, Proceedings of 17th International Conference on Operator Theory at Timisoara, 1998, published by Theta Foundation, Bucharest, 2000, ed. A. Gheondea, R.N. Gologan and D. Timotin, 1-20
27. *A note on  $H_2$  optimal control problems with passivity constraints* (with Clas Jacobson), IEEE Transactions on Automatic Control, Vol. 45 No. 2 [2000] 286-290
26. *How to give a good colloquium* Canadian Mathematical Society Notes, Vol. 31 No. 5 [1999] 3-4. Reprinted and distributed by the American Mathematical Society.
25. *Equilibrium of Highly Asymmetric Non-neutral Plasmas* (with Joel Fajans and Elena Backhaus) Physics of Plasmas, Vol. 6 [1999] 6-12
24. *Nevanlinna-Pick Interpolation on the Bidisk* (with Jim Agler), Journal für die reine und angewandte Mathematik, Vol. 506, [1999] 191-204
23. *Solving Poisson's Equation with Interior Conditions* (with Elena Backhaus and Joel Fajans) Journal of Mathematical Physics, Vol. 39 [1998] 6720-6729
22. *Operators that dominate normal operators* (with Jim Agler), Journal of Operator Theory, Vol. 40, [1998] 385-407
21. *Reflexivity of isometries* (with Wing-Suet Li), Studia Mathematica, Vol. 124, No. 2, [1997] 101-105
20. *Subnormal operators and quadrature domains* (with Liming Yang), Advances in Mathematics, Vol. 127, No. 1, [1997] 52-72
19. *On Pisier's construction*, MSRI Preprint No. 1996-017
18. *Boundary values and Cowen-Douglas curvature* Journal of Functional Analysis, Vol. 137, No. 1, [1996] 1-18
17. *Cyclic subnormal operators with finite rank self-commutators* (with Liming Yang), Proceedings of the Royal Irish Academy, Vol. 95A, No. 2 [1995] 173-177
16. *The range of Toeplitz operators on the ball* (with Boris Korenblum), Revista Matemática Iberoamericana, Vol. 12, No. 1 [1996] 47-61
15. *Growth of the Bergman kernel on planar regions* (with Liming Yang), Illinois Journal of Mathematics, Vol. 40, No. 1 [1996] 141-150
14. *Bounded point evaluations on the boundary of  $L$  regions* (with Liming Yang), Indiana University Mathematics Journal Vol. 43, No. 3 [1994] 857-883
13. *Coefficient estimates in weighted Bergman spaces*, Duke Mathematical Journal Vol. 76, No. 3, [1994] 751-760
12. *Non-attainable boundary values for  $H^\infty$  functions* (with Boris Korenblum), Extracta Mathematicae Vol. 8, No. 2 [1993] 138-141
11. *Composition preserves rigidity* (with Ben Lotto), Bulletin of the London Mathematical Society Vol. 25 No. 117 [1993] 573-576

10. *Reflexivity of subnormal operators*, Pacific Journal of Mathematics Vol. 161 No. 2 [1993] 359-370
9. *Geometric interpolation between Hilbert spaces*, Arkiv för Matematik Vol. 30 No. 2 [1992] 321-330
8. *Interpolation between weighted Hardy spaces*, (with Michael Cwikel and Thomas Wolff), Proceedings of the American Mathematical Society Vol. 116 No. 2 [1992] 381-388
7. *Topologies on the Smirnov class*, Journal of Functional Analysis Vol. 104 No. 1 [1992] 229-241
6. *Weighted Bergman spaces*, in Function Spaces, (K. Jarosz, ed.), Marcel Dekker, 1992, 301-306
5. *Multipliers of de Branges spaces* (with Mark Davis), Michigan Mathematical Journal Vol. 38 No. 2 [1991] 225-240
4. *Continuity of semi-norms* (with Henry Helson), in Functional Analysis and Operator Theory, (B.S. Yadav and D. Singh, eds.), Springer LNM 1511, 1992, 88-90
3. *Common range of co-analytic Toeplitz operators*, Journal of the American Mathematical Society Vol. 3 No. 4 [1990] 793-799
2. *Quasisisimilarity of rationally cyclic subnormal operators*, Journal of Operator Theory 24 [1990] 105-116
1. *Analytic structures for subnormal operators*, Integral Equations and Operator Theory Vol. 13 No. 2 [1990] 251-270

### Professional Activities:

1. Member of American Mathematical Society Council, 2003-2006.
2. Member of American Mathematical Society Committee on Publications, 2003-2006.
3. Associate Editor, *Journal of Mathematical Analysis and Applications*, 2002-2004.
4. Co-chair of organizing committee for program on “Holomorphic Spaces” at the Mathematical Sciences Research Institute, Berkeley, Fall 1995.
5. Organizer of workshop on Holomorphic Spaces at MSRI, October 16-20 1995.
6. Organizer of a Special Session on “Holomorphic Spaces” at the 1993 Winter AMS Meeting in San Antonio.
7. Organizer of a Special Session on “Hilbert Spaces of Analytic Functions” at the March 1991 Sectional AMS Meeting in South Bend. 1987-1988
8. Reviewer: Math Reviews, Zentralblatt.

9. Referee: Acta Math. Hung., Amer. Math. Monthly, Annals of Math., Illinois J. Math, Indian J. of Math., Indiana Math. J., J. Amer. Math. Soc., J. Austral. Math Soc., J. Func. Analysis, J. London Math. Soc., J. Math. Anal. Appl., J. Math. Physics, J. Operator Thy., Math. Control Signals and Systems, Math. Scand., Mem. Amer. Math. Soc., Mich. Math. J., Monat. Math., New York J. of Math., Pac. Math. J., Phys. Rev. Letters, Proc. Amer. Math. Soc., Proc. London Math. Soc., Rev. Mat. Iberoamericana, Rocky Mountain Math. J., Trans. Amer. Math. Soc., Conference Proceedings.
10. Referee: National Science Foundation, National Research Council of Canada, Israel Science Foundation. Served as Panelist for the National Science Foundation for both “Operator Theory and Operator Algebras” and “Real, Complex and Harmonic Analysis”.
11. Member: American Mathematical Society (Life Member), Mathematical Association of America, Irish Mathematical Society.

## Awards and Honors

- Recognition of Excellence in Mentoring, Graduate Student Senate of Washington University, 2004
- Elected Member of the Council of the American Mathematical Society, 2003-2006
- There was a Featured Review of the paper “Subnormal operators and quadrature domains”, written with L. Yang, in Math. Reviews, September 1998
- Member, Mathematical Sciences Research Institute, 1995-1996
- Distinguished Visiting Professor, Bucknell University, 1995

## Grants

- National Science Foundation Grant DMS 0501079, *Operator Theory and Complex Geometry*, 2005-2010.
- Department of Education Grant for Graduate Assistance in Areas of National Need, P200A030039, 2003-2006.
- National Science Foundation “High Impact” Grant DMS 0070639, with Creativity Extension DMS 0322255, *Interpolation and Related Topics*, 2000-2005.
- Department of Education Grant for Graduate Assistance in Areas of National Need, P200A000617, 2000-2003.
- National Science Foundation Group Infrastructure Grant DMS 9631359, 1996-1999 (joint P.I.).
- National Science Foundation Grant DMS 9531967, *Subnormal Operators*, 1996-2000.
- National Science Foundation Grant DMS 9301508, *Holomorphic Spaces*, 1993-1996.
- National Science Foundation Grant DMS 9102965, *Toeplitz Operators and Hilbert Spaces of Analytic Functions*, 1991-1993.

## Teaching

- *Ph.D. Dissertations Supervised:*

John Stapel: Ph.D. 1994.

Michael Jury: Ph.D. 2002.

Saida Sultanic: Ph.D. 2005.

Prasad Vegulla: Ph.D. 2007.

Gregory Knese: Ph.D. 2007.

Brian Maurizi: In progress.

- *Member of Ph.D. Dissertation Committee*

Maciej Paluszynski: Ph.D. 1992; Jianwen Wang: Ph.D. 1995; Judy Munshower: Ph.D. 1997; Dylan Retsek: Ph.D. 2001; Van Maurice Savage: Ph.D. 2001 (Physics); Lynn Apfel : Ph.D. 2003; Seth Howell : Ph.D. 2004; Leonid Kovalev : Ph.D. 2005; David Opela : Ph.D. 2006; Wang-Q Lim : Ph.D. 2006; Paul Koester: Ph.D. 2007; Junhua Chen: Ph.D. 2007 (Physics); Jeff Blanchard : Ph.D. 2007; Bo Zhao: Ph.D. 2007; Lina Lee : Ph.D. 2007.

- *Courses Taught at Washington University, 1991-2007*

Survey of Calculus II (122)

Calculus I (131) (3 times)

Calculus II (132) (4 times)

Freshman Seminar: How Mathematicians think (201) (2 times)

Calculus III (233) (2 times)

Differential Equations (217) (3 times)

Foundations for Higher Mathematics (310) (2 times)

Foundations for Higher Mathematics : Writing Intensive version (310W)

Elementary Probability and Statistics (320)

Mathematical Biology (350)

Partial Differential Equations (415)

Topology and Analysis I (417)

Topology and Analysis II (418)

Financial Derivatives and Differential Equations (450)

Complex Analysis I (5021) (2 times)

Complex Analysis II (5022) (2 times)

Measure Theory and Functional Analysis I (5051) (2 times)

Measure Theory and Functional Analysis II (5052) (3 times)

Hilbert Spaces I (517)

Hilbert Spaces II (518)

Dirichlet Series (521)

Nevanlinna-Pick Interpolation (527)  
Teaching Seminar (597)  
Banach spaces of analytic functions (Seminar)

- *Courses Taught at U.C. San Diego*

1996: Calculus IV (20D)

- *Courses Taught at Indiana University*

1990-91: Calculus III (311); Business Calculus II (120); Finite Mathematics (118)

1989-90: Calculus I (215) (2 sections); Calculus II (216)

- *Outreach Activities*

2006: Talk to Pew Scholars on "Careers in Mathematics"

2006: Lecture to Missouri Scholars' Academy

2005: Science on Tap "Chaos"

2005: Century Club Lecture "How Mathematics saves lives"

2005: Talks to Washington University Alumni Chapters (Los Angeles and San Diego).

2002: Talk at Eureka High School on "Calculus in the Medical Field"

## Committee Work

- *University*

Arts and Sciences Academic Planning Committee, 2005-2009.

Philosophy Department Search Committee, 2005-06.

Internal Review Committee for Performing Arts, 2005-06.

Secretary of the Faculty Senate and Faculty Senate Council, 2003-2006.

Faculty Representative to Washington University Board of Trustees, 2003-2006.

Task Force on Graduate Education, 2004-2006.

Faculty Council of Arts and Sciences, 1999-2002 (Secretary, Fall 2000; Chair, 2001-02).

Subcommittee on Student Concerns of the Internal Review Committee of the Division of  
Biology and Biomedical Sciences 2002.

- *Mathematics Department*

Chair of Graduate Committee, 1996-2005 (except 2003), Fall 2006.

Graduate Committee, Member 2005-07.

Executive Committee, 1999-2000, 2001-02, 2002-03, 2005-06, 2006-07.

Undergraduate Committee, 1993-95.

Library Committee, 1994-95.

## Invited Long Addresses

1. Plenary Speaker, Southeastern Analysis Meeting, Nashville, March 2008.
2. Colloquium, University of North Carolina, September 2007.
3. Conference on Extremal Problems in Complex and Real Analysis, Moscow, May 2007.
4. Colloquium, University of Tennessee, February 2007.
5. Barcelona Analysis Conference, (Satellite Conference to International Congress of Mathematicians), Barcelona, September 2006.
6. Colloquium, University College Cork, June 2006.
7. Plenary Speaker (2 lectures), North British Functional Analysis Seminar, Newcastle, April 2006.
8. Keynote Speaker in Session “Function Spaces and their Operators”, joint meeting of the American, German and Austrian Mathematical Societies, Mainz, June 2005.
9. 50 minute talk in Session “Complex and Functional analysis”, AMS national meeting, Atlanta, January 2005.
10. Plenary Speaker, Wabash Modern Analysis Conference, Indianapolis, September 2004.
11. Plenary Speaker, Conference on Function Theory, Dublin, August 2004.
12. Plenary Speaker, International Workshop on Operator Theory and Applications, Newcastle, July 2004.
13. Complex Analysis Seminar, University of Washington, Seattle, May 2004.
14. Colloquium, Georgia Institute of Technology, Atlanta, April 2004.
15. Analysis Seminar, University of California at Santa Barbara, March 2004.
16. Several Complex Variables Seminar, University of Illinois at Urbana, November 2003.
17. Colloquium, University of Arkansas, November 2003.
18. Keynote speaker (5 lectures) Young Analysts Meeting of the SouthEast, Greenville, July 2003.
19. Conference on Quadrature Domains and their Applications, Santa Barbara, March 2003.
20. Keynote speaker, Operator and Function Theory Conference, Berkeley, January 2003.
21. Thai-American Meeting on advanced catalyst characterization and modeling, Saint Louis, October 2002.
22. Colloquium, Virginia Polytechnic Institute, March 2002.
23. Institute for International Research, Chicago, July 2001.

24. South-Eastern Analysis Meeting, University of Georgia, March 2001 (plenary speaker: 2 talks).
25. Analysis Seminar, U.C. Berkeley, October 2000.
26. Analysis Seminar, Fudan University, Shanghai, October 2000.
27. Operator function theory and Semigroups Conference, Ambleside, September 2000.
28. Analysis Seminar, University of Newcastle, August 2000.
29. International Workshop on Operator Theory and Applications, Bordeaux, June 2000.
30. Young Analysts Meeting of the SouthEast, Greenville, July 1999.
31. Analysis Seminar, University of Illinois at Urbana, April 1999.
32. Colloquium, Brown University, March 1999.
33. 17<sup>th</sup> International Conference on Operator Theory, Timisoara, Romania, June 1998.
34. Conference on Function Spaces, Edwardsville, May 1998.
35. Colloquium, University of Arkansas, April 1998.
36. Colloquium, University of Hawaii, April 1997.
37. Analysis Seminar, University of Calgary, April 1997.
38. Analysis Seminar, U.C. Berkeley, March 1997.
39. 16<sup>th</sup> International Conference on Operator Theory, Timisoara, Romania, July 1996.
40. Analysis Seminar, U.C.L.A., May 1996.
41. Colloquium for M.S.R.I. Sponsors' Meeting, March 1996.
42. Analysis Seminar, U.C. Berkeley, January 1996.
43. MSRI-Evans Monday Colloquium, U.C. Berkeley, October 1995.
44. Functional Analysis Colloquium, U.C. Berkeley, September 1995.
45. Mathematics Colloquium, Vassar College, May 1995.
46. North-Eastern Operator Theory Seminar, Vassar College, April 1995.
47. Mathematics Colloquium, University of California at Riverside, April 1995.
48. Mathematics Colloquium, Bucknell University, April 1995.
49. Analysis Seminar, Bucknell University, April 1995.
50. Mathematics Colloquium, University of California at San Diego, January 1995.
51. South-Eastern Analysis Meeting, Virginia Polytechnic Institute and State University, March 1994.

52. Mathematics Colloquium, University of Hawaii, November 1993.
53. Mathematics Colloquium, Georgia Institute of Technology, October 1993.
54. Functional Analysis Seminar, Georgia Institute of Technology, October 1993.
55. Mathematics Colloquium, San Diego State University, July 1993.
56. Mathematics Colloquium, University of the Western Cape, South Africa, May 1993.
57. Analysis Seminar, University of California at San Diego, March 1993.
58. Mathematics Colloquium, University of Arkansas, October 1991.
59. Seminar as Visiting Consultant, University of North Carolina at Chapel Hill, June 1991.
60. Wabash Extramural Modern Analysis Seminar, February 1991.
61. Mathematics Colloquium, Washington University, February 1991.
62. Mathematics Colloquium, IUPUI, November 1990.
63. Mathematics Colloquium, Wright State University, November 1990.
64. Mathematics Colloquium, IUPUI, November 1989.
65. Analysis Seminar, Purdue University, September 1989.

## Other Lectures

1. First Joint Meeting between the AMS and the Real Sociedad Matematica Española, Seville, June 2003.
2. International Workshop on Operator Theory and Applications, Blacksburg, August 2002.
3. Special Session on “Holomorphic Spaces”, AMS sectional meeting, San Francisco, October 2000.
4. Special Session on “Operator Theory, Systems Theory and Interpolation in Several Complex Variables,” AMS annual meeting, Washington D.C., January 2000.
5. Special Session on “Banach spaces of holomorphic functions and operators on these spaces”, AMS annual meeting, San Antonio, January 1999.
6. Special Session on “Operator Algebras and Applications”, AMS annual meeting, San Antonio, January 1999.
7. Special Session on “Operator Theory and Holomorphic Spaces”, AMS meeting, Wake Forest, October 1998.
8. Special Session on “Operator Theory and Function Spaces”, AMS meeting, Milwaukee, October 1997.
9. Conference on  $C^*$ -algebras and their invariants, Cork, Ireland, July 1995.

10. Conference on Function Spaces, Interpolation Spaces and Related Topics, Haifa, Israel, June 1995.
11. South-eastern Analysis Meeting, Atlanta, March 1995.
12. Special Session on “Holomorphic Spaces”, AMS annual meeting, San Francisco, January 1995.
13. AMS Summer Research Conference on Bergman Spaces, South Hadley, July 1994.
14. Wabash Modern Analysis Mini-Conference, Bloomington, October 1993.
15. Conference on Harmonic Analysis in honor of Guido Weiss, Madrid, May 1993.
16. International Conference on Abstract Analysis, Kruger Park, South Africa, April 1993.
17. Special Session on “Operator theory and Triangular operator algebras”, AMS annual meeting, San Antonio, January 1993.
18. Wabash Modern Analysis Mini-Conference, Indianapolis, September 1992.
19. Great Plains Operator Theory Seminar, Iowa City, May 1992.
20. Special Session on “Harmonic analysis”, AMS meeting, Tuscaloosa, March 1992.
21. Special Session on “Hilbert spaces of analytic functions”, AMS meeting, South Bend, March 1991.